White Rose Carbon Capture and Storage (CCS) Project

Document Ref: 6.4.5
PINS Ref: EN10048

The White Rose CCS (Generating Station) Order

Land within and adjacent to the Drax Power Station site, Drax, near Selby, North Yorkshire

ES Volume 3 Section L - Habitats Regulations Assessment Report

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure)

Applicant: Capture Power Limited
Date: November 2014

Document Owner: Peter Wright

Revision History

Revision No.	Date	Reason for Revision	Authorised By
01	21.08.2014	Internal review	LH
02	28.08.2014	Revised following client review – Draft issue for PINs	LH
03	03.10.2014	Revised following comments from Planning Inspectorate and Natural England and revised air quality modelling	LH
04	05.10.2014	Client draft	KJM
05	10.11.2014	Issue Draft	KJM
06	19.11.2014	Revised Issue	KJM

Glossary

AA	Appropriate Assessment
ASU	Air Separation Unit
CCS	Carbon Capture and Storage
CPL	Capture Power Ltd
DCO	Development Consent Order
EA	Environment Agency
EAL	Environmental Assessment Limit
EC	European Commission
EIA	Environmental Impact assessment
GPU	Gas Processing Unit
HGV	Heavy Goods Vehicle
HF	Hydrogen Fluoride
HRA	Habitats Regulations Assessment
IROPI	Imperative Reasons of Overriding Public Interest
IPC	Infrastructure Planning Commission
ODPM	Office of the Deputy Prime Minister
PEIR	Preliminary Environmental Information Report
MWe	Megawatt electrical
NE	Natural England
NGCL	National Grid Carbon Ltd
NSIP	National Significant Infrastructure Project
SAC	Special Area of Conservation
SPA	Special Protection Area
SNH	Scottish Natural Heritage
SoS	Secretary of State

CONTENTS

1	*INTRODUCTION*	*1*
1.1	*PROJECT DESCRIPTION*	*1*
2	*METHODOLOGY*	*5*
2.1	*OVERVIEW OF HRA PROCESS*	*5*
2.2	*CONSULTATION*	*12*
3	*EUROPEAN SITES WHICH COULD BE AFFECTED*	*13*
4	*ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS*	*25*
4.1	*EFFECTS CONSIDERED IN ASSESSMENT*	*25*
4.2	*SUMMARY OF EIA ASSESSMENT OF POTENTIAL EFFECTS*	*25*
4.3	*ASSESSMENT OF DISTURBANCE OF MOBILE QUALIFYING FEATURES OF THE RIVER DERWENT*	*27*
4.4	*ASSESSMENT OF EFFECTS FROM EMISSIONS TO AIR*	*27*
4.5	*IN COMBINATION ASSESSMENT*	*68*
4.6	*STAGE 1: SCREENING MATRICES*	*93*

ANNEX A CONSULTATION

1 INTRODUCTION

Environmental Resources Management Ltd (ERM) has been commissioned by Capture Power Limited (CPL) to undertake a Habitats Regulations Assessment (HRA) to support a Development Consent Order (DCO) for the White Rose Carbon Capture and Storage (CCS) Project (the Project) on land adjoining Drax Power Station in Selby, North Yorkshire.

1.1 PROJECT DESCRIPTION

1.1.1 Background to the White Rose CCS Project

CPL plans to construct and operate a new 448 MWe (1) gross power station with the capacity to provide electricity to 630,000 households whilst capturing two million tonnes of CO_2 per year arising from the combustion process. The Project will support the development of a CO_2 transport pipeline (a separate project developed by National Grid Carbon Ltd (NGCL)) which is believed will also be used by other industries and power stations in the Yorkshire and Humber area to transport their CO_2 emissions for permanent storage in the North Sea in geological features.

The application site (henceforth the 'Project site') is located on land adjoining the existing Drax Power Station. CO_2 captured will not be stored on site as the Project will link to a CO_2 transport and storage solution as noted above.

The Project is in line with Government strategies (for instance the CCS Roadmap (2)) for controlling the construction / operation of new electrical generation infrastructure whilst meeting carbon reduction targets for the energy sector in the UK. The Project is also a key part of the UK's development / commercialisation of CCS, which the Government is supporting through over £1billion of capital and research and development funding.

1.1.2 Application for an Order Granting Development Consent

As the electrical output of the Project will exceed 50 MWe it is classed as a Nationally Significant Infrastructure Project (NSIP) and therefore a DCO is required under the Planning Act 2008 as amended.

(1) MWe – Megawatt (electrical) – a megawatt is equal to one million watts
(2) Department of Energy and Climate Change, Supporting the Deployment of Carbon Capture and Storage in the U, April 2012

Consent for a NSIP may only be granted by a DCO through an application under Section 37 of the Planning Act 2008. Section 37 of the Planning Act 2008 as amended also governs the content of an application for a DCO, including the requirements for the necessary supporting documentation. These requirements are specified in the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 ('APFP Regulations').

Where a project has the potential, either alone or in combination with other plans or projects, to result in likely significant effects on one or more European sites, it is subject to the requirements of The Conservation of Habitats and Species Regulations (2010) (*the Habitats Regulations*).

If an NSIP is likely to affect a European site and/or a European marine site, a report must be provided with the application showing the site(s) that may be affected together with sufficient information to enable the competent authority to make an appropriate assessment (AA), if required. This report is referred to as a Habitat Regulations Assessment (HRA).

For this Project, the competent authority is the Secretary of State. The Project does not overlap into devolved assemblies or other European member states.

1.1.3 The Project

The Project has been developed to demonstrate Oxy-fuel CCS technology installed on a modern, state-of-the-art, ultra-supercritical coal fired power plant with the ability to co-fire up to 15 % biomass. It includes the following main components:

- Oxy-fuel boiler, steam turbine generator and other power block components;
- two Air Separation Units (ASU) which separate oxygen and nitrogen from air, considerably reducing the content of nitrogen entering the boiler, and in turn resulting in a CO_2 rich flue gas (the Oxy-fuel process) which can then be processed and captured;
- a flue gas cleaning system within the plant to reduce atmospheric pollutants arising from combustion; and
- a Gas Processing Unit (GPU) to process and compress the flue gas to achieve the required transport and storage CO_2 specifications and pressure.

The Project will also include the following:

- ancillary plant, equipment and buildings;
- internal roads plus car and heavy goods vehicle (HGV) parking;
- security fencing;
- site raising to levels agreed with the Environment Agency (EA) to provide flood protection to essential site infrastructure;
- landscaping within the site boundary;
- connection to the electricity grid infrastructure;
- connection terminal points within the site boundary for the CO_2 pipeline;
- inter-connections with the existing Drax Power Station for water, fuel transport, and other ancillary fuels / materials;
- connection between the Project and the existing Barlow Mound for disposal of pulverised fuel ash from the operational Project for long term storage;
- surface water management systems and foul drainage provision;
- lighting; and
- use of an existing Jetty adjacent to the River Ouse, east of the main Drax site and creation of a temporary terrestrial uploading area. These works are limited to:
    - the clearance of approximately one hectare of land adjacent to the jetty will have the top soil stripped and be temporarily stored and the ground will consolidated with limestone to serve as a temporary construction laydown area. This land will be reinstated after the construction phase; and
    - the use of the existing jetty structure without any intrusive in-river works during construction. The jetty will not be used during operation.

1.1.4 Programme

The total construction period will be approximately 56 months, followed by around six months of commissioning. Construction workings hours will be 0700 to 1900 Monday to Friday and 0700 to 1300 on Saturdays. No work will take place on Sunday or bank holidays (other than in exceptional circumstances). The workings hours do not apply to construction works which do not exceed a noise limit of 50dB at the DCO Order limits (and are covered by a prior agreement of Selby District Council), or for the delivery or removal of materials, plant, machinery and abnormal indivisible loads and finally to emergency situations..

Part of the site may be raised as part of a separate planning application under the *Town and Country Planning Act 1990* with works due to commence in mid-2015 and be completed within 9-12 months.

Works subject to the DCO is expected to start in April 2016 and the programme for the core phases is detailed in *Table 1.1*. During construction the level of workers required on-site will vary considerably from around 200 at the start to 3,300 at the peak of construction.

Table 1.1 Key Project Phases

Activity	Start Date	End Date
Site preparation	04.2016	08.2016
Platform Formation	08.2016	07.2017
Preparation of Construction Laydown Areas	08.2016	07.2017
Piling and Installation of Service Runs	05.2017	01.2018
Erection of Power Plant	01.2018	05.2021
Construction of ASU	06.2018	12.2020
CCS Commissioning	05.2021	11.2021
Operational	11.2021	

2 METHODOLOGY

The approach to the HRA has followed that set out in the Planning Inspectorate's Advice Note Ten: Habitat Regulations Assessment relevant to NSIPS republished in August 2013 (version 5) and Planning Circular 06/2005 on Biodiversity and Geological Conservation – *Statutory Obligations and their Impact within the Planning System* produced by the Office of the Deputy Prime Minister (ODPM). It has also taken account of a range of other guidance material including that produced by the Infrastructure Planning Commission (IPC) (2011) (1) and the European Commission (EC) (2011 (2), 2007 (3); 2002 (4), 2000 (5)).

2.1 OVERVIEW OF HRA PROCESS

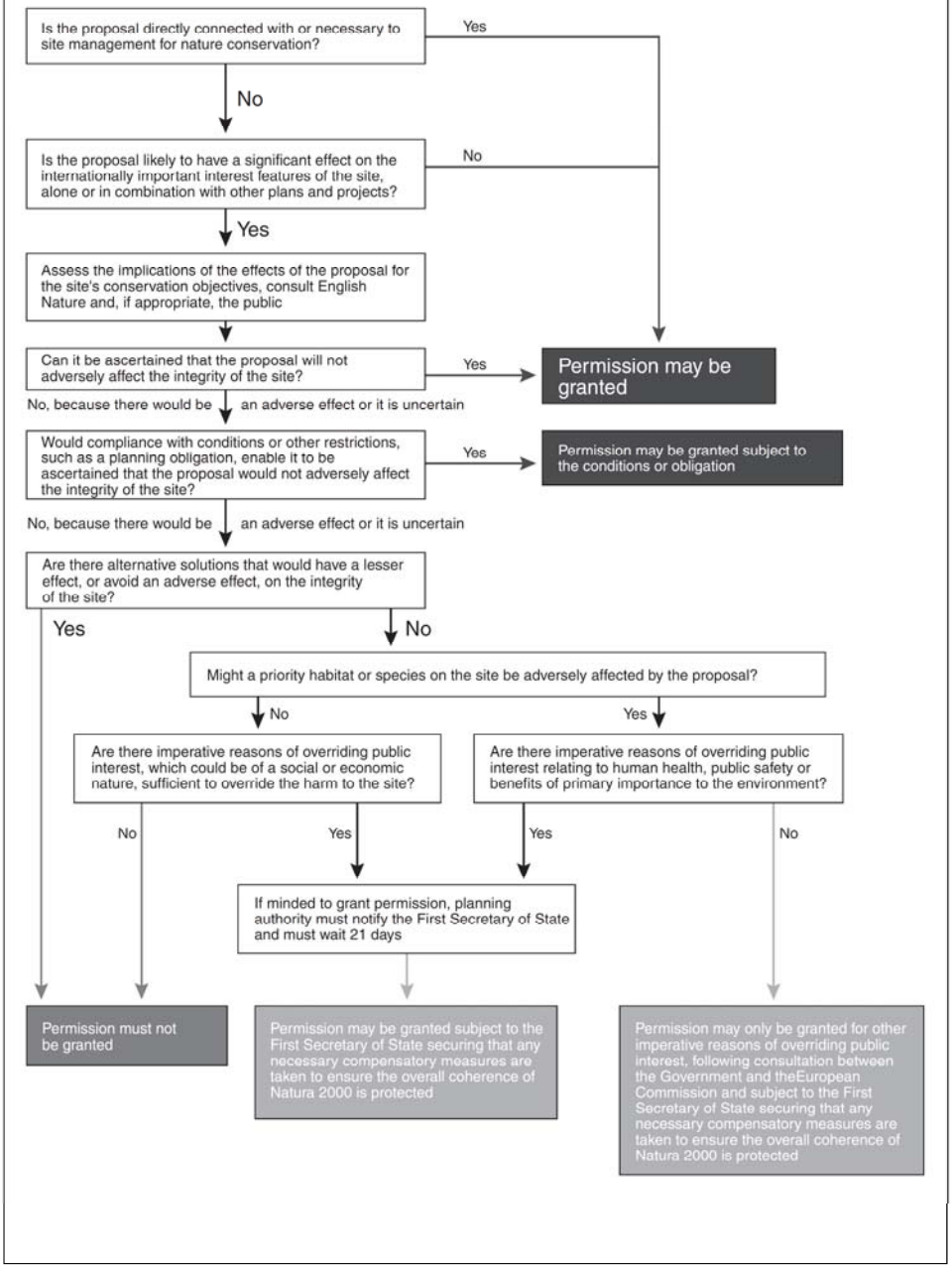
The HRA process comprises four main stages as shown in Figure 1 below (which is directly copied from Circular 06/2005 produced by the Office of the Deputy Prime Minister (ODPM)). These are:

- **Stage 1 Screening** to identify the likely effects of a project on a European Site and consider whether the effects are likely to be significant;
- **Stage 2 Appropriate Assessment** to determine whether the integrity of the European site will be adversely affected by the project;
- **Stage 3 Assessment of Alternative Solutions** to establish if there are any that will result in a lesser effect on the European site; and
- **Stage 4 Imperative Reasons of Overriding Public Interest (IROPI) and Compensatory Measures** to establish whether it is necessary for the project to proceed despite the effects on the European site, and to confirm that necessary compensatory measures are in place to maintain the coherence of the Natura 2000 network.

Each of the above stages is discussed in more detail in the following sections and shown graphically in *Figure 1.*

(1) The Planning Inspectorate (2013) *Habitats Regulations Assessment relevant tor Nationally Significant Infrastructure Projects.* .
(2) European Commission (2011) *Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones with Particular Attention to Port Development and Dredging.* **Advice Note 10** EC
(3) European Commission (2007) *Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC.* EC
(4) European Commission (2002) *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.* EC
(5) European Commission (2000) *Managing Natura 2000 Sites - The Provisions of Article 6 of the 'Habitats' Directive 92/43/CEE.* EC

Figure 1: **Consideration of development proposals affecting Internationally Designated Nature Conservation Sites**



7

2.1.1 Stage 1 - Screening

The screening stage examines the likely effects of a project either alone, or in combination with other projects and plans on a European site, and seeks to answer the question *"can it be concluded that no likely significant effect will*

occur?" To determine if the Project is likely to have any significant effects on the designated sites the following issues have been considered:

- could the proposals affect the qualifying interest and are they sensitive / vulnerable to the effect;
- the probability of the effect happening;
- the likely consequences for the site's conservation objectives if the effect occurred; and
- the magnitude, duration and reversibility of the effect.

The screening stage has therefore sought to conclude one of the following outcomes:

1. no likely significant effect;
2. either a likely significant effect or it cannot be concluded that there will be no likely significant effect

Where the assessment concludes the second outcome, then the need for an Appropriate Assessment (AA) is triggered (1).

'Likely significant effect' in this context is any effect that may reasonably be predicted as a consequence of the project that may significantly affect the conservation or management objectives of the features for which a site was designated (2). A significant effect is different from any effect as insignificant effects plainly do not constitute significant effects. The effect must be an effect on a European site and a judgement as to significance must take into account factors relevant to the question of significance as described above. These will include such matters as temporal considerations (*i.e.* length of time of effect), physical considerations (i.e. extent of effect on the European site and the elements of the site including its conservation objectives). It is possible, therefore, for an effect to damage something on the European site, but because such damage is fleeting, limited in extent or damaging to something outwith any conservation objectives the effect is insignificant on the European site. The judgement should also take into account the likely effects of mitigation.

(1) In the case of the third outcome, European guidance (Assessment of Plans and Projects Significantly affecting Natura 2000 sites (2001)) advises that sufficient uncertainty remains to indicate that an appropriate assessment should be carried out.
(2) Habitats Regulations Guidance Note 3. The Determination of Likely Significant Effect under The Conservation (Natural Habitats &c) Regulations 1994. English Nature, 1999.

For NSIPs, Planning Inspectorate guidance (1) states that a screening assessment should draw on the following information:

- a detailed description of the development, processes, timings, and method of work proposed as part of the NSIP;
- details of the methodology used to determine which European sites should be included within the assessment;
- a plan and description of the European site(s) and all of the associated interest features potentially affected;
- an appraisal of the project's likely effects on the European site(s);
- an outline and interpretation of baseline data;
- an appraisal of any other plans or projects likely to have a significant effect in combination with the proposed development;
- an evaluation of the potential for the scheme to require two or more appropriate assessments by different competent authorities;
- a statement which specifies where the site boundaries of the scheme overlap into devolved assemblies or other European member states; and
- evidence (such as copies of correspondence or Statements of Common Ground) of agreement between the applicant and statutory nature conservation bodies on the appraisal, interpretation, and conclusions of the assessment.

2.1.2 Stage 2 - Appropriate Assessment (AA)

An AA is an assessment carried out under *Article 6(3)* of the Habitats Directive or under *Regulation 61* of the *2010 Habitats Regulations*. The aim is to assess whether the proposals alone or in combination will have any adverse effects on the integrity of the European site. Site integrity is defined as:

"*the coherence of its structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*" (2).

(1) The Planning Inspectorate (2013) Habitats Regulations Assessment relevant to Nationally Significant Infrastructure Projects.
(2) European Communities (2000) *Managing Natura 2000 sites - The provisions of Article 6 of the 'Habitats' Directive* 92/43/CEE. EC

The decision on whether the integrity of the site could be adversely affected by the proposals should focus on and be limited to the site's conservation objectives.

The assessment should draw on the following information:

- description of the protected sites within a defined distance parameter and the qualifying interest features for each site;

- details on the project, highlighting possible effects on the qualifying interest features of the protected sites;
- identification and evaluation of effects on the ecology and nature conservation value of each site; and

- the potential for in combination effects when considered along with other existing and proposed developments.

The aim of the Appropriate Assessment is to answer the question "*can it be demonstrated that the proposals will not adversely affect the integrity of the site?*" In accordance with the Waddenzee judgment (ECJ Case 127/02), the European Court of Justice ruled that a plan or project may be authorised only if a competent authority has made certain that the plan or project will not adversely affect the integrity of the site. "*That is the case where no reasonable scientific doubt remains as to the absence of such effects*". In terms of what is reasonable, guidance from Scottish Natural Heritage (SNH) states "*to identify the potential risks, so far as they may be reasonably foreseeable in the light of such information as can be reasonably obtained*" (1).

The assessment will also take into account any avoidance or mitigation measures which will be implemented to avoid or reduce the level of impact from the project. The Competent Authority may also consider the use of conditions or restrictions to help avoid adverse effects on site integrity.

If the AA concludes that the proposals will not adversely affect the integrity of the European site, then permission may be granted. However if the AA concludes that there will be an adverse effect on the integrity of the European site, or that there is uncertainty and a precautionary approach is taken, then consent can only be granted if there are no alternative solutions, IROPI is applicable and compensatory measures have been secured.

(1) Scottish Natural Heritage (SNH) (2001) *Natura Casework Guidance: Consideration of Proposals Affecting SPAs and SACs.* SNH Guidance Note Series. SNH

For NSIPs, Planning Inspectorate guidance (1) states that a full HRA Report for Stage 2 – Appropriate Assessment should include:

- evidence about the project's impacts on the integrity of protected sites;
- a description of any mitigation measures proposed which avoid or reduce each impact and any residual effect;
- a schedule indicating the timing of mitigation measures in relation to the progress of the development;
- cross references to the relevant DCO requirements and development consent obligations that secure these mitigation measures, and identification of any factors that might affect the certainty of their implementation;
- a statement as to which (if any) residual effects constitute an adverse impact on the integrity of European sites either alone or in combination with other plans or projects and therefore need to be included within the AA; and
- evidence to demonstrate that the applicant has fully consulted and had regard to comments received by the relevant Statutory Nature Conservation Body (SNCBs) during pre-application consultation (in this instance Natural England).

2.1.3 Stage 3 – Assessment of Alternative Solutions

All feasible alternatives have to be analysed to ensure that there are none which *"better respect the integrity of the site in question"* and its contribution to the overall coherence of the Natura 2000 network (EC, 2007). Alternatives could include the location of the site, its scale and design, and the way in which it is constructed and operated. The do nothing option also has to be considered.

The comparisons of alternatives should not allow other assessment criteria (*e.g.* economics) to overrule ecological criteria (EC, 2007). However, the same guidance also refers to the opinion for the case C-239/04, where the opinion of the Advocate General was that "*the choice does not inevitably have to be determined by which alternative least adversely affects the site concerned. Instead, the choice requires a balance to be struck between the adverse effect on the integrity of the SPA and the relevant reasons of overriding public interest*".

(1) The Planning Inspectorate (2013) Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects.

2.1.4 *Stage 4 - Imperative Reasons of Overriding Public Interest and Compensation Measures*

Where a development has an adverse effect on the integrity of a European site and there are no alternative solutions consent can only be granted in one of the following ways as described in *Regulation 62* of the *Habitats Regulations 2010*:

- if the site hosts a priority habitat or species which is affected, proposals can only be consented if they relate to:
  - human health, public safety or beneficial consequences of primary importance to the environment; or
  - any other reasons which are considered by the Competent Authority to be IROPI taking account of the opinion of the EC; and

- if the site does not host a priority habitat or species then IROPI must be demonstrated, and the reasons can include those of a social or economic nature.

If the importance of the project is deemed to outweigh the effects which will result on the European site, and there are no alternatives, compensatory measures must be secured before consent is granted. Compensatory measures are independent of the project and intended to offset the adverse effects of a project. The compensation measures must ensure that the overall coherence of the Natura 2000 network is maintained. Article 6 (3) describes Natura 2000 as *"a coherent European ecological network of special areas of conservation that shall enable the natural habitat types and species' habitats concerned to be maintained, or where appropriate, restored at a favourable conservation status in their natural range"* (EC, 2007).

To be acceptable, compensatory measures should:

- take account of the comparable proportions of habitats and species which are adversely effected;

- be within the same bio-geographical range within which the European site is located;

- provide functions which are comparable to those which justified the selection of the of the original site; and

- have clearly defined implementation and management objectives so the measures can achieve the aim of maintaining the overall coherence of the network.

2.2 CONSULTATION

Extensive consultation has been undertaken with a wide range of organisations and the public extensive throughout the DCO process. The following statutory consultees have been consulted and their views on the HRA, if given, are included in *Annex A* of this HRA:

- The Planning Inspectorate (PINS)
- Selby District Council (SDC);
- North Yorkshire County Council (NYCC);
- East Riding of Yorkshire Council (ERYC);
- The Environment Agency (EA);
- Natural England (NE); and
- Yorkshire Wildlife Trust (YWT).

A meeting with Natural England (NE) took place on 24 July 2014 to discuss the HRA; potential air quality impacts and the potential disturbance or interference with badger setts. Furthermore, it was agreed that a Statement of Common Ground would be drawn up between NE, Capture Power Ltd and ERM.

A draft of the HRA report was submitted to PINS in August 2014. Their comments and responses to them are presented in *Annex A*.

As part of the consultation response, PINS commented that:

"*The Inspectorate welcomes this engagement* [with NE] *and advises that, where possible, evidence of agreement of the following is provided:*

- *All relevant European sites and features have been considered*
- *All relevant plans and/or projects have been considered in the in-combination assessment*
- *The conclusions of the HRA"*

The summary of consultation responses presented in *Annex A* sets out this evidence.

3 EUROPEAN SITES WHICH COULD BE AFFECTED

European sites which could be affected by the Project were identified as those which fell within the maximum Project area of influence, based on the air quality modelling presented in the *Emissions to Atmosphere Technical Report, Section A of the ES*. The area of influence comprises a radius of 15 km of the Project, adopting the worst case distance for effects on the basis of the Project being a large coal fired power plant, as defined by Environment Agency Guidance Note H1 (1) . The sites screened into the assessment were discussed and agreed with NE during a meeting on the 24th July 2014.

European sites (2) within a 15 km radius of the Project site are listed in *Table 3.1*. The qualifying features for each site are detailed, with information obtained from the JNCC website (3).

Details of European Protected sites are provided in *Table 3.1* and illustrated in *Figure 3.1.*

(1) The Environment Agency for England and Wales (2010) Horizontal Guidance Note H1: Annex F
(2) As defined in Advice Note 10
(3) http://jncc.defra.gov.uk/ first accessed 18.08.2014

Table 3.1 Natura 2000 Sites within 15km of the Project

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
River Derwent Special Area of Conservation (SAC) 0.66 km NE	**Annex I habitats that are a primary reason for selection of this site:**	• Not applicable
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:	• Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation
	Annex II species that are a primary reason for selection of this site	• River lamprey *Lampetra fluviatilis* The Derwent is one example of river lamprey *Lampetra fluviatilis* populations which inhabit the many rivers flowing into the Humber estuary in eastern England. Only the lower reaches of the Derwent are designated, reflecting the spawning distribution of the species in the Derwent system.
	Annex II species present as a qualifying feature, but not a primary reason for site selection	• Sea lamprey *Petromyzon marinus* • Bullhead *Cottus gobio* • Otter *Lutra lutra*
Lower Derwent Valley SAC 4.87 km NE	**Annex I habitats that are a primary reason for selection of this site**	• Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) The Lower Derwent Valley in north-east England contains a greater area of high-quality examples of lowland hay meadows than any other UK site and encompasses the majority of this habitat type occurring in the Vale of York. The abundance of the rare narrow-leaved water-dropwort *Oenanthe silaifolia* is a notable feature. Traditional management has ensured that ecological variation is well-developed, particularly in the transitions between this grassland type and other types of wet and dry grassland, swamp and fen vegetation.
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:	• Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)
	Annex II species that are a primary reason for selection of this site	• Not applicable.
	Annex II species present as a qualifying	• Otter *Lutra lutra*

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
	feature, but not a primary reason for site selection	
Lower Derwent Valley Special Protection Area (SPA) 4.87 km NE	**Article 4.1 Qualification (2009/147/EC)**	Over winter the area regularly supports: • Bewick's swan *Cygnus columbianus bewickii* 0.7% of the GB population (Western Siberia/North-eastern & North-western Europe) 5 year peak mean 1991/92-1995/96 Ruff *Calidris pugnax* (1) 19% of the GB population (Western Africa - wintering) 5 year peak mean 1991/92-1995/96 • Golden plover *Pluvialis apricaria* 2.4% of the GB population (North-western Europe - breeding) 5 year peak mean 1991/92-1995/96
		During the breeding season the area regularly supports: • Shoveler *Anas clypeata* 5% of the population in Great Britain (North-western/Central Europe) 5 year mean 1986/7-1990/1
		Over winter the area regularly supports: • Teal *Anas crecca* 1.5% of the population (North-western Europe) 5 year peak mean 1991/92-1995/96 • Wigeon *Anas penelope* 0.7% of the population (Western Siberia/North-western/North-eastern Europe) 5 year peak mean 1991/92-1995/96
	Article 4.2 Qualification (2009/147/EC): An Internationally Important assemblage of birds.	Over winter the area regularly supports: • 40616 waterfowl (5 year peak mean 01/04/1998) Including: Bewick's swan *Cygnus columbianus bewickii* , Wigeon *Anas penelope* , Teal *Anas crecca* , Golden plover *Pluvialis apricaria* , Ruff *Calidris pugnax* .
Lower Derwent Valley Ramsar site 4.87 km NE	**Justification for the application of Ramsar 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 hydrological and ecological functioning of the Humber Basin.
	Justification for the application of	• The site has a rich assemblage of wetland invertebrates including 16 species of

(1) Formally *Philomachus pugnax*, recent research has led to the reclassification of this species within the *Calidris* genus.Van Gils, J. & Wiersma, P. (1996). Ruff (Calidris pugnax). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. & de Juana, E. and this has been adopted by the British Ornithologist Union who maintain the official British list (2014).

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
	Ramsar Criterion 2	dragonfly and damselfly, 15 British Red Data Book wetland invertebrates as well as a leafhopper, *Cicadula ornate* for which Lower Derwent Valley is the only known site in Great Britain.
	Justification for the application of Ramsar Criterion 4	• The site qualifies as a staging post for passage birds in spring. Of particular note are the nationally important numbers of Ruff, *Calidris pugnax* and Whimbrel, *Numenius phaeopus*.
	Justification for the application of Ramsar Criterion 5	Species with peak counts in winter: • 31942 waterfowl (5 year peak mean 1998/99-2002/2003)
	Justification for the application of Ramsar Criterion 6 Qualifying Species/populations (as identified at designation):	Species with peak counts in winter: • Eurasian wigeon , *Anas penelope*, NW Europe 8350 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9- 2002/3) • Eurasian teal , *Anas crecca*, NW Europe 4200 individuals, representing an average of 1% of the population (5 year peak mean 1998/9- 2002/3)
Humber Estuary SAC 6.13 km E	**Annex I habitats that are a primary reason for selection of this site**	Estuaries • The Humber is the second-largest coastal plain estuary in the UK, and the largest coastal plain estuary on the east coast of Britain. It is a muddy, macro-tidal estuary, fed by the Rivers Ouse, Trent and Hull, Ancholme and Graveney. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. This is the northernmost of the English east coast estuaries whose structure and function is intimately linked with soft eroding shorelines. Habitats within the Humber Estuary include 1330 Atlantic salt meadows and a range of sand dune types in the outer estuary, together with subtidal sandbanks (Sandbanks which are slightly covered by sea water all the time), extensive intertidal mudflats (Mudflats and sandflats not covered by seawater at low tide), glasswort beds (*Salicornia* and other annuals colonising mud and sand), and coastal lagoons. As salinity declines upstream, reedbeds and brackish saltmarsh communities fringe the estuary. These are best-represented at the confluence of the Rivers Ouse and Trent at Blacktoft Sands. Upstream from the Humber Bridge,

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
		the navigation channel undergoes major shifts from north to south banks, for reasons that have yet to be fully explained. This section of the estuary is also noteworthy for extensive mud and sand bars, which in places form semi-permanent islands. Significant fish species include river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* which breed in the River Derwent, a tributary of the River Ouse. • Mudflats and sandflats not covered by seawater at low tide the Humber Estuary includes extensive intertidal mudflats and sandflats not covered by seawater at low tide. Upstream from the Humber Bridge, extensive mud and sand bars in places form semi-permanent islands.
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:	• Sandbanks which are slightly covered by sea water all the time • Coastal lagoons * Priority feature • *Salicornia* and other annuals colonizing mud and sand • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) • Embryonic shifting dunes • "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")" • "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature • Dunes with *Hippopha rhamnoides*
	Annex II species that are a primary reason for selection of this site	• Not applicable.
	Annex II species present as a qualifying feature, but not a primary reason for site selection	• Sea lamprey *Petromyzon marinus* • River lamprey *Lampetra fluviatilis* • Grey seal *Halichoerus grypus*
Humber Estuary SPA 6.13 km E	**Article 4.1 Qualification (2009/147/EC)**	During the breeding season the area regularly supports: • Bittern *Botaurus stellaris* 10.5% of the population in Great Britain. (Europe - breeding) 2000-2002 • Marsh harrier *Circus aeruginosus* 6.3% of the population in Great Britain 1998-2002 • Avocet *Recurvirostra avosetta* 8.6% of the population in Great Britain (Western Europe/Western Mediterranean - breeding) 1998-2002

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
		• Little tern *Sterna albifrons* 2.1% of the population (Eastern Atlantic - breeding) 1998-2002
		Over winter the area regularly supports: • Bittern *Botaurus stellaris* 4% of the population in Great Britain (Europe - breeding) 1998/9 to 2002/3 • Hen harrier *Circus cyaneus* 1.1% of the population in Great Britain 1997/8 to 2001/2 • Bar-tailed godwit *Limosa lapponica* 4.4% of the population in Great Britain (Western Palearctic - wintering) 1996/7 to 2000/1 • European golden plover *Pluvialis apricaria* 12.3% of the population in Great Britain (North-western Europe - breeding) 1996/7 to 2000/1 • Avocet *Recurvirostra avosetta* 1.7% of the population in Great Britain (Western Europe/Western Mediterranean - breeding) 1996/7 to 2000/1
		On passage the area regularly supports: • Ruff *Calidris pugnax* 1.4% of the population in Great Britain (Western Africa - wintering) 1996-2000
	Article 4.2 Qualification (2009/147/EC)	Over winter the area regularly supports: • Dunlin *Calidris alpina alpina* 1.7% of the population. (Northern Siberia/Europe/Western Africa) 1996/7 to 2000/1 • Red knot *Calidris canutus* 6.3% of the population. (North-eastern Canada/ Greenland/Iceland /Northwestern Europe)1996/7 to 2000/1 • Black tailed godwit *Limosa limosa islandica* 3.2% of the population. (Iceland - breeding) 1996/7 to 2000/1 • Shelduck *Tadorna tadorna* 1.5% of the population. (North-western Europe) 1996/7 to 2000/1 • Common Redshank *Tringa totanus* 3.6% of the population. (Eastern Atlantic - wintering) 1996/7 to 2000/1
		On passage the area regularly supports: • Dunlin *Calidris alpina alpina* 1.5% of the population. (Northern Siberia/Europe/Western Africa) 1996-2000 • Red knot *Calidris canutus* 4.1% of the population. (North-eastern Canada /Greenland/ Iceland/ Northwestern Europe) 1996-2000 • Black-tailed godwit *Limosa limosa islandica* 2.6% of the population. (Iceland -

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
		breeding) 1996-2000 • Common Redshank *Tringa totanus* 5.7% of the population. (Eastern Atlantic - wintering) 1996-2000
	Article 4.2 Qualification (2009/147/EC): An Internationally Important assemblage of birds.	In the non-breeding season the area regularly supports: • 153934 waterfowl (5 year peak mean 1996/7 to 2000/1) Including: Teal *Anas crecca* , Wigeon *Anas penelope* ,Mallard *Anas platyrhynchos* , Ruddy turnstone *Arenaria interpres* , Common pochard *Aythya ferina* , Greater Scaup *Aythya marila* , Bittern *Botaurus stellaris* , Brant goose *Branta bernicla bernicla* , Goldeneye *Bucephala clangula* , Sanderling *Calidris alba* , Dunlin *Calidris alpina alpina* , Red knot *Calidris canutus* , Ringed Plover *Charadrius hiaticula* , Eurasian oystercatcher *Haematopus ostralegus* , Bar-tailed godwit *Limosa lapponica* , Black-tailed godwit *Limosa limosa islandica* , Eurasian curlew *Numenius arquata* , Whimbrel *Numenius phaeopus* , Ruff *Calidris pugnax* , Golden plover *Pluvialis apricaria* , Grey plover *Pluvialis squatarola* , Avocet *Recurvirostra avosetta* , Shelduck *Tadorna tadorna* , Common greenshank *Tringa nebularia* , Common Redshank *Tringa totanus* , Lapwing *Vanellus vanellus*
Humber Estuary Ramsar site 6.13 km E	**Justification for the application of Ramsar 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. • It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast. 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. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers. The lower saltmarsh of the Humber is dominated by common cordgrass *Spartina anglica* and annual glasswort *Salicornia* communities. Low to mid marsh communities are

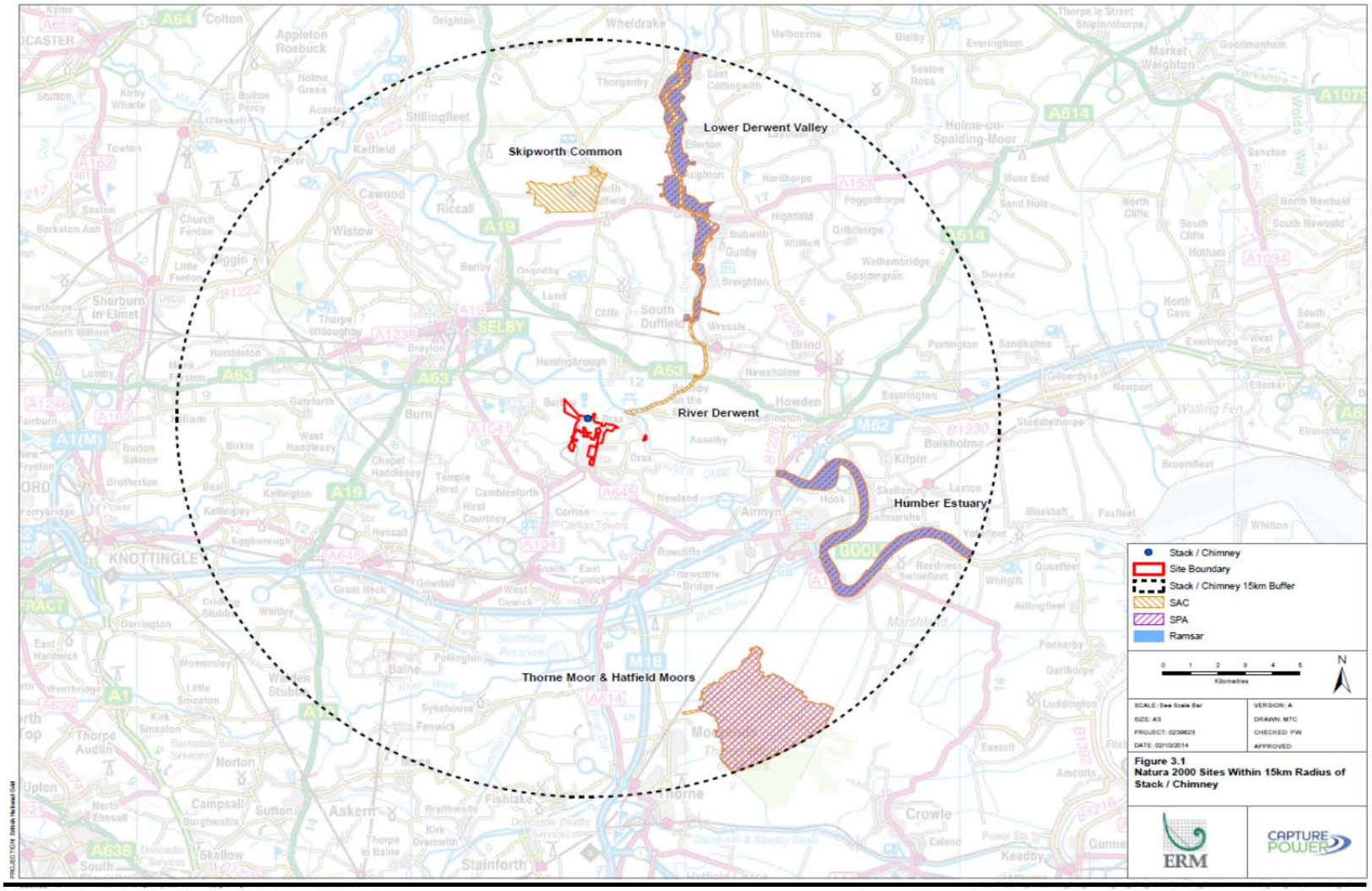
Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
		mostly represented by sea aster *Aster tripolium*, common saltmarsh grass *Puccinellia maritima* and sea purslane *Atriplex portulacoides* communities. • The upper portion of the saltmarsh community is atypical, dominated by sea couch *Elytrigia atherica* (*Elymus pycnanthus*) saltmarsh community. In the upper reaches of the estuary, the tidal marsh community is dominated by the common reed *Phragmites australis* fen and sea club rush *Bolboschoenus maritimus* swamp with the couch grass *Elytrigia repens (Elymus repens)* saltmarsh community. Within the Humber Estuary Ramsar site there are good examples of four of the five physiographic types of saline lagoon.
	Justification for the application of Ramsar 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*.
	Justification for the application of Ramsar Criterion 5 Assemblages of international importance:	• 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001)
	Justification for the application of Ramsar Criterion 6 Species/populations occurring at levels of international importance:	Species with peak counts in spring/autumn: • Eurasian golden plover, *Pluvialis apricaria altifrons* subspecies – NW Europe, W Continental Europe, NW Africa population 17,996 individuals, passage, representing an average of 2.2% of the population (5 year peak mean 1996-2000) • Red knot, *Calidris canutus islandica* subspecies 18,500 individuals, passage, representing an average of 4.1% of the population (5 year peak mean 1996-2000) • Dunlin, *Calidris alpina alpina* subspecies – Western Europe (non-breeding) population 20,269 individuals, passage, representing an average of 1.5% of the population (5 year peak mean 1996-2000) • Black-tailed godwit, *Limosa limosa islandica* subspecies 915 individuals, passage,

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
		representing and average of 2.6% of the population (5 year peak mean 1996-2000) • Common redshank, *Tringa totanus brittanica* subspecies 7,462 individuals, passage, representing an average of 5.7% of the population (5 year peak mean 1996-2000) Species with peak counts in winter: • Common shelduck, *Tadorna tadorna* Northwestern Europe (breeding) population 4,464 individuals, wintering, representing an average of 1.5% of the population (5 year peak mean 1996/7-2000/1) • Golden plover, *Pluvialis apricaria altifrons* subspecies – NW Europe, W Continental Europe, NW Africa population 30,709 individuals, wintering, representing an average of 3.8% of the population (5 year peak mean 1996/7-2000/1) • Red knot, *Calidris canutus islandica* subspecies 28,165 individuals, wintering, representing an average of 6.3% of the population (5 year peak mean 1996/7-2000/1) • Dunlin, *Calidris alpina alpina* subspecies – Western Europe (non-breeding) population 22,222 individuals, wintering, representing an average of 1.7% of the population (5 year peak mean 1996/7-2000/1) • Black-tailed godwit, *Limosa limosa islandica* subspecies 1,113 individuals, wintering, representing an average of 3.2% of the population (5 year peak mean 1996/7-2000/1) • Bar-tailed godwit , *Limosa lapponica lapponica* subspecies 2,752 individuals, wintering, representing an average of 2.3% of the population (5 year peak mean 1996/7-2000/1) • Common redshank, *Tringa totanus brittanica* subspecies 4,632 individuals, wintering, representing an average of 3.6% of the population (5 year peak mean 1996/7-2000/1)
	Justification for the application of Ramsar 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	**Annex I habitats that are a primary reason for selection of this site**	• Northern Atlantic wet heaths with Erica tetralix The northern Atlantic wet heath at Skipwith Common is the most extensive of its

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
8.00 km N		type in the north of England. The M16 *Erica tetralix – Sphagnum compactum* wet heath 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 swap to European dry heaths and other habitats. The site has great ornithological and entomological importance. • European dry heaths Skipwith Common is one of the only two extensive areas of open heathland remaining in the Vale of York, the other being Strensall Common. The dry heath element is an example of H9 *Calluna vulgaris – Deschampsia flexuosa* heath dominated by heather *Calluna vulgaris*. The area has entomological and ornithological importance, with nearly 80 species of birds recorded, including European nightjar *Caprimulgus europaeus*.
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:	• Not applicable.
	Annex II species that are a primary reason for selection of this site	• Not applicable.
	Annex II species present as a qualifying feature, but not a primary reason for site selection	• Not applicable.
Thorne Moor SAC 9.37 km SE	**Annex I habitats that are a primary reason for selection of this site**	• Degraded raised bogs still capable of natural regeneration 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 recent management has increased the proportion of 7110 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 species of Active raised bogs with bog-mosses *Sphagnum* spp., cottongrasses *Eriophorum angustifolium* and *E. vaginatum*, heather

Site Name, Designation and Proximity to Project Site (km to closest point)	Qualifying Features (Annex I and Annex II primary and non-primary reasons for selection of the SAC, Article 4.1 Qualification (2009/147/EC and Article 4.2 Qualification (2009/147/EC for SPA and Justification for the application of Ramsar Criteria)	
		Calluna vulgaris, cross-leaved heath *Erica tetralix*, round-leaved sundew *Drosera rotundifolia*, cranberry *Vaccinium oxycoccos* and bog-rosemary *Andromeda polifolia*.
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:	• Not applicable.
	Annex II species that are a primary reason for selection of this site	• Not applicable.
	Annex II species present as a qualifying feature, but not a primary reason for site selection	• Not applicable.
Thorne and Hatfield Moors SPA 9.37 km SE	**Article 4.1 Qualification (2009/147/EC) During the breeding season the area regularly supports:**	• Nightjar *Caprimulgus europaeus* 1.9% of the GB breeding population. 5 count peak mean 1993, 1995-1998

Figure 3.1 European Protected Sites Considered within the HRA



4 STAGE 1: SCREENING OF ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

4.1 EFFECTS CONSIDERED IN ASSESSMENT

The potential effects upon European site(s) as a result of the Project and therefore that have been considered within this HRA report relate to emissions to atmosphere/air quality issues, and potential disturbance downstream of the River Derwent SAC due to works on / adjacent to the jetty on the River Ouse. In this latter case it is the potential to disturb mobile qualifying features of the SAC during construction works that provides a potential pathway of effect.

Within this HRA report SPAs have not been considered as their qualifying bird interest features are insensitive to effects arising from the Project. Where Ramsar sites are designated for habitats potentially sensitive to air quality these have been included in the assessment.

All other impacts arising from the Project are not likely to have significant effects due to the lack of connectivity and/or distance between the European sites and the Project.

4.2 SUMMARY OF EIA ASSESSMENT OF POTENTIAL EFFECTS

The Environmental Statement (ES) (November 2014) will report no direct effects on statutory sites. The ES reported sensitivity to emissions from the operational power station at a number of designated sites, with air quality modelling predicting no significant effects whilst the Project is operating in 'oxy-mode', and unacceptable effects on some of the designated sites were predicted if the Project was to operate long term in 'air-mode'. This information is replicated in ***Error! Reference source not found.*** *Box 4.1* below. It is important to note that where the air quality modelling identifies unacceptable effects, this does not necessarily mean that an effect will be significant, but provides a guide on whether effects require further assessment or consideration of specific further mitigation.

Box 4.1 Extract from ES (Section 4.1, Table 4.1)

No direct effects will occur, as these sites are located outwith the Project site.

Statutory designated sites with sensitivity to emissions from the operational power station are:

- Lower Derwent Valley SAC
- Skipwith Common SAC
- Thorne Moor SAC
- Humber Estuary SAC
- River Derwent SAC

Air quality modelling predicts no significant effects whilst the Project is operating in 'oxy-mode' and whilst unacceptable effects on some of the above sites are predicted if the Project was to operate long term in 'air-mode', this is not the expected primary operational mode of the Project. (see *Air Quality EIA Technical Report*). It is important to note that where the air quality modelling identifies unacceptable effects, this does not necessarily mean that an effect will be significant, but provides a guide on whether effects require further assessment or consideration of specific further mitigation. Nonetheless, a Stage 1 HRA has been undertaken and submitted to PINS and NE for comment.

Emissions from traffic on the main transport routes to the site will not result in significant effects on any statutory designated site. This is because although the Project will generate additional traffic on the local road network during construction in the form of construction workforce, contractor vehicles and vehicles delivering construction materials to site, the numbers generated are not expected to exceed those specified in the UK Highways Agency Design Manual for Roads and Bridges (DMRB) above which impacts on air quality are potentially significant (more than an additional 200 Heavy Goods Vehicles movements (HGVs) per day, or more than 1000 total vehicles per day) (see *Air Quality Technical Report (Section A of the ES)*).

A dust impact assessment has been undertaken given that the construction of the Project has the potential to generate airborne dust as a result of heavy vehicle movements and construction earthworks, with potential to cause deposition at nearby ecological receptors. Receptors identified within 350m of the site boundary (study parameter defined in Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Dust from Demolition and Construction) have been classed as high sensitivity to dust soiling as a result of the site raising activities. However, based on the IAQM guidance there are no ecological receptors that require further assessment for the effect of dust during the construction phase.

Disturbance effects due to noise, lighting, vehicle movements and human activity are considered unlikely as the closest statutory site is situated 0.66 km from the Project site.

Indirect effects due to hydrological connectivity are not predicted as there will be no variation to the current abstraction and discharge licences and the River Derwent SAC is located upstream of the Project site

Further consideration of the effects of the Project, when operating in air mode, is provided below.

4.3 ASSESSMENT OF DISTURBANCE OF MOBILE QUALIFYING FEATURES OF THE RIVER DERWENT SAC

The River Derwent SAC supports three mobile qualifying interest features (River lamprey, sea lamprey and otter) which may travel or migrate outside of the SAC into the River Ouse and pass the jetty, approximately 960 m downstream of the SAC.

The construction of the Project will require the use of a jetty on the River Ouse to deliver a small number of abnormal indivisible loads (AILs).

Berthing / unloading will be onto an existing structure already used for this purpose and will represent an insignificant increase in background river traffic volumes given existing freight and recreational use and will not represent a significant change in existing levels of disturbance. It will not prevent the qualifying interest features of the River Derwent SAC from moving along the Ouse, which is approximately 80 m wide at the jetty location.

4.4 ASSESSMENT OF EFFECTS FROM EMISSIONS TO AIR

4.4.1 *Introduction*

The effects of the Project from emissions to air were assessed within the Air Emissions Technical Report (Section A of the ES). The Technical Report is presented in *Section A of the ES*, and relevant sections are presented below outlining the following key information:

- the model used for the assessment;
- the identification of sensitive receptors;
- the assessment criteria used to identify likely significant effects; and
- the results of the model for receptors considered in this HRA.

4.4.2 *Air Quality Dispersion Model*

The operational impacts from the combustion process were assessed using the ADMS (Atmospheric Dispersion Modelling System) version 5.0. ADMS is one of a 'new generation' of dispersion models which describe the atmospheric boundary layer properties. ADMS allows for the modelling of dispersion under convective meteorological conditions using a skewed Gaussian concentration distribution. It is able to simulate the effects of terrain and building downwash simultaneously. It can also calculate concentrations for direct comparison with air quality standards or guidelines.

Details of the modelling approach and assumptions are presented in the *Emissions to Atmosphere Technical Report, Section A of the ES.* .

4.4.3 Sensitive Receptors

Details of the European sites considered are set out in *Table 4.1* and *Table 4.2* along with the critical loads, critical levels and background levels of acid deposition, ammonia, nutrient nitrogen, oxides of nitrogen and sulphur dioxide at each site. Only those qualifying interest feature receptors which are sensitive to each pollutant are listed.

In many areas of the UK, the baseline conditions are already in excess of critical loads and critical levels[1] at many sensitive ecological receptors. This is the case here, where: the critical levels for NH_3 and HF are exceeded at all receptors; the critical load for nutrient nitrogen is exceeded at all receptors; and the critical load for acid deposition is exceeded at the Humber Estuary, Skipwith Common and Thorne Moor. With regard to the habitat descriptions, the most similar habitat type available from the Air Pollution Information Service (APIS) has been used to define the site, and where multiple habitat types are present, all have been included. It is acknowledged that in some cases the characteristics of the habitat site do not exactly match the habitat type on APIS as there are a limited range of habitat types available.

Site-relevant critical loads for acid and nutrient nitrogen deposition have been used. Site-relevant critical loads for acid deposition are defined for the sulphur and nitrogen contributions (from SO_2, HCl, NO_x and NH_3), corresponding to the critical load functions established for these sites. The advantage of using the critical load function is that it modifies the empirical critical load derived from dominant soil types, by allowing for non-marine base cation deposition and base cation uptake by vegetation. Furthermore, critical load functions are established to support the conservation objectives of each sensitive ecological receptor and hence are more representative of its protected features.

In order to ensure that the maximum impacts at the sensitive ecological receptors are captured, a grid of receptors is defined across each habitat, with a resolution of 150 m. The grid location identified in *Table 4.1* represents the point of maximum impact within each habitat.

[1] The **critical load** relates to the quantity of pollutant **deposited** from air to the ground, whereas the **critical level** is the gaseous **concentration** of a pollutant in the air.

Table 4.1 Summary of Sensitive Ecological Receptors and Baseline Information – Critical Levels

Name	Designation	Eastings (m)	Northings (m)	Direction	Distance (km)	NO_x (µg m^{-3}) Annual mean		24 hour mean		SO_2 (µg m^{-3})		Ammonia (µg m^{-3})		HF (24 hour mean)		HF (24 weekly mean)	
						CL	Baseline	CL	Baseline	CL	Baseline	CL	Baseline	CL	Baseline	CL	Baseline
Humber Estuary	SAC, SPA, Ramsar Site	473343	426348	North	7.3	30	18.0	75	36.0	10	5.39	1	2.18	5	1.45	0.5	1.23
Lower Derwent Valley	SPA, SAC, Ramsar Site	470043	432348	North	5.4	30	12.8	75	25.6	10	5.99	1	2.18	5	1.45	0.5	1.23
River Derwent	SAC	467943	428748	North-east	1.7	30	13.8	75	27.6	10	5.76	1	2.18	5	1.45	0.5	1.23
Skipwith Common	SAC	465093	436698	South-east	8.4	30	12.9	75	25.9	10	6.75	1	2.18	5	1.45	0.5	1.23
Thorne Moor/ Thorne and Hatfield Moors	SAC, SPA	470793	417798	North-west	11.5	30	15.7	75	31.5	10	4.81	1	2.18	5	1.45	0.5	1.23

Table 4.2 Summary of Sensitive Ecological Receptors and Baseline Information – Critical Loads

Name	Habitat type	Nutrient Nitrogen			Acid Deposition					
		CL Min	Max	Baseline	CL Max S	CL Max N	CL Min N	S back-ground	N back-ground	Total back-ground
Humber Estuary	Fixed dunes with herbaceous vegetation (grey dunes) (H2130) Supralittoral sediment (acidic type)	8	10	31.08	0.42	0.643	0.223	0.26	2.22	2.48
	Fixed dunes with herbaceous vegetation (grey dunes) (H2130) Supralittoral sediment (calcareous type)	10	15	31.08	4	4.856	0.856	0.26	2.22	2.48
	Embryonic shifting dunes	10	20	31.08	n/a	n/a	n/a	n/a	n/a	n/a
	shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	10	20	31.08	n/a	n/a	n/a	n/a	n/a	n/a
	Coastal Lagoons	20	30	57.68	n/a	n/a	n/a	n/a	n/a	n/a
	Estuaries	20	30	31.08	n/a	n/a	n/a	n/a	n/a	n/a
	Salicornia and other annuals colonising mud and sand	20	30	31.08	n/a	n/a	n/a	n/a	n/a	n/a
	Pioneer, low-mid,	20	30	31.08	n/a	n/a	n/a	n/a	n/a	n/a

Name	Habitat type	Nutrient Nitrogen			Acid Deposition					
		CL Min	Max	Baseline	CL Max S	CL Max N	CL Min N	S back-ground	N back-ground	Total back-ground
	mid-upper saltmarshes									
	Dunes with *Hippophae rhamnoides*	n/a	n/a	31.08	0.42	0.643	0.223	0.26	2.22	2.48
	Mudflats and sandflats not covered by seawater at low tide	n/a	n/a	31.08	n/a	n/a	n/a	n/a	n/a	n/a
Lower Derwent Valley	Lowland Hay meadows Neutral Grassland (acid type)	20	30	35.42	4	4.856	0.856	0.24	2.53	2.77
	Lowland Hay meadows Neutral Grassland (calcareous type)	20	30	35.42	n/a	n/a	n/a	n/a	n/a	n/a
River Derwent	Not sensitive	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	10	15	20.16	0.160	0.802	0.642	0.23	1.44	1.67
	Northern Atlantic wet heaths with Erica tetralix	10	20	20.16	0.160	0.802	0.642	0.23	1.44	1.67
Thorne Moor	Degraded raised bogs still capable of natural regeneration	5	10	20.72	0.141	0.462	0.321	0.23	1.48	1.71

4.4.4 *Assessment Criteria for the Protection of Sensitive Ecological Receptors*

The criteria for assessment of effects at sensitive ecological receptors are derived from three sources:

- UK statutory Air Quality Standards;
- critical loads estimated by CEH and others and set out on the APIS website(1); and
- guideline values set out in H1.

Effects relating directly to atmospheric concentrations of NO_x, SO_2, NH_3 and HF are not habitat or species specific and are the same for all locations. These are set out in

(1) Centre for Ecology and Hydrology (2009) Air Pollution Information System http://www.apis.ac.uk/

Table 4.3. Effects relating to acid and nutrient nitrogen deposition are habitat and species specific; the site specific critical loads are set out in *Table 4.2* for the sensitive ecological receptors of interest.

Table 4.3 Air Quality Critical Loads used for the Assessment of Effects on Sensitive Ecological Receptors

Pollutant	Averaging Period and Statistic	Assessment Criterion (µg/m³)	Source
NO_x	Annual mean	30	H1 and AQS
NO_x	24 hour maximum	75	H1and APIS
SO_2	Annual mean	10 (lichens)	H1
SO_2	Annual mean	20 (other sites)	UK/EU AQS
SO_2	6 month mean (October-March)(1)	20	APIS
NH_3	Annual mean	1 (lichens)	H1 and APIS
NH_3	Annual mean	3 (other sites)	H1 and APIS
HF	3 month mean	0.2-0.3	APIS
HF	1 month mean	0.2-0.3	APIS
HF	1 week mean	0.5	H1 and APIS
HF	24 hour mean	5	H1 and APIS

(1) H1: Derived from the Environment Agency H1 guidance documents version 2.1 and 2.2
(2) UK/EU AQS: Air Quality Standard – these are currently legally binding in the UK and are derived from CAFE
(3) APIS: Derived from guidelines presented on the APIS website
(4) The lower thresholds are recommended for sites where there are significant population of lichens present. For other sites the upper threshold is recommended.
(5) The dispersion model cannot readily model the one month, three month and six month mean. The annual mean is calculated, and the assumption has been made that if the critical loads for the annual mean are comfortably achieved, then it is reasonable to assume that the one month, three month and six month means will also be achieved

Operational Emissions

In relation to effects on ecological receptor locations during the operational phase of the plant, the significance of effects used in the EIA process is based on guidance specified by the Expert Panel on Air Quality Standards (EPAQS) as detailed in the Environment Agency's (EA) Technical Guidance Note H1 Environmental Risk Assessment[1].

Effects have been further assessed based on guidance developed jointly by Environmental Protection UK (EPUK) and the UK Institute of Air Quality Management (IAQM) (2).

The significance is determined in terms of:

- Process Contribution (PC), this is the impact associated with emissions from the Project only; and

[1] Environment Agency H1 Annex F – Air Emissions V2.2 (December, 2011)

(2) Environmental Protection (UK) (2010) Development Control: Planning for Air Quality (2010 update)

- Predicted Environmental Concentration (PEC), this is the impact associated with PC added to the existing background conditions.

The EA H1 guidance specifies that the PC for a particular pollutant can be considered insignificant if:

- the long term PC is < 1% of the long term environmental standard; and

- the short term PC is < 10% of the short term environmental standard.

If the PC is found to be exceeding the specified thresholds, and therefore considered a 'not insignificant' contribution, then the PEC is used to determine whether more detailed modelling is required and calculated as follows:

- PC (long term) + background concentration > 70% standard

- PC (short term) > 20% (short term standard – 2 x long term background)

The method outlined in the EA H1 guidance is used to test for likely insignificance.

In relation to effects on sensitive ecological receptors, there are specific significance criteria that are used in this assessment derived from H1. These relate to the '*Critical Loads*' and '*Critical Levels*' set for the protection of sites designated under the Habitats Regulations. Impacts of emissions are considered not to have significant effects (ie it can be concluded that there will be no likely significant effect) upon sensitive ecological receptors if the PC <1% of the Long Term Critical Load or Critical Level; or , if PC> 1%; then the PEC <70% of the Critical Load or Critical Level .

Where the PC>1% of the Long Term Critical Load or Critical Level and the PEC <70% of the Critical Load or Critical Level, this is defined in the Air Emissions Technical Report as Acceptable, and reported in the subsequent LSE matrices (*Matrices 1 – 7 in Section 4.6*) as no likely significant effect.

This approach is used to give clear definition of which effects can be disregarded as not significant or requiring further assessment. Where these criteria are exceeded (Unacceptable in *Tables 4.4 – 4.29 below*), this does not necessarily mean that an effect will be significant, but provides a guide on whether effects require further assessment or consideration of specific further

mitigation. Within the HRA process, those effects identified as Unacceptable have been subject to further discussion and assessment.

4.4.5 Results of Air Quality Modelling

During normal operations, when the capture technology is collecting carbon dioxide (CO_2) for transportation by the proposed National Grid Carbon Ltd CO_2 pipeline for storage in geological features under the North Sea, the Project uses enriched oxygen (96% oxygen) rather than air (21% oxygen) in the combustion process; within this assessment this is referred to as 'oxy-mode'. The Project is also designed to operate as a standard coal-fired power station, using air in the combustion process. In the assessment, this is referred to as 'air-mode' and will be assessed as an abnormal operating scenario. This mode of operation is used when the Project is operating under start-up or shut-down conditions, when the CO_2 pipeline is off-line or in the event that the Air Separation Unit (ASU) or the Gas Processing Unit (GPU) is off-line.

Summary of Predicted Effects on Sensitive Ecological Receptors in Oxy-mode

Table 4.4 to *Table 4.11* set out the results of the dispersion modelling for the sensitive ecological receptors due to acid deposition, nutrient nitrogen deposition, NO_x, SO_2, NH_3 and HF. These results are based upon modelling of emissions as specified in *(Emissions to Air Technical Report Table 5.11 and Table 5.12 (Section A of the ES))*.

The air quality impacts at sensitive ecological receptors are defined on the basis of the highest impacts arising at any point on the designated habitat. Therefore, the predicted impacts may not actually be coincidental with the sensitive feature described. This approach is a precautionary worst case assessment.

Table 4.4 Predicted Acid Deposition at Ecological Receptors (Annual Mean) in Oxy-mode

Site	APIS Habitat – main feature	APIS Habitat – broad habitat	Critical Load for Acid Deposition (keq ha^{-1} yr^{-1})	Background Acid Deposition (keq ha^{-1} yr^{-1})	PC (keq ha^{-1} yr^{-1})	PC/CL (%)	PEC (keq ha^{-1} yr^{-1})	PEC/CL (%)	Significance (EA H1)
Humber Estuary	Fixed dunes with herbaceous vegetation	Supralittoral sediment (acidic type)	0.643	2.48	1.06×10^{-3}	<1	2.48	386	Not Significant
		Supralittoral sediment (calcareous type)	4.856	2.48	1.06×10^{-3}	<1	2.48	51	Not Significant
	Dunes with *Hippophae rhamnoides*	n/a	0.643	2.48	1.06×10^{-3}	<1	2.48	386	Not Significant
Lower Derwent Valley	Neutral Grassland (calcareous type)	n/a	4.856	2.77	1.40×10^{-3}	<1	2.77	57	Not Significant
River Derwent	No habitat sensitive to acidification.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	n/a	0.802	1.67	1.12×10^{-3}	<1	1.67	208	Not Significant
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	0.802	1.67	1.12×10^{-3}	<1	1.67	208	Not Significant
Thorne Moor	Degraded raised bogs still capable of	n/a	0.462	1.71	9.35×10^{-4}	<1	1.71	370	Not Significant

	natural regeneration								

Table 4.5 Predicted Nutrient Nitrogen Deposition at Ecological Receptors (Annual Mean)

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance (EA H1)
Humber Estuary	Fixed dunes with herbaceous vegetation (grey dunes) (H2130)	Supralittoral sediment (acidic type)	8	31.1	7.09×10^{-3}	<0.1	31.1	389	Not Significant
		Supralittoral sediment (calcareous type)	10	31.1	7.09×10^{-3}	<0.1	31.1	311	Not Significant
	Embryonic shifting dunes	n/a	10	31.1	7.09×10^{-3}	<0.1	31.1	311	Not Significant
	shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	n/a	10	31.1	7.09×10^{-3}	<0.1	31.1	311	Not Significant
	Coastal Lagoons	n/a	20	57.7	7.09×10^{-3}	<0.1	57.7	288	Not Significant
	Estuaries	n/a	20	31.1	7.09×10^{-3}	<0.1	31.1	155	Not Significant
	Salicornia and other annuals	n/a	20	31.1	7.09×10^{-3}	<0.1	31.1	155	Not Significant

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance (EA H1)
	colonising mud and sand								
	Pioneer, low-mid, mid-upper saltmarshes	n/a	20	31.1	7.09 x 10^{-3}	<0.1	31.1	155	Not Significant
	Dunes with *Hippophae rhamnoides*	n/a	No comparable habitat with established critical load estimate available	31.1	7.09 x 10^{-3}	n/a	31.1	n/a	n/a
	Mudflats and sandflats not covered by seawater at low tide	n/a	No comparable habitat with established critical load estimate available	31.1	7.09 x 10^{-3}	n/a	31.1	n/a	n/a
Lower Derwent Valley	Lowland Hay meadows	Neutral Grassland (acid type)	20	35.4	9.35 x 10^{-3}	<1	35.4	177	Not Significant
		Neutral grassland (calcareous type)	20	35.4	9.35 x 10^{-3}	<1	35.4	177	Not Significant
River Derwent	No sensitive ecological habitat present	n/a	No comparable habitat with established critical load estimate	n/a	n/a	n/a	n/a	n/a	n/a

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance (EA H1)
			available						
Skipwith Common	European dry heaths	n/a	10	20.2	7.54 x 10^{-3}	<1	20.2	202	Not Significant
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	10	20.2	7.54 x 10^{-3}	<1	20.2	202	Not Significant
Thorne Moor	Degraded raised bogs still capable of natural regeneration	n/a	5	20.7	6.24 x 10^{-3}	<1	20.7	415	Not Significant

Table 4.6 Predicted NO_X at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance (EA H1)
Humber Estuary	30	18.0	0.0101	<1	18.0	60	Not Significant
Lower Derwent Valley	30	12.8	0.0138	<1	12.8	43	Not Significant
River Derwent	30	13.8	0.0731	<1	13.8	46	Not Significant
Skipwith Common	30	12.9	0.0103	<1	12.9	43	Not Significant
Thorne Moor	30	15.7	8.84 x 10^{-3}	<1	15.7	53	Not Significant

Table 4.7 Predicted NO_X at Ecological Receptors (24 hour Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance (EA H1)
Humber Estuary	75	36.0	0.103	<1	36.1	48	Not Significant
Lower Derwent Valley	75	25.6	0.173	<1	25.7	34	Not Significant
River Derwent	75	27.6	0.728	<1	28.3	38	Not Significant
Skipwith Common	75	25.9	0.113	<1	26.0	35	Not Significant
Thorne Moor	75	31.5	0.101	<1	31.6	42	Not Significant

Table 4.8 Predicted SO_2 at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance (EA H1)
Humber Estuary	10	5.39	4.68×10^{-3}	<1	5.39	54	Not Significant
Lower Derwent Valley	10	5.99	6.12×10^{-3}	<1	6.00	60	Not Significant
River Derwent	10	5.76	0.0332	<1	5.79	58	Not Significant
Skipwith Common	10	6.75	4.95×10^{-3}	<1	6.75	68	Not Significant
Thorne Moor	10	4.81	4.12×10^{-3}	<1	4.81	48	Not Significant

Table 4.9 Predicted Ammonia Concentrations at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance (EA H1)
Humber Estuary	1	2.18	1.08×10^{-3}	<1	2.18	218	Not Significant
Lower Derwent Valley	1	2.18	1.42×10^{-3}	<1	2.18	218	Not Significant
River Derwent	1	2.18	7.70×10^{-3}	<1	2.18	218	Not Significant
Skipwith Common	1	2.18	1.15×10^{-3}	<1	2.18	218	Not Significant
Thorne Moor	1	2.18	9.55×10^{-4}	<1	2.18	218	Not Significant

Table 4.10 Predicted Hydrogen Fluoride at Ecological Receptors (Weekly Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance (EA H1)
Humber Estuary	0.5	1.23	3.29×10^{-5}	<1	1.23	246	Not Significant
Lower Derwent Valley	0.5	1.23	5.15×10^{-5}	<1	1.23	246	Not Significant
River Derwent	0.5	1.23	2.429×10^{-4}	<1	1.23	246	Not Significant
Skipwith Common	0.5	1.23	3.60×10^{-5}	<1	1.23	246	Not Significant
Thorne Moor	0.5	1.23	2.55×10^{-5}	<1	1.23	246	Not Significant

Table 4.11 Predicted Hydrogen Fluoride at Ecological Receptors (24 hour Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance (EA H1)
Humber Estuary	5	1.45	7.81×10^{-5}	<1	1.45	29	Not Significant
Lower Derwent Valley	5	1.45	1.14×10^{-4}	<1	1.45	29	Not Significant
River Derwent	5	1.45	4.97×10^{-4}	<1	1.45	29	Not Significant
Skipwith Common	5	1.45	1.01×10^{-4}	<1	1.45	29	Not Significant
Thorne Moor	5	1.45	1.02×10^{-4}	<1	1.45	29	Not Significant

The results of the assessment identified that based on the maximum predicted concentrations at any point within the habitats identified; effects on sensitive ecological receptors during operation in oxy-mode will be not significant for nutrient nitrogen and acid deposition, and for ambient concentrations of NO_x, SO_2, NH_3 and HF.

Summary of Predicted Effects at Sensitive Ecological Receptors while operating in Air-Mode (abnormal conditions)

Table 4.12 to *Table 4.19* set out the results of the dispersion modelling for the sensitive ecological receptors due to acid deposition, nutrient nitrogen deposition, NO_x, SO_2, NH_3 and HF. These results are based upon modelling of emissions as specified in *(Emissions to Atmosphere Technical Report, Table 5.16 (Volume 2, Chapter A of the ES)).*

The effects on sensitive ecological receptors are defined on the basis of the highest impacts arising at any point on the designated habitat. Therefore, the predicted effects may not actually relate to the sensitive feature described. This approach is a worst case assessment.

Table 4.12 Predicted Acid Deposition at Ecological Receptors (Annual Mean)

Site	APIS Habitat – main feature	APIS Habitat – broad habitat	Critical Load for Acid Deposition (keq ha^{-1} yr^{-1})	Background Acid Deposition (keq ha^{-1} yr^{-1})	PC (keq ha^{-1} yr^{-1})	PC/CL (%)	PEC (keq ha^{-1} yr^{-1})	PEC/CL	Significance
Humber Estuary	Fixed dunes with herbaceous vegetation	Supralittoral sediment (acidic type)	0.643	2.48	0.0368	6	2.52	391	Unacceptable
		Supralittoral sediment (calcareous type)	4.856	2.48	0.0368	<1	2.52	52	Not Significant
	Dunes with *Hippophae rhamnoides*	n/a	0.643	2.48	0.0368	6	2.52	391	Unacceptable
Lower Derwent Valley	Neutral Grassland (calcareous type)	n/a	4.856	2.77	0.0470	<1	2.81	58	Not Significant
River Derwent	NO habitat sensitive to acidification.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	n/a	0.802	1.67	0.0417	5	1.71	213	Unacceptable
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	0.802	1.67	0.0417	5	1.71	213	Unacceptable
Thorne Moor	Degraded raised bogs still capable of natural regeneration	n/a	0.462	1.71	0.0310	7	1.74	377	Unacceptable

Table 4.13 Predicted Nutrient Nitrogen Deposition at Ecological Receptors (Annual Mean)

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance
Humber Estuary	Fixed dunes with herbaceous vegetation (grey dunes) (H2130)	Supralittoral sediment (acidic type)	8	31.08	0.0397	<1	31.1	389	Not Significant
		Supralittoral sediment (calcareous type)	10	31.08	0.0397	<1	31.1	311	Not Significant
	Embryonic shifting dunes	n/a	10	31.08	0.0397	<1	31.1	311	Not Significant
	shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	n/a	10	31.08	0.0397	<1	31.1	311	Not Significant
	Coastal Lagoons	n/a	20	57.68	0.0397	<1	57.7	289	Not Significant
	Estuaries	n/a	20	31.08	0.0397	<1	31.1	156	Not Significant
	Salicornia and other annuals colonising mud and sand	n/a	20	31.08	0.0397	<1	31.1	156	Not Significant
	Pioneer, low-mid, mid-upper saltmarshes	n/a	20	31.08	0.0397	<1	31.1	156	Not Significant

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance
	Dunes with *Hippophae rhamnoides*	n/a	No comparable habitat with established critical load estimate available	31.08	0.0397	n/a	n/a	n/a	n/a
	Mudflats and sandflats not covered by seawater at low tide	n/a	No comparable habitat with established critical load estimate available	31.08	0.0397	n/a	n/a	n/a	n/a
Lower Derwent Valley	Lowland Hay meadows	Neutral Grassland (acid type)	20	35.4	0.0489	<1	35.5	177	Not Significant
		Neutral grassland (calcareous type)	20	35.4	0.0489	<1	35.5	177	Not Significant
River Derwent	No sensitive ecological habitat present	n/a	No comparable habitat with established critical load estimate available	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	n/a	10	20.2	0.0442	<1	20.2	202	Not Significant

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	10	20.2	0.0442	<1	20.2	202	Not Significant
Thorne Moor	Degraded raised bogs still capable of natural regeneration	n/a	5	20.7	0.0337	<1	20.8	415	Not Significant

Table 4.14 Predicted NO_X at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	30	15.0	0.233	<1	15.3	51	Not Significant
Lower Derwent Valley	30	12.8	0.287	<1	13.1	44	Not Significant
River Derwent	30	13.8	1.46	5	15.3	51	Acceptable
Skipwith Common	30	12.9	0.260	<1	13.2	44	Not Significant
Thorne Moor	30	15.8	0.198	<1	16.0	53	Not Significant

Table 4.15 Predicted NO_X at Ecological Receptors (24 hour Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	75	30.0	2.71	4	34.2	44	Not Significant
Lower Derwent Valley	75	25.6	3.15	4	28.1	38	Not Significant
River Derwent	75	27.6	14.2	19	41.1	56	Acceptable
Skipwith Common	75	25.9	2.83	4	28.0	38	Not Significant
Thorne Moor	75	31.6	1.97	3	34.8	45	Not Significant

Table 4.4.16 Predicted SO_2 at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	10	5.39	0.259	3	5.65	56	Acceptable
Lower Derwent Valley	10	5.99	0.318	3	6.31	63	Acceptable
River Derwent	10	5.76	1.62	16	7.38	74	Unacceptable
Skipwith Common	10	6.75	0.288	3	7.04	70	Unacceptable
Thorne Moor	10	4.53	0.219	2	4.75	47	Acceptable

Table 4.17 Predicted Ammonia Concentrations at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	1	2.18	1.19×10^{-3}	<1	2.18	218	Not Significant
Lower Derwent Valley	1	2.18	1.46×10^{-3}	<1	2.18	218	Not Significant
River Derwent	1	2.18	7.42×10^{-3}	<1	2.18	218	Not Significant
Skipwith Common	1	2.18	1.32×10^{-3}	<1	2.18	218	Not Significant
Thorne Moor	1	2.18	1.00×10^{-3}	<1	2.18	218	Not Significant

Table 4.18 Predicted Hydrogen Fluoride at Ecological Receptors (Weekly Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	0.5	1.23	2.23×10^{-3}	<1	1.23	246	Not Significant
Lower Derwent Valley	0.5	1.23	3.45×10^{-3}	<1	1.23	247	Not Significant
River Derwent	0.5	1.23	0.0132	3	1.24	249	Not Significant
Skipwith Common	0.5	1.23	2.69×10^{-3}	<1	1.23	247	Not Significant
Thorne Moor	0.5	1.23	1.78×10^{-3}	<1	1.23	246	Not Significant

Table 4.19 Predicted Hydrogen Fluoride at Ecological Receptors (24 hour Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	5	1.45	6.51×10^{-3}	<1	1.46	29	Not Significant
Lower Derwent Valley	5	1.45	7.55×10^{-3}	<1	1.46	29	Not Significant
River Derwent	5	1.45	0.0340	<1	1.49	30	Not Significant
Skipwith Common	5	1.45	6.79×10^{-3}	<1	1.46	29	Not Significant
Thorne Moor	5	1.45	4.72×10^{-3}	<1	1.46	29	Not Significant

When operating in air-mode several unacceptable impacts associated with effects on habitats are predicted. Specifically, these relate to acid deposition at Humber Estuary, Skipwith Common and Thorne Moor (as the annual mean) and SO_2 impacts at River Derwent and Skipwith Common (as the annual mean). The context for these air quality impacts in terms of likely significant effects on the European sites is discussed further in *Section 4.4.6*.

In practice the effects associated with acid deposition and SO_2 (measured as an annual mean) will not arise, as air-mode is not the expected primary operational mode for the Project.

Summary of Predicted Effects at Sensitive Ecological Receptors while operating in Oxy-Mode with Auxiliary Boiler start-up combined

Table 4.20 to *Table 4.24* set out the results of the dispersion modelling for the sensitive ecological receptors due to acid deposition, nutrient nitrogen deposition, NO_x and SO_2 in oxy-mode with auxiliary boiler start up. The results of the modelling are based upon modelling of emissions as presented in *(Emissions to Atmosphere Technical Report, Chapter A of the ES, Table 5.11, Table 5.12, Table 5.13, Table 5.28 and Table 5.29).*

The effects on sensitive ecological receptors are defined on the basis of the highest impacts arising at any point on the designated habitat. Therefore, the predicted effects may not actually relate to the sensitive feature described. This approach is worst case.

Table 4.20 Predicted Acid Deposition at Ecological Receptors (Annual Mean)

Site	APIS Habitat – main feature	APIS Habitat – broad habitat	Critical Load for Acid Deposition (keq ha^{-1} yr^{-1})	Background Acid Deposition (keq ha^{-1} yr^{-1})	PC (keq ha^{-1} yr^{-1})	PC/CL (%)	PEC (keq ha^{-1} yr^{-1})	PEC/CL	Significance (H1)
Humber Estuary	Fixed dunes with herbaceous vegetation	Supralittoral sediment (acidic type)	0.643	2.48	1.09×10^{-3}	<1	2.48	386	Not Significant
		Supralittoral sediment (calcareous type)	4.856	2.48	1.09×10^{-3}	<1	2.48	51.1	Not Significant
	Dunes with *Hippophae rhamnoides*	n/a	0.643	2.48	1.09×10^{-3}	<1	2.48	386	Not Significant
Lower Derwent Valley	Neutral Grassland (calcareous type)	n/a	4.856	2.77	1.43×10^{-3}	<1	2.77	58	Not Significant
River Derwent	NO habitat sensitive to acidification.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	n/a	0.802	1.67	1.15×10^{-3}	<1	1.67	208	Not Significant
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	0.802	1.67	1.15×10^{-3}	<1	1.67	208	Not Significant
Thorne Moor	Degraded raised bogs still capable of natural regeneration	n/a	0.462	1.71	9.64×10^{-4}	<1	1.71	370	Not Significant

Table 4.21 Predicted Nutrient Nitrogen Deposition at Ecological Receptors (Annual Mean)

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance (H1)
Humber Estuary	Fixed dunes with herbaceous vegetation (grey dunes) (H2130)	Supralittoral sediment (acidic type)	8	31.08	7.13×10^{-3}	<1	31.1	389	Not Significant
		Supralittoral sediment (calcareous type)	10	31.08	7.13×10^{-3}	<1	31.1	311	Not Significant
	Embryonic shifting dunes	n/a	10	31.08	7.13×10^{-3}	<1	31.1	311	Not Significant
	shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	n/a	10	31.08	7.13×10^{-3}	<1	31.1	311	Not Significant
	Coastal Lagoons	n/a	20	57.7	7.13×10^{-3}	<1	57.7	288	Not Significant
	Estuaries	n/a	20	31.1	7.13×10^{-3}	<1	31.1	155	Not Significant
	Salicornia and other annuals colonising mud and sand	n/a	20	31.1	7.13×10^{-3}	<1	31.1	155	Not Significant
	Pioneer, low-mid, mid-upper saltmarshes	n/a	20	31.1	7.13×10^{-3}	<1	31.1	155	Not Significant

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance (H1)
	Dunes with *Hippophae rhamnoides*	n/a	No comparable habitat with established critical load estimate available	n/a	n/a	n/a	n/a	n/a	n/a
	Mudflats and sandflats not covered by seawater at low tide	n/a	No comparable habitat with established critical load estimate available	n/a	n/a	n/a	n/a	n/a	n/a
Lower Derwent Valley	Lowland Hay meadows	Neutral Grassland (acid type)	20	35.4	9.41×10^{-3}	<1	35.4	177	Not Significant
		Neutral grassland (calcareous type)	20	35.4	9.41×10^{-3}	<1	35.4	177	Not Significant
River Derwent	No sensitive ecological habitat present	n/a	No comparable habitat with established critical load estimate available	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	n/a	10	20.2	7.49×10^{-3}	<1	20.2	202	Not Significant

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance (H1)
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	10	20.2	7.49×10^{-3}	<1	20.2	202	Not Significant
Thorne Moor	Degraded raised bogs still capable of natural regeneration	n/a	5	20.7	6.28×10^{-3}	<1	20.7	415	Not Significant

Table 4.22 Predicted NO_X at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	30	18.0	0.0104	<1	18.0	60	Not Significant
Lower Derwent Valley	30	12.8	0.0142	<1	12.8	43	Not Significant
River Derwent	30	13.8	0.0750	<1	13.9	46	Not Significant
Skipwith Common	30	12.9	0.0107	<1	13.0	43	Not Significant
Thorne Moor	30	15.8	9.13×10^{-3}	<1	15.8	53	Not Significant

Table 4.23 Predicted NO_X at Ecological Receptors (24 hour Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	75	36.0	0.527	<1	36.5	49	Not Significant
Lower Derwent Valley	75	25.6	0.584	<1	26.1	35	Not Significant
River Derwent	75	27.9	2.334	3	30.3	40	Not Significant
Skipwith Common	75	26.0	0.702	<1	26.7	36	Not Significant
Thorne Moor	75	29.8	0.848	1	30.6	41	Not Significant

Table 4.24 Predicted SO_2 at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	10	5.39	4.91×10^{-3}	<1	5.39	54	Not Significant
Lower Derwent Valley	10	5.99	6.42×10^{-3}	<1	6.00	60	Not Significant
River Derwent	10	5.76	0.0346	<1	5.79	58	Not Significant
Skipwith Common	10	6.75	5.19×10^{-3}	<1	6.76	68	Not Significant
Thorne Moor	10	4.53	4.34×10^{-3}	<1	4.53	45	Not Significant

The results of the assessment identified that based on the maximum predicted concentrations at any point within the habitats identified; effects on sensitive ecological receptors will be not significant for nutrient nitrogen and acid deposition, and for ambient concentrations of NO_x and SO_2.

Summary of Predicted Effects at Sensitive Ecological Receptors while operating in Air-Mode with Auxiliary Boiler start-up combined

Table 4.25 to Table 4.29 set out the results of the dispersion modelling for the sensitive ecological receptors due to acid deposition, nutrient nitrogen deposition, NO_x and SO_2 in air mode with auxiliary boiler start up. These results are based upon modelling of emissions as specified in *(Emissions to Atmosphere Technical Report, Table 5.18, Table 5.28 and Table 5.29 (Chapter A of the ES)).*

The effects on sensitive ecological receptors are defined on the basis of the highest impacts arising at any point on the designated habitat. Therefore, the predicted effects may not actually relate to the sensitive feature described. This approach is worst case.

Table 4.25 Predicted Acid Deposition at Ecological Receptors (Annual Mean)

Site	APIS Habitat – main feature	APIS Habitat – broad habitat	Critical Load for Acid Deposition (keq ha^{-1} yr^{-1})	Background Acid Deposition (keq ha^{-1} yr^{-1})	PC (keq ha^{-1} yr^{-1})	PC/CL (%)	PEC (keq ha^{-1} yr^{-1})	PEC/CL	Significance
Humber Estuary	Fixed dunes with herbaceous vegetation	Supralittoral sediment (acidic type)	0.643	2.48	0.0368	6	2.52	391	Unacceptable
		Supralittoral sediment (calcareous type)	4.856	2.48	0.0368	<1	2.52	52	Not Significant
	Dunes with *Hippophae rhamnoides*	n/a	0.643	2.48	0.0368	6	2.52	391	Unacceptable
Lower Derwent Valley	Neutral Grassland (calcareous type)	n/a	4.856	2.77	0.0471	<1	2.82	58	Not Significant
River Derwent	NO habitat sensitive to acidification.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	n/a	0.802	1.67	0.0417	5	1.71	213	Unacceptable
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	0.802	1.67	0.0417	5	1.71	213	Unacceptable
Thorne Moor	Degraded raised bogs still capable of natural regeneration	n/a	0.462	1.71	0.0310	7	1.74	377	Unacceptable

Table 4.26 Predicted Nutrient Nitrogen Deposition at Ecological Receptors (Annual Mean)

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance
Humber Estuary	Fixed dunes with herbaceous vegetation (grey dunes) (H2130)	Supralittoral sediment (acidic type)	8	31.08	0.0398	<1	31.1	389	Not Significant
		Supralittoral sediment (calcareous type)	10	31.08	0.0398	<1	31.1	311	Not Significant
	Embryonic shifting dunes	n/a	10	31.08	0.0398	<1	31.1	311	Not Significant
	shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	n/a	10	31.08	0.0398	<1	31.1	311	Not Significant
	Coastal Lagoons	n/a	20	57.68	0.0398	<1	31.1	289	Not Significant
	Estuaries	n/a	20	31.08	0.0398	<1	31.1	156	Not Significant
	Salicornia and other annuals colonising mud and sand	n/a	20	31.08	0.0398	<1	31.1	156	Not Significant
	Pioneer, low-mid, mid-upper saltmarshes	n/a	20	31.08	0.0398	<1	31.1	156	Not Significant

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance
	Dunes with *Hippophae rhamnoides*	n/a	No comparable habitat with established critical load estimate available	n/a	n/a	n/a	n/a	n/a	n/a
	Mudflats and sandflats not covered by seawater at low tide	n/a	No comparable habitat with established critical load estimate available	n/a	n/a	n/a	n/a	n/a	n/a
Lower Derwent Valley	Lowland Hay meadows	Neutral Grassland (acid type)	20	35.4	0.0490	<1	35.4	177	Not Significant
		Neutral grassland (calcareous type)	20	35.4	0.0490	<1	35.4	177	Not Significant
River Derwent	No sensitive ecological habitat present	n/a	No comparable habitat with established critical load estimate available	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	n/a	10	20.2	0.443	<1	20.2	202	Not Significant

Sites	APIS Habitat feature	Sub feature	Critical Load for Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	Background Nutrient Nitrogen Deposition (kgN ha^{-1} yr^{-1})	PC (kgN ha^{-1} yr^{-1})	PC/CL (%)	PEC (kgN ha^{-1} yr^{-1})	PEC/CL (%)	Significance
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	10	20.2	0.443	<1	20.2	202	Not Significant
Thorne Moor	Degraded raised bogs still capable of natural regeneration	n/a	5	20.7	0.0337	<1	20.7	415	Not Significant

Table 4.27 Predicted NO_X at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	30	18.0	0.160	<1	18.2	61	Not Significant
Lower Derwent Valley	30	12.8	0.253	<1	13.1	44	Not Significant
River Derwent	30	13.8	1.46	5	15.3	51	Acceptable
Skipwith Common	30	12.9	0.163	<1	13.2	44	Not Significant
Thorne Moor	30	14.9	0.136	<1	15.1	50	Not Significant

Table 4.28 Predicted NO_X at Ecological Receptors (24 hour Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	75	36.0	3.06	4	39.0	52	Not Significant
Lower Derwent Valley	75	25.6	3.55	5	29.1	39	Not Significant
River Derwent	75	27.6	15.6	21	43.2	58	Acceptable
Skipwith Common	75	25.9	3.38	5	29.3	39	Not Significant
Thorne Moor	75	29.8	2.52	3	32.3	43	Not Significant

Table 4.29 Predicted SO_2 at Ecological Receptors (Annual Mean)

Sites	Critical Level (µg m^{-3})	Background Conditions (µg m^{-3})	PC (µg m^{-3})	PC/ AQS (%)	PEC (µg m^{-3})	PEC/AQS (%)	Significance
Humber Estuary	10	5.39	0.259	3	5.65	56	Acceptable
Lower Derwent Valley	10	5.99	0.319	3	6.31	63	Acceptable
River Derwent	10	5.76	1.619	16	7.38	74	Not acceptable
Skipwith Common	10	6.75	0.288	3	7.04	70	Not acceptable
Thorne Moor	10	4.53	0.219	2	4.75	47	Acceptable

When operating in air-mode in combination with the auxiliary boiler during start up, a number of unacceptable impacts associated with effects on habitats are predicted. Specifically, these relate to acid deposition at Humber Estuary, Skipwith Common and Thorne Moor (annual mean) and impacts of SO_2 (annual mean) on the River Derwent and Skipwith Common resulting in not insignificant emission exceedances. The context for these air quality impacts in terms of likely significant effects on the European sites is discussed further in *Section 4.4.6*. It should be further noted that use of the auxiliary boiler would not be for sustained periods and would not therefore make a material contribution to annual deposition rates or annual average atmospheric concentrations at European sites.

In practice the impacts associated with acid deposition and SO_2 (measured as an annual mean) will not arise, as air-mode is not the expected primary operational mode for the Project.

4.4.6 The Emissions Performance Standard

The Emissions Performance Standard (EPS) provides a regulatory back-stop on CO_2 emissions from new power stations by setting an annual limit equivalent to 450g CO_2/kWh at baseload for new fossil fuelled plant (only applicable to plant over 50MWe).

Effectively the EPS thus requires that new coal-fired power stations are equipped with CCS to enable them to operate under this emissions threshold. Power stations consented under the EPS would be subject to the 450 g/kWh level until 2045 (1).

The annual EPS limit of 450g/kWh is to be interpreted as a total CO_2 tonnage allowance within which the generating plant would have to remain each year. For the Project the annual limit is based on a load factor of 85% and the plant's installed electrical capacity.

The net annual emissions (assuming the plant was operating entirely in air mode (abnormal operations)) would be the total emissions without abatement, i.e. 2.6 Mt CO2, which would exceed the EPS allowance. In this situation, to remain within the EPS allowance the Project would be limited to operating for 56% of the year, i.e. 29 weeks.

(1) Electricity Market Reform: Update on the Emissions Performance Standard, available from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48375/5350-emr-annex-d--update-on-the-emissions-performance-s.pdf

The EPS will only be applicable to new power stations (with CCS capability) after their first three years of operation, to allow for commissioning and testing of new CCS technology during the first three years of operation. As a result it would be possible, and therefore a realistic worst case scenario, for the Project to operate in air mode for 100% of the time during these three years. However after this time, the Project would be limited to operating in air mode for 56% of the year.

As a result, further screening of effects, assuming a worst case operating scenario of 56% of the time in air mode, to assess the effects of the project once the EPS is applied, are presented below.

Summary of Predicted Impacts at Sensitive Ecological Receptors while operating in Air-Mode for 56% of time

Table 4.30 to Table 4.31 set out the results of the dispersion modelling for the sensitive ecological receptors due to acid deposition and SO_2 deposition, the two pollutants for which it cannot be concluded there will be no LSE at 100% operation in air mode. As the PC for pollutants is lower when operating for 56% of the time rather than 100% of the time, it can be assumed that the effects for all other pollutants will be Not Significant when operating at 56% of the time in air mode. Modelling is therefore confined to acid deposition and SO_2 to ascertain if there are unacceptable effects on European protected sites when operating in 56% air mode. These results are based upon modelling of emissions as specified in *in the Emissions to Atmosphere Technical Report, Chapter A of the ES Table 5.16.*

The effects on sensitive ecological receptors are defined on the basis of the highest impacts arising at any point on the designated habitat. Therefore, the predicted effects may not actually relate to the sensitive feature described. This approach is worst case.

Table 4.30 Predicted Acid Deposition at Ecological Receptors (Annual Mean) Assuming Air Mode Operating at 56% of the Time

Site	APIS Habitat – main feature	APIS Habitat – broad habitat	Critical Load for Acid Deposition (keq ha^{-1} yr^{-1})	Background Acid Deposition (keq ha^{-1} yr^{-1})	PC (keq ha^{-1} yr^{-1})	PC/CL (%)	PEC (keq ha^{-1} yr^{-1})	PEC/CL	Significance
Humber Estuary	Fixed dunes with herbaceous vegetation	Supralittoral sediment (acidic type)	0.643	2.48	0.021	3.2	2.50	389	Unacceptable
		Supralittoral sediment (calcareous type)	4.856	2.48	0.021	0.4	2.50	51	Not Significant
	Dunes with *Hippophae rhamnoides*	n/a	0.643	2.48	0.021	3.2	2.50	389	Unacceptable
Lower Derwent Valley	Neutral Grassland (calcareous type)	n/a	4.856	2.77	0.0263	0.5	2.80	58	Not Significant
River Derwent	NO habitat sensitive to acidification.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Skipwith Common	European dry heaths	n/a	0.802	1.67	0.0234	2.9	1.69	211	Unacceptable
	Northern Atlantic wet heaths with *Erica tetralix*	n/a	0.802	1.67	0.0234	2.9	1.69	211	Unacceptable
Thorne Moor	Degraded raised bogs still capable of natural regeneration	n/a	0.462	1.71	0.0174	3.8	1.73	374	Unacceptable

Table 4.31 Predicted SO_2 at Ecological Receptors (Annual Mean) Assuming Air Mode Operating at 56% of the Time

Sites	Critical Level (µg m-3)	Background Conditions (µg m-3)	PC (µg m-3)	PC/ AQS (%)	PEC (µg m-3)	PEC/AQS (%)	Significance
Humber Estuary	10	5.39	0.145	1.5	5.54	55	Acceptable
Lower Derwent Valley	10	5.99	0.178	1.8	6.17	62	Acceptable
River Derwent	10	5.76	0.907	9.2	6.67	67	Acceptable
Skipwith Common	10	6.75	0.161	1.6	6.91	69	Acceptable
Thorne Moor	10	4.53	0.123	1.2	4.65	47	Acceptable

The results presented in *Table 4.30* show that when operating in air mode for 56% of the time, unacceptable impacts would still occur at three European sites as a result of acid deposition. No significant effects of SO_2 occur under this operational mode.

The likelihood of the predicted acid deposition levels resulting in a significant ecological effect at these four sites are screened further in the following section.

4.4.7 Summary of Overall Predicted Impacts at Sensitive Ecological Receptors Considering three years operating at up to 100% in Air Mode and then 56% in Air Mode

The realistic worst case for the Project in terms of emissions to atmosphere would be that the plant operating in 100% air mode for up to three years during commissioning, followed by the rest of the operational life operating at 56% air mode. During the first three years at 100% air mode, the following impacts have been identified by the emissions modelling:

- Humber Estuary SAC – acid deposition;
- Skipwith common SAC – acid deposition and SO_2;
- Thorne Moor SAC – acid deposition; and
- River Derwent SAC – SO_2.

During the rest of the operational life of the Project at 56% air mode, the following impacts have been identified by the emissions modelling:

- Humber Estuary SAC – acid deposition;
- Skipwith common SAC – acid deposition; and
- Thorne Moor SAC – acid deposition.

Only two qualifying interest feature Annex I habitats of the Humber Estuary SAC (and component habitats of the Ramsar Criterion 1) are sensitive to acid deposition:

- Fixed dunes with herbaceous vegetation; and
- Dunes with *Hippophae rhamnoides*

The level of background acid deposition on the Humber Estuary is currently 2.48 keq ha^{-1} yr^{-1}, which exceeds the critical load for both of the SAC qualifying interest features and the Ramsar qualifying interest feature which are sensitive to acid deposition (Fixed dunes with herbaceous vegetation and Dunes with *Hippophae rhamnoides*) of 0.643 keq ha^{-1} yr^{-1}. The process

contribution from the Project during the three years operating at 100% air mode (0.0368 keq ha^{-1} yr^{-1}) equates to 1.4% of background levels if these habitats were within 15 km of the Project. The process contribution from the Project operating in air mode for 56% of the year (0.0206 keq ha^{-1} yr^{-1}) equates to 0.8% of background levels if these habitats were within 15km of the Project.

In reality both of these qualifying features are coastal habitats that do not occur within the upper reaches of the estuary. The closest areas of Coastal Sand Dune Biodiversity Action Plan Sand Dune habitat shown on the MAGIC website (1) within the Humber estuary are approximately 67 km southeast of the Project site at Cleethorpes. As a result the qualifying interest feature Annex I dune habitats will not experience the levels of acid deposition predicted by the air quality modelling for areas within 15 km, and no likely significant effects are predicted on the Humber Estuary SAC or Humber Estuary Ramsar Site.

The rest of the impacts identified within the air quality modelling as un-acceptable (ie requiring further assessment) in either 100% air mode or in air mode for 56% of the time are taken forward to Stage 2 of the HRA process.

4.5 IN COMBINATION ASSESSMENT

The ES sets out the approach to assessing the cumulative effects of the Project in *Chapter 3 Section 3.6*. The same approach has been used to identify plans and projects which may have an in combination effect on European sites for this HRA. Other developments considered in the assessment include those which are:

- under construction;
- permitted application(s), but not yet implemented;
- submitted application(s) not yet determined;
- projects on PINS programme of projects;
- identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited; and
- identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

(1) http://magic.defra.gov.uk/MagicMap.aspx accessed September 2014

The full list of developments considered is presented in *Table 4.32* and shown in *Figure 4.1.* No direct impacts from the Project on European sites have been identified as part of the EIA or HRA and therefore the in combination assessment focusses on potential indirect impacts from emissions to air.

The cumulative assessment undertaken for the EIA used an area of influence for air quality of 30 km from the Project, to identify other sources of emissions to air up to 15 km from receptors which might be affected by the Project (potentially 15 km from the Project, and 15 km from another source of emissions).

However, as part of the Section 42 ES consultation NE stated that:

"*As mentioned in our response to the Section 42 consultation, we welcome the inclusion of other power projects in the cumulative effects assessment. This would include other coal or oil fired power stations within 15 km of any of the designated sites which have been included in the emissions assessment and other significant combustion sources with 10 km".*

None of the projects identified within the area of influence is a coal or oil fired power station. Therefore, *Table 4.2* presents those projects screened into the ES cumulative assessment as a result of potential air quality impacts, together with the distance to the closest European Site considered in this HRA. The location of these projects, relative to the Project and European designated sites is shown in *Figure 4.2*. None of the projects lie within 10 km of the designated sites screened into this HRA. The closest project to any of the designated sites is the Pollington Airfield Biomass Project which is 10.5 km from the Thorne Moor SAC. As a result, no in combination effects are predicted.

Table 4.32 Projects and Plans with the Potential for Cumulative Effects in Combination with the Project

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
The proposed Don Valley Power Plant CCS scheme	Located in South Yorkshire will use pre-combustion CO_2 capture technology in a new build integrated gasification combined cycle (IGCC) coal fired power plant. The project would have a gross electrical output of 650 MWe. The captured gas is proposed to be compressed and transported to the North Sea for sequestration via NGCL's pipeline.	Approximately 25 km due south. Grid Ref: SE654116 Easting 465471, Northing 411664	On hold. The project was granted its Section 36 in 2009. To be built in two stages: firstly a CCGT gas fired power station that is designed and optimised for operation using hydrogen-rich gas and the second phase, at a later date would add coal gasification and a carbon capture facility and convert the CCGT plant to run on the hydrogen-rich gas. However the project deselected from commercialisation programme and 2Co now plans to make Financial Investment Decision by the end of 2015.	**Not included** This scheme is not currently being progressed		**24**
The Ouse Renewable Energy Plant	Drax had proposed to construct and operate a 290 MWe biomass power station on a previously used site within the Drax Power Ltd landholding, immediately to the north of the existing Drax Power Station.	Adjacent to the Project site.	Drax had submitted an application under section 36 of the Electricity Act 1989 but however have now confirmed cancellation of the Project on the ground that it is no longer economically feasible.	**Not included** This scheme is not currently being progressed		**1**
National Grid Carbon Ltd	Pipeline to transport the CO_2 generated by the	The pipeline will run from the	NGCL has submitted a DCO for a pipeline and associated facilities and it has been	**Included** Relevant	**During construction**	**43**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
(NGCL) Pipeline	Project to an undersea location in the North Sea. Additionally the NGCL pipeline will support the development of carbon capture, transport and storage in the wider Yorkshire and Humber region. The pipeline would initially transport up to 2 million tonnes of CO_2 per year (from the Project). The design of the pipeline is such that it will be able to transport safely up to 17 million tonnes per year when the regional network of CO_2 emitters has been 'plugged in'.	Project site to Bridlington (Grid Ref: (TA170595) Easting 517005, Northing 459586) on the coast (approx. 75 km) and then out into the North Sea to a location for permanent storage in geological features under the North Sea.	accepted for examination by Planning Inspectorate.	aspects being/to be addressed.	**potential receptors include:** • **surface water** • **ecology** • **noise** • **traffic** • **landscape** **Operational stage of the pipeline not considered within the assessment.**	
Drax Power Ltd – annual 'outages'	Every year the existing Drax Power Station is subject to periodic shut down where one or more of the six operational units are taken out of electrical generation to facilitate maintenance and servicing. These periods	Drax Power Site. Grid Ref: SE662266 Easting 466213, Northing 426635	N/A	**Included** Chiefly of relevance due to additional periodic traffic.	**During construction potential receptors include:** • **socio-economic** • **transport and traffic**	**25**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	are referred to as 'outages'. During outages, a large number of contractors are present on site. This level peaks at around 1,000 contractors for a central four week period.				**Not applicable during operation.**	
Capture Power Ltd	Site Raising EIA	On the Operational Area	Planning application to be submitted to Selby District Council in October 2014	**Screened in** This aspect is integral to the WRCCS project description and included within all of the impact assessments already.	Not applicable during operation	2
The Highway Agency	Works to the A160 between the junction with the A180 at Brocklesby Interchange and the Port of Immingham. The project would widen the existing single carriageway section of the A160 to dual carriageway, with	Approximately 60 km west. However of relevance as potential uses adjacent to the port proposed to be used for the import for abnormal loads and other Project	Subject to a DCO. The examination began on 24.04.2014 and closes on 24.10. 2014. Work on this project is expected to start in summer 2015 instead of during 2016 and complete by autumn 2016 instead of during 2018.	Based on scheme details but potentially could affect routing of AILs and other materials, although not capacity of the network or traffic flows.	**During construction potential receptors include:** • **traffic** **Not applicable during operation.**	**38**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	associated works to junctions along the length of the route.	elements. Grid Ref: TA119135 Easting 511892, Northing 413554				
Multifuel Energy Ltd - Ferrybridge Multifuel 2 (FM2) Power Station	Proposed multifuel generating station with a capacity of up to 90 MWe Gross, primarily through waste derived fuel from various sources of processed municipal solid waste, commercial and industrial waste and waste wood.	23 km west. Grid Ref: SE472253 Easting 447261, Northing 425319	DCO application is expected Q2/Q3 2014. Project accepted for examination by Planning Inspectorate.	**To be included** Due to the potential for emissions to atmosphere to affect the same ecological receptors Ferrybridge Power Station will be included for context within the Landscape and Visual CEA but will not be formally assessed.	**Not applicable during construction.** **During operation:** • **air quality** • **ecology (via emissions to atmosphere)**	**6**
Dogger Bank Creyke Beck (offshore wind farm)	It will comprise two wind farms, each with an installed capacity of up to 1.2 GW, which are expected to connect to the national grid in the	Approximately 50 km to Creyke Beck substation, Cottingham, Hull.	Development Consent Order submitted. Project accepted for examination by Planning Inspectorate.	**Not included** Considered because of the Project's proposed use		**4**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	East Riding of Yorkshire. The project could have a total installed capacity of up to 2.4 GW. The onshore elements of the development will be located in the East Riding of Yorkshire.	Grid Ref: OW280407 Easting 628020, Northing 540742		of Immingham Dock although this scheme is not yet approved.		
Smart Wind Ltd - Hornsea Offshore Wind Farm (Zone 4) (1 & 2)	Three offshore wind generating stations with a total capacity of up to 1,200 MWe and will include all offshore and onshore. Infrastructure and associated facilities. Project Two is for an Offshore Wind Generating Station with maximum output of 1,800 MWe. The proposed port is ABP's proposed Green Port Hull development at Alexandra Dock, Port of Hull.	Approximately 50 km to Port of Hull. Grid Ref: TA378027 Easting 537830, Northing 402732	Project One is at Pre-examination stage of the DCO process. Project Two is at the pre-application stage. Application is expected Q4 2014.	**Not included** Considered because of the Project's proposed use of Immingham Dock although this scheme is now using Hull.		**45**
Able Marine Energy	Project consists of ABLE Marine Energy Park (AMEP) and ABLE Logistics Park (ALP)	Approximately 75 km southeast. Grid Ref:	Planning permission granted.	**Not included** Outside of the key receptor's		**44**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	and is Europe's largest new port development to provide logistics support for North Sea renewable energy developments.	TA172177 Easting 517283, Northing 417765		study areas.		
York Potash Mine	Proposed underground potash mine in North Yorkshire Moors National Park and extending under the North Sea.	Approximately 100 km northeast. Grid Ref: NZ892056 Easting 489296, Northing 505642	Application withdrawn. New application possible - http://www.northyorkmoors.org.uk/living-in/planning/york-potash	**Not included** This scheme is not currently being progressed.		**3**
Killingholme Energy Centre	Combined cycle gas turbine (CCGT) with a nominal generating capacity of up to 1,200MWe and associated overhead power lines, gas pipeline and highway access.	Approximately 75 km southeast. Grid Ref: TA144183 Easting 514407, Northing 418352	Pre-application. Application expected Q4 2014.	**Not included** Outside of the key receptors study areas (air 15km).		**39**
Knottingley Power Project	A 1500 MWe Combined Cycle Gas Turbine (CCGT) power station and associated infrastructure.	Approximately 20 km due west. Grid Ref: SE515232 Easting 451593, Northing 423227	Under examination.	**To be included** Due to the potential of emissions to atmosphere to affect the same ecological	Not applicable during construction. During operation: • air quality	7

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
				receptors	• ecology (via emissions to atmosphere)	
North Doncaster Rail Chord	The project comprises the construction of a new 3.2 km long twin track railway constructed partly on embankment and partly on a new 246 m long viaduct which will span the East Coast Mainline Railway (ECML) and Joan Croft Lane.	Approximately 30 km southwest. Grid Ref: SE583100 Easting 458347, Northing 410042	Operational since June 2014 (1)	**Not included** Located outside area of influence for all topics.		13
Southmoor Energy Centre at Kellingley	280k tonnes per annum; 28 MWe Energy from Waste (Efw) merchant facility. Not linked to any specific pre-identified waste management contracts. As such, it is likely to primarily accept commercial and industrial waste.	Approximately 15 km west Grid Ref: SE529235 Easting 452934, Northing 423521	Planning application is currently under consideration by North Yorkshire County Council.	**To be included** Due to the potential of emissions to atmosphere to affect the same ecological receptors	Not applicable during construction. During operation: • air quality • ecology (via emissions to atmosphere)	9
North Killingholme Power Project	The proposal is for a new thermal generating station that will operate either as a CCGT plant	Approximately 75 km southeast. Grid Ref:	Development Consent granted.	**Not included** Outside of the key receptor's		**41**

(1) http://www.railtechnologymagazine.com/Rail-News/first-train-runs-on-new-north-doncaster-chord

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	or as an Integrated Gasification Combined Cycle (IGCC) plant, with a total electrical output of up to 470MWe	TA161203 Easting 516121, Northing 420305		study areas.		
Thorpe Marsh Gas Pipelines	Gas pipeline of approximately 18 km from an offtake approximately 1.5 km west of Camblesforth to the Thorpe Marsh CCGT Power Station site.	Approximately 2 km west. Grid Ref: SE632256 Easting 463295, Northing 425647	Application expected in Q3 2014. (1)(2).	**To be included** Potential to affect Traffic on the network although limit. Potential noise / disruption to ecology.	During construction potential receptors include: • surface water • ecology • traffic • landscape Operational stage of the pipeline not considered within the assessment.	21
Olympia Park, Selby	A mixed-use development	Approximately 11 km north.	Outline planning permission granted.	Not included due to		**20**

(1) http://thorpemarshgaspipeline.co.uk/
(2) Peak labour force of approximately 190 personnel predicted on-site during the busiest construction period, Thorpe Marsh Gas Pipeline Environmental Statement, page 17-5, http://thorpemarshgaspipeline.co.uk/wp-content/uploads/2014/06/R-UK15-18574_2-Chapter-17-Socio-economics.pdf

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	comprising green space, retail, residential, commercial development and associated infrastructure. To be delivered as part of a series of separate planning applications.	Grid Ref: SE625323 Easting 462525, Northing 432351		relatively small scale and distance from Project site.		
Hungate, York	Outline planning permission was granted in 2005 for a mixed use scheme including offices, housing, shops and a new bridge over the River Foss.	Approximately 32 km north. Grid Ref: SE609519 Easting 460918, Northing 451902	Outline planning permission granted in 2005.	**Not Included**		**18**
Germany Beck, York	Reserved matters application includes details of appearance, landscaping, layout and scale of 677 dwellings and associated facilities.	Approximately 30 km north. Grid Ref: SE614491 Easting 461478, Northing 449115	Outline planning permission granted. Part under construction (Derwenthorpe).	**Not included** No effect expected upon the network given distance from the Project site.		**19**
Former Terry's factory, York	A 27 acre development site south of the city centre that includes circa 250,000 sq ft of existing listed buildings. The brief sets out the	Approximately 30 km north. Grid Ref: SE601505	Masterplan approved in 2010 subject to 106 agreements between the landowner and the Council.	**Not included** Nature of the scheme and distance from the Project site.		**14**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	council's requirements for the redevelopment of the site.	Easting 460100, Northing 450577				
Heslington East Campus, University of York, York	Planning application for the development of land between Heslington village and Grimston Bar Park & Ride. Includes academic, teaching and research facilities, a new lake, student housing on the campus, new transport links into the site and landscaping.	Approximately 31 km north. Grid Ref: SE635505 Easting 463545, Northing 450577	Outline planning application approved.	**Not included** Nature of the scheme and distance from the Project site		**22**
Nestle South, York	Mixed use scheme on the former Nestlé factory site. Includes a range of uses including offices, live-work units, community facilities, retail, cafe, housing and apartments including student accommodation, assisted living units and affordable housing.	Approximately 35 km north. Grid Ref: SE606538 Easting 460676, Northing 453835	Planning application approved.	**Not included** Nature of the scheme and distance from the Project site.		**17**
Logistics Park and Strategic Rail Freight Terminal, Doncaster	Port development comprises a 337 acre greenfield site with outline planning consent for up to 6m sq ft of	Approximately 38 km southwest. Grid Ref:	Outline planning consent granted.	**Not included** Nature of the scheme and distance from		**30**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	warehouse space. The project incorporates a dedicated, 35-acre Strategic Rail Freight Terminal.	SK553980 Easting 455368, Northing 398079		the Project site.		
Civic and Cultural Quarter, Doncaster	One of the largest urban centre developments in the UK. 23 hectare, brownfield site, representing 25% of the urban centre.	Approximately 37 km southwest. Grid Ref: SE577029 Easting 457714, Northing 402983	Under construction since 2013.	**Not included** Nature of the scheme and distance from the Project site.		**12**
DN7 Initiative, Doncaster	A major redevelopment opportunity in the north of the Borough incorporating employment (41 ha), residential (1200 homes), leisure and infrastructure improvements.	Approximately 37 km southwest. Grid Ref: SE649109 Easting 464927, Northing 410940	The detailed planning and delivery of the DN7 Initiative will be co-ordinated through the preparation of a master plan.	**Not included** Nature of the scheme and distance from the Project site.		**23**
PGA Doncaster	Major leisure development opportunity covering 200 ha. Plans for the complex includes 18 hole golf courses, leisure facilities and residential homes	Approximately 38 km southwest. Grid Ref: SK642968 Easting 464203,	Planning application submitted 20/05/13 (13/01080/COU) and currently pending consideration by Doncaster Metropolitan Borough Council.	**Not included** Nature of the scheme and distance from the Project site.		**31**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
		Northing 396833				
Robin Hood Airport Business Park	The 62 acre Business Park has planning consent for over 186,000m² of commercial development.	Approximately 39 km south. Grid Ref: SK649991 Easting 464924, Northing 399143	Planning permission granted.	**Not included** Nature of the scheme and distance from the Project site.		**32**
Doncaster Waterfront	Brownfield waterside sites in the UK – 460,000m² / £300 million regeneration scheme. One of the largest brownfield waterside sites left in the UK with 46 hectares of potential development land. The vision is to create a world class mixed use development of residential, retail, commercial and leisure developments on 15 ha of land at the marina.	Approximately 37 km southwest. Grid Ref: SE574036 Easting 457418, Northing 403702	Major works have already been undertaken including the filling in of the former Gas House Bight and construction of a 90 berth Marina; provision of utilities infrastructure including the construction of an electricity sub-station and the relocation of the sewage pumping station and acquisition of key land and buildings and associated clearance and remediation works.	**Not included** Nature of the scheme and distance from the Project site.		**11**
Beverley Bypass, Beverley	A new bypass for Beverley, also known as the southern relief road. Proposed 1.6 mile road	Approximately 43 km northeast. Grid Ref:	Under construction, expected to be finished in early 2015.	**Not included** Nature of the scheme and		**33**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	will connect the A164 at Morrisons roundabout to the A1174 near Figham.	TA020407 Easting 502007, Northing 440718		distance from the Project site.		
Flemingate, Beverley	£120 million mixed use development which will be constructed on the site of a former chemical works and the old Army Transport Museum in Beverley.	Approximately 44 km northeast. Grid Ref: TA041391 Easting 504100, Northing 439183	Under construction, expected to be finished in October 2015.	**Not included** Nature of the scheme and distance from the Project site.		**35**
A1079 Roundabout, Market Weighton	New roundabout at the existing junction between the A1079 and Holme Road in Market Weighton.	Approximately 35 km northeast. Grid Ref: SE868413 Easting 486799, Northing 441336	Work will start on site in autumn 2014, with the scheme due to be completed in spring 2015.	**Not included** Nature of the scheme and distance from the Project site.		**27**
Wolfreton School, Willerby	The proposal for Wolfreton is to consolidate the whole school on to the Lower School site on Carr Lane. The new school will have capacity for 1,675 pupils.	Approximately 45 km east. Grid Ref: TA028303 Easting 502798, Northing 430401	It is intended to start building work on site in February 2015. The project is scheduled to be completed by summer 2016 in time for the start of the academic year 2016/17.	**Not included** Nature of the scheme and distance from the Project site.		**34**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
Lincolnshire Lakeside, Scunthorpe	Outline planning application submitted for a major mixed-use development including 3,500 new homes across two new villages on the outskirts of Scunthorpe.	Approximately 50 km southeast. Grid Ref: SE917084 Easting 491707, Northing 408454	Outline application submitted in August 2013.	**Not included** Nature of the scheme and distance from the Project site		28
Various onshore windfarms	Multiple onshore windfarms within 15 km of Drax (see Windmap locations map as provided by ERY).	Various	Some are pending consideration, others are approved.	**To be included**	The landscape and visual assessment will consider further the potential for cumulative effects.	n/a
Thorpe Marsh CCGT (RP3238KG)	1600 MWe CCGT and 230 MWe OCGT	Approximately 18 km from Drax. Grid Ref: SE60530985 Easting 460553, Northing 409480	Has planning consent and environmental permit. To be constructed.	To be included	Potential effects include cumulative emissions to atmosphere and effects on ecological receptors.	15
Distributed Renewable Energy Networks Ltd (DRENL).	A 10 MWe Waste Recycling and Renewable Energy Facility at the former ARBRE Renewable Energy	Approximately 10 km from Drax Grid Ref: SE56754 24220 Easting 457355,	Uncertain	**Not included. Small scale development**	Not applicable during construction. During operation: • air quality	10

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	Facility, north of Eggborough	Northing 424542			ecology (via emissions to atmosphere)	
Precision Diesel Enterprises, Sherburn.	Eight diesel generators (combined output circa 48 MWe) housed within a single pre-fabricated steel building as well as an associated infrastructure for water coolers, diesel storage tanks and underground cabling.	Approximately 15 km from Drax Grid Ref: SE52343 31890 Easting 452721, Northing 431802	Planning permission granted.	As a Short Term Operating Reserve (STOR) project only operational at periods of peak demand, envisaged at a maximum of 500 hours per year (although probably substantial less)	•	8
Clean Power energy recovery centre at Castleford.	~128 K tonnes/year waste for pyrolysis and 67 K tonnes for AD with a 10 MWe energy output. Construction and operation of 8 MWe pyrolysis advanced	Approximately 22.8 km from Drax Grid Ref: SE4356326500 Easting 444699, Northing 426477	Planning application was rejected but the decision has been appealed.	Not included. Relatively small scale and distance from site		5

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	conversion technology plant including 2MWe anaerobic digestion plant, associated office, visitor centre, new access road and weighbridge facilities, solar panels, landscaping, surface water attenuation features and construction of new rail infrastructure, two sidings and an unloading area with associated earthworks.					
Sunrise Renewables at Hull Docks.	A 9 MWe biomass power plant at King George Dock using recycled woodchip.	Approximately 50 km east. Grid Ref: TA104288 Easting 510478, Northing 428861	Planning permission granted (30735C). Further application lodged 25/07/14 to increase capacity from 9MW to 10MW (14/00923/FULL).	Not included. Small scale and distance from Project site.		**37**
Thermeco (Yorkshire) Ltd at Melton (Transwaste site)	Construction and operation of an energy generation plant based upon the principle of pyrolysis. It will use waste generated at the	Approximately 35 km east. Grid Ref: SE969257	The Council has confirmed in its written response to TYL, dated 20 April 2011, that the development proposals do not comprise EIA development. Permission approved in 2012 (09/00613/STPLF).	Not included due to distance from Project site.		**29**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	existing Transwaste facility on site to generate renewable energy.	Easting 496963, Northing 425719				
Real Ventures, Biomass Plant, Queen Elizabeth Dock, Hull	Erection of 49.9mw Biomass Combined heat and power facility with associated plant (including condenser, fuel storage, ash storage, electrical equipment) plus administrative building, car parking, access and landscaping (maximum building height 48m (158ft) flue height 77m (253ft).	Approximately 55 km east. Grid Ref: TA146284 Easting 514692, Northing 428418	Approved by Hull City Council in 2012 (12/00715/FULL).	**Not included** due to distance from Project Site		**40**
Capitol Park and other residential housing schemes in Goole.	Capitol Park is a warehouse and storage, offices, retail and leisure development in Goole. Capitol Park in Goole has seen some major recent development and additional smaller schemes have outline permission.	Approximately 8 km southeast. Grid Ref: SE730235 Easting 473069, Northing 423532	Recent outline planning permission for approximately 150 houses but no detailed applications pending or anticipated.	**Not included** Nature of the scheme and distance from the Project site	However CPL is aware of the scheme and should a detailed application be submitted post to the DCO submission, the traffic assessment etc will be revisited to ensure the	26

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	There is a large allocation in Goole which is expected to deliver 1,064 dwellings adjacent to the M62, but no application is expected in the short term. These two sites amount to 39.71 hectares and are expected to contribute 1,042 dwellings. A Development brief is needed prior to developing the site which will include provision for a new school, substantial landscape buffer to the M62 and a new access to the A614. It will be at least 2016 before the first house is occupied.				conclusions are still correct and no additional management measures are required.	
Energy Works (Hull) Ltd	The first phase of the development will be an innovative energy recovery facility that will generate 28MW of electricity by an	Cleveland St Hull, approximately 50 km east	Approved, EPC contractor appointed	**Not included** Located outside area of influence for all topics		**36**

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
	advanced gasification process. Construction is due to begin early in 2015 and completion is scheduled by March 2017. Phase two of the scheme will see the later addition of an Anaerobic Digestion plant and materials processing facilities. (1)	Grid Ref: TA097279 Easting 509765, Northing 427996				
Siemens Development at Paull	An 80 ha space being utilised to support the wind turbine manufacturing industry. Siemens plan to build a rotor blade manufacturing facility on the site supporting wind projects in the North Sea.	Approximately 60 km east. Grid Ref: TA165266 Easting 516557, Northing 426681	Local Development Order: 12/00121/LDO The proposed development area was designated as a Local Enterprise Zone a number of years ago and has recently been ear-marked as a site for major industrial development as part of the 'Green Port of Hull' scheme supporting the construction of wind energy equipment.	**Not included.** Port not proposed for use.		**42**

(1) http://thespencergroup.co.uk/energy-works-selects-joint-venture-to-build-pioneering-power-plant

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Rational for Screening in or out of the assessment	Potential Receptors (if screened in)	Ref # (*Figure 4.1*)
Pollington Airfield Biomass Project	The 53MWe power station at the former RAF airfield at Pollington will be fuelled by 360,000 tonnes of waste wood per annum. This feedstock will be delivered to the site via the Aire and Calder Navigation Canal.	Approximately 11 km south. Pollington Airfield Heck And Pollington Lane Heck Goole East Yorkshire Grid Ref: SE606205 Easting 460639, Northing 420582	Application permitted (2010/0008/GOV).	**To be included**	**Not applicable during construction.** **During operation:** • **air quality** • **ecology (via emissions to atmosphere)** • **water**	**16**

Table 4.33 Projects and Plans with the Potential for Cumulative Effects in Combination with the Project

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Distance to closest European Site considered in HRA
Multifuel Energy Ltd - Ferrybridge Multifuel 2 (FM2) Power Station	Proposed multifuel generating station with a capacity of up to 90 MWe Gross, primarily through waste derived fuel from various sources of processed municipal solid waste, commercial and industrial waste and waste wood.	23 km west. Grid Ref: SE472253 Easting 447261, Northing 425319	DCO application is expected Q2/Q3 2014. Project accepted for examination by Planning Inspectorate.	21 km from the River Derwent SAC
Knottingley Power Project	A 1500 MWe Combined Cycle Gas Turbine (CCGT) power station and associated infrastructure.	Approximately 20 km due west.	Under examination.	17.5 km from the River Derwent SAC

Development	Description	Location and Distance / orientation from Project site	Consenting Status	Distance to closest European Site considered in HRA
		Grid Ref: SE515232 Easting 451593, Northing 423227		
Southmoor Energy Centre at Kellingley	280k tonnes per annum; 28 MWe Energy from Waste (Efw) merchant facility. Not linked to any specific pre-identified waste management contracts. As such, it is likely to primarily accept commercial and industrial waste.	Approximately 15 km west Grid Ref: SE529235 Easting 452934, Northing 423521	Planning application is currently under consideration by North Yorkshire County Council.	16 km from the River Derwent SAC
Thorpe Marsh CCGT (RP3238KG)	1600 MWe CCGT and 230 MWe OCGT	Approximately 18 km from Drax. Grid Ref: SE60530985 Easting 460553, Northing 409480	Has planning consent and environmental permit. To be constructed.	12.2 km from Thorne Moor SAC
Pollington Airfield Biomass Project	The 53MWe power station at the former RAF airfield at Pollington will be fuelled by 360,000 tonnes of waste wood per annum. This feedstock will be delivered to the site via the Aire and Calder Navigation Canal.	Approximately 11 km south. Pollington Airfield Heck And Pollington Lane Heck Goole East Yorkshire Grid Ref: SE606205 Easting 460639, Northing 420582	Application permitted (2010/0008/GOV).	10.5 km to Thorne Moor SAC

Figure 4.1 Developments Included in the Initial Screening of for In Combination Effects

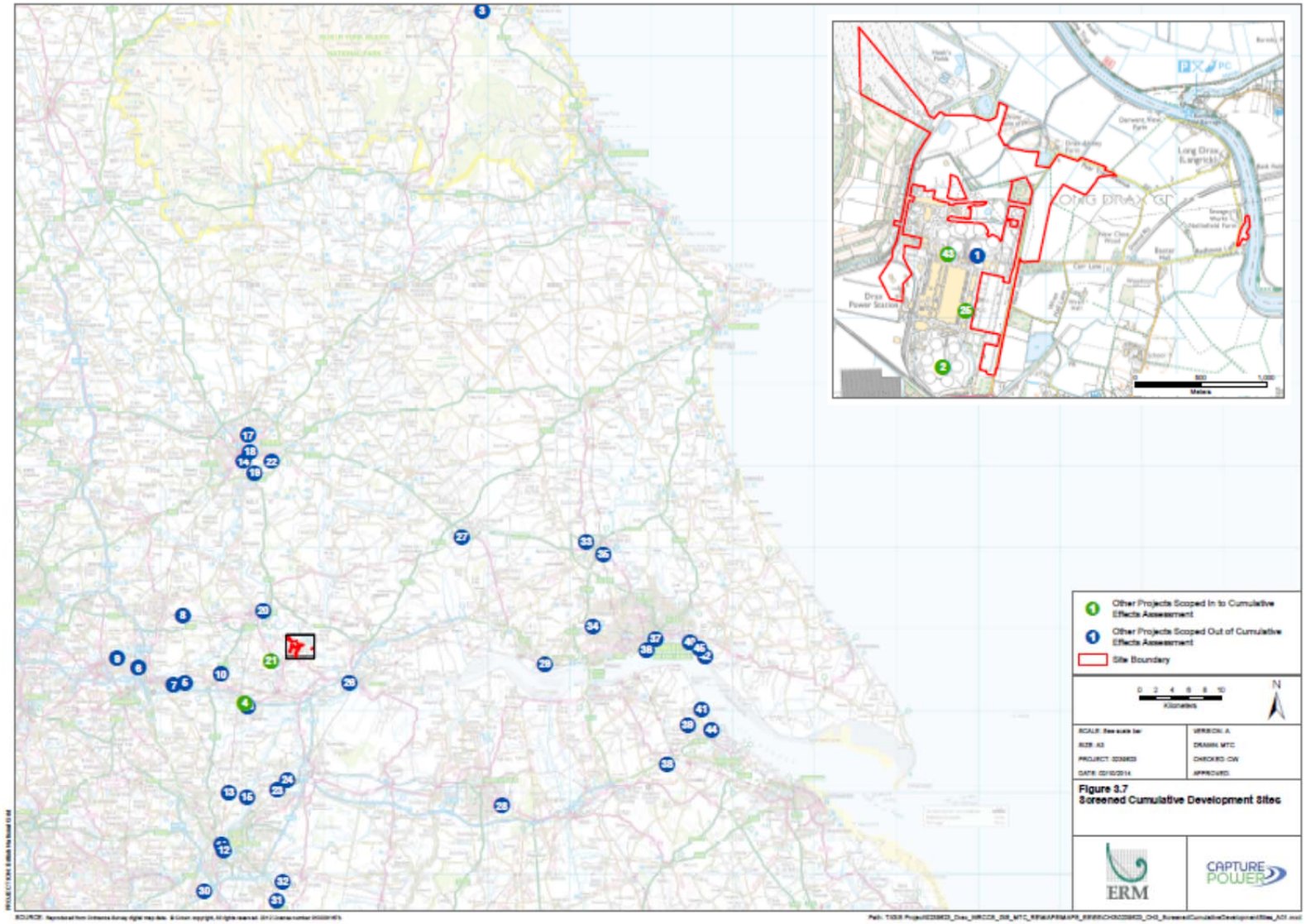
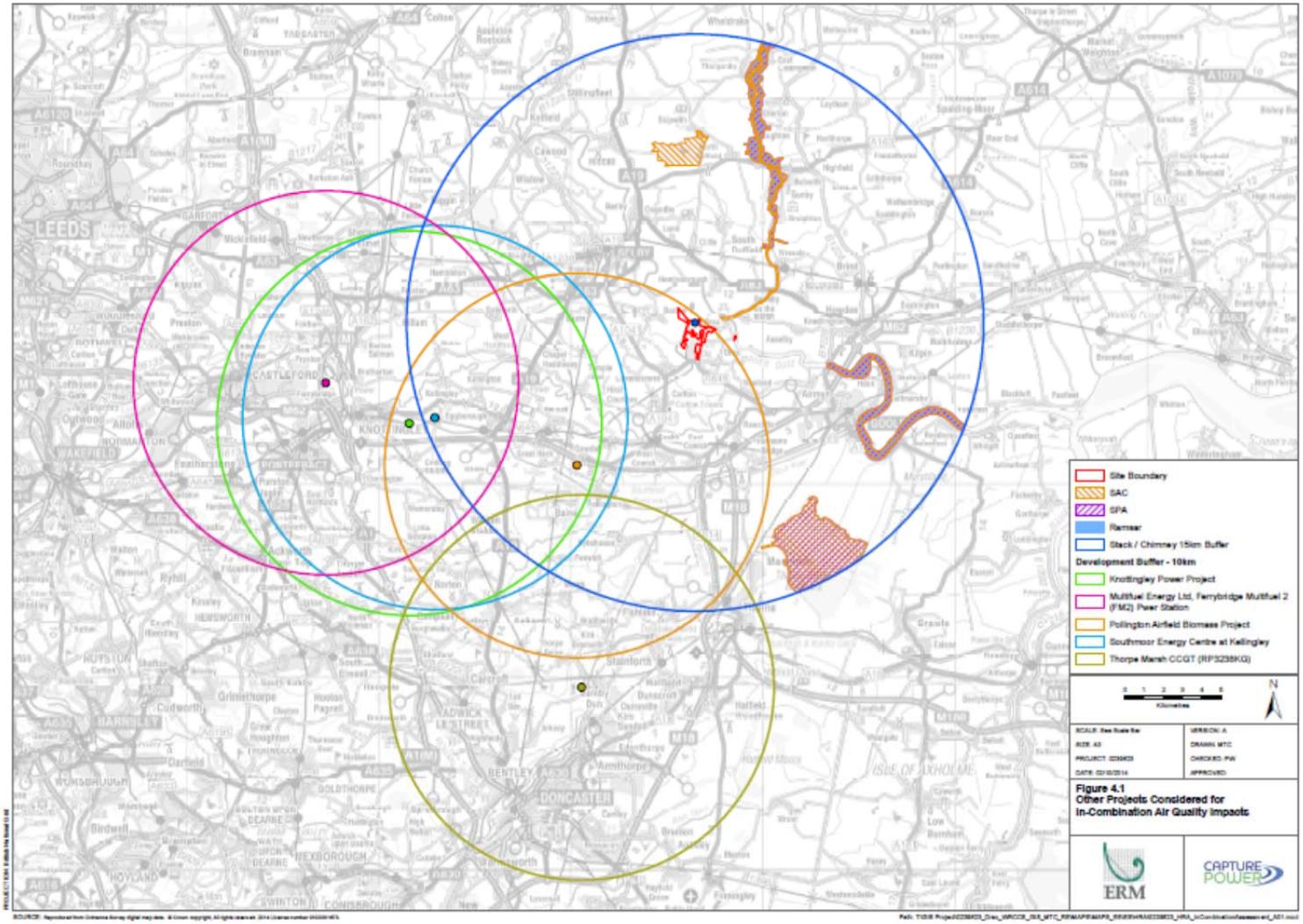


Figure 4.2 Developments Screening into Assessment of In Combination Effects



4.6 STAGE 1: SCREENING MATRICES

The European Sites included within the screening assessment are:

- River Derwent SAC
- Lower Derwent Valley SAC
- Lower Derwent Valley Ramsar site
- Humber Estuary SAC
- Humber Estuary Ramsar Site
- Skipwith Common SAC
- Thorne Moor SAC

The impacts and effects which have been considered in this assessment, and the way they have been referred to in the screening matrices are presented below.

Table 4.34 Impacts and Effects Considered within the Screening Matrices

Designation	Impacts and effects in submission information	Presented in screening matrices as:
River Derwent SAC	• Emissions to air from the Project while operating in Oxy- mode (normal conditions) • Emissions to air from the Project while operating in Air mode for 100% of the time during three years of commissioning • Emissions to air from the Project while operating in Air-mode for 56% of the time (abnormal conditions)	• Emissions (Oxy-mode) • Emissions (Air-mode 100%) • Emissions (Air-mode 56%)
	• Jetty works – disturbance during construction associated with terrestrial activities adjacent to the Ouse and vessels berthing / unloading onto the jetty.	• Jetty works
Lower Derwent Valley SAC	• Emissions to air from the Project while operating in Oxy- mode (normal conditions) • Emissions to air from the Project while operating in Air mode for 100% of the time during three years of commissioning • Emissions to air from the power station while operating in Air-mode for 56% of the time (abnormal conditions)	• Emissions (Oxy-mode) • Emissions (Air-mode 100%) • Emissions (Air-mode 56%)
Lower Derwent Valley Ramsar site	• Emissions to air from the Project while operating in Oxy- mode (normal conditions) • Emissions to air from the Project while operating in Air mode for 100% of the time during three years of commissioning • Emissions to air from the Project while	• Emissions (Oxy-mode) • Emissions (Air-mode 100%) • Emissions (Air-mode 56%)

Designation	Impacts and effects in submission information	Presented in screening matrices as:
	operating in Air-mode for 56% of the time (abnormal conditions)	
Humber Estuary SAC	• Emissions to air from the Project while operating in Oxy- mode (normal conditions) • Emissions to air from the Project while operating in Air mode for 100% of the time during three years of commissioning • Emissions to air from the Project while operating in Air-mode for 56% of the time (abnormal conditions)	• Emissions (Oxy-mode) • Emissions (Air-mode 100%) • Emissions (Air-mode 56%)
Humber Estuary Ramsar Site	• Emissions to air from the Project while operating in Oxy- mode (normal conditions) • Emissions to air from the Project while operating in Air mode for 100% of the time during three years of commissioning • Emissions to air from the Project while operating in Air-mode for 56% of the time (abnormal conditions)	• Emissions (Oxy-mode) • Emissions (Air-mode 100%) • Emissions (Air-mode 56%)
Skipwith Common SAC	• Emissions to air from the Project while operating in Oxy- mode (normal conditions) • Emissions to air from the Project while operating in Air mode for 100% of the time during three years of commissioning • Emissions to air from the Project while operating in Air-mode for 56% of the time (abnormal conditions)	• Emissions (Oxy-mode) • Emissions (Air-mode 100%) • Emissions (Air-mode 56%)
Thorne Moor SAC	• Emissions to air from the Project while operating in Oxy- mode (normal conditions) • Emissions to air from the Project while operating in Air mode for 100% of the time during three years of commissioning • Emissions to air from the Project while operating in Air-mode for 56% of the time (abnormal conditions)	• Emissions (Oxy-mode) • Emissions (Air-mode 100%) • Emissions (Air-mode 56%)

Evidence for likely significant effects on their qualifying features is detailed within the footnotes to the screening matrices 1 – 7 below, drawing from information presented in previous sections of this HRA. The key to the Screening Matrix is summarised in *Box 4.2*.

Box 4.2 Screening Matrix Key

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

C = construction
O = operation
D = decommissioning

Where effects are not applicable to a particular feature the matrix cell is formatted as follows: n/a

Stage 1 Matrix 1: River Derwent SAC

	Name of European site: River Derwent SAC														
	Distance to NSIP 0.66 km NE														
European site features	**Likely Effects of NSIP**														
	Emissions (Oxy-mode)			*Emissions (Air-mode 100%)*			*Emissions (Air-mode 56%)*			*Jetty Works*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	**n/a**	**×a**	**×b**	**n/a**	**✓c, m**	**×b**	**n/a**	**×n**	**×b**	**×d**	**×d**	**×d**	**×d**	**×e**	**×b**
River lamprey *Lampetra fluviatilis*	**n/a**	**×a**	**×b**	**n/a**	**× f**	**×b**	**n/a**	**× f**	**×b**	**×g**	**×g**	**×g**	**×g**	**×e**	**×b**
Sea lamprey *Petromyzon marinus*	**n/a**	**×a**	**×b**	**n/a**	**× f**	**×b**	**n/a**	**× f**	**×b**	**×g**	**×g**	**×g**	**×g**	**×e**	**×b**
Bullhead *Cottus gobio*	**n/a**	**×a**	**×b**	**n/a**	**× f**	**×b**	**n/a**	**× f**	**×b**	**×g**	**×g**	**×g**	**×g**	**×e**	**×b**
Otter *Lutra lutra*	**n/a**	**×a**	**×b**	**n/a**	**× f**	**×b**	**n/a**	**× f**	**×b**	**×g**	**×g**	**×g**	**×g**	**×e**	**×b**

Evidence supporting conclusions*:*

a. Project operating in oxy-mode will not result in release of significant pollutants to atmosphere – *Section 4.4.5*.
b. Decommissioning of power station will not result in release of significant pollutants to atmosphere.
c. No Unacceptable impacts identified in the Emissions to Air Technical Report apart from SO_2 during three year commissioning (up to) operation in Air-mode for 100% of time.
d. Ecological receptor is upstream of site of proposed jetty works (on River Ouse) and will not be affected by, or sensitive to the works.

e. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.

f. Not sensitive to air pollutants in concentrations modelled- *Section 4.4.3*.

g. Offloading facility works associated with jetty use will be terrestrial, short term during construction only and reversible and it is unlikely these would have significant adverse effects on mobile qualifying features downstream of the SAC limit. Berthing / unloading will be onto an existing structure already used for this purpose and will represent an insignificant increase in background river traffic volumes given existing freight and recreational use and will not represent a significant change in existing levels of disturbance – *Section 4.3*.

m. SO_2 process contribution exceeds 1% of annual mean critical level and 70% of PEC during 3 years of commissioning at 100% air mode, therefore taken forward to Stage 2 AA – see *Section 4.4.6*.

n. No Unacceptable impacts identified in air quality modelling.

Stage 1 Matrix 2: Lower Derwent Valley SAC

	Name of European site: Lower Derwent Valley SAC														
	Distance to NSIP 4.87 km NE														
European site features	**Likely Effects of NSIP**														
	Emissions (Oxy-mode)			*Emissions (Air-mode 100%)*			*Emissions (Air-mode 56%)*			*Jetty Works*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Otter *Lutra lutra*	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**

Evidence supporting conclusions*:*

a. Project operating in oxy-mode will not result in release of significant pollutants to atmosphere - *Section 4.4.5*.
b. Decommissioning of the Project will not result in release of significant pollutants to atmosphere.
e. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.
f. Not sensitive to air pollutants in concentrations modelled- *Section 4.4.3*.
g. Offloading facility works associated with jetty use will be terrestrial, short term during construction only and reversible and it is unlikely these would have significant adverse effects on mobile qualifying features downstream of the SAC limit. Berthing / unloading will be onto an existing structure already used for this purpose and will represent an insignificant increase in background river traffic volumes given existing freight and recreational use and will not represent a significant change in existing levels of disturbance – *Section 4.3*.
h. European site and its features will not be affected by jetty works.
i. No direct impacts from the Project and therefore no potential for in combination effects – *Section 4.5*.
n. No Unacceptable impacts identified in air quality modelling.

Stage 1 Matrix 3: Lower Derwent Valley Ramsar Site

	Name of European site: Lower Derwent Valley Ramsar Site														
	Distance to NSIP 4.87 km NE														
European site features	**Likely Effects of NSIP**														
	Emissions (Oxy-mode)			*Emissions (Air-mode 100%)*			*Emissions (Air-mode 56%)*			*Jetty Works*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Ramsar Criterion 1 - traditionally managed species-rich alluvial flood meadow habitat	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Ramsar Criterion 2 - assemblage of wetland invertebrates	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Ramsar Criterion 4 - passage birds in spring - Ruff, *Calidris pugnax* and Whimbrel, *Numenius phaeopus*	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Ramsar Criterion 5 - Species with peak counts in winter: 31942 waterfowl	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Ramsar Criterion 6 - Species with peak counts in winter - Eurasian wigeon , *Anas Penelope* and Eurasian teal , *Anas crecca*	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**

Evidence supporting conclusions*:*

a. Project operating in oxy-mode will not result in release of significant pollutants to atmosphere - *Section 4.4.5*.
b. Decommissioning of the Project will not result in release of significant pollutants to atmosphere.

e. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.
f. Not sensitive to air pollutants in concentrations modelled- *Section 4.4.3*.
h. European site and its features will not be affected by jetty works.
i. No direct impacts from the Project and therefore no potential for in combination effects – *Section 4.5*.
n. No Unacceptable impacts identified in air quality modelling.

Stage 1 Matrix 4: Humber Estuary SAC

	Name of European site: Humber Estuary SAC														
	Distance to NSIP 6.13 km E														
European site features	**Likely Effects of NSIP**														
	Emissions (Oxy-mode)			*Emissions (Air-mode 100%)*			*Emissions (Air-mode 56%)*			*Jetty Works*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Estuaries	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Mudflats and sandflats not covered by seawater at low tide	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Sandbanks which are slightly covered by sea water all the time	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Coastal lagoons * Priority feature	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Salicornia and other annuals colonizing mud and sand	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Embryonic shifting dunes	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
"Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")"	**n/a**	**×a**	**×b**	**n/a**	**×n**	**×b**	**n/a**	**×n**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
"Fixed coastal dunes	**n/a**	**×a**	**×b**	**n/a**	**×j**	**×b**	**n/a**	**×j**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**

with herbaceous vegetation (""grey dunes"")" * Priority feature															
Dunes with *Hippophae rhamnoides*	**n/a**	**×a**	**×b**	**n/a**	**×j**	**×b**	**n/a**	**×j**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Sea lamprey *Petromyzon marinus*	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
River lamprey *Lampetra fluviatilis*	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
Grey seal *Halichoerus grypus*	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**

Evidence supporting conclusions*:*

a. Project operating in oxy-mode will not result in release of significant pollutants to atmosphere - *Section 4.4.5*.
b. Decommissioning of the Project will not result in release of significant pollutants to atmosphere.
e. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in Section 4.5
f. Not sensitive to air pollutants in concentrations modelled- *Section 4.4.3*.
h. European site and its features will not be affected by jetty works.
i. No direct impacts from the Project and therefore no potential for in combination effects – *Section 4.5*.
j. Sensitive features at least 67 km from the Project and therefore no effects predicted – *Section 4.4.5*.
n. No Unacceptable impacts identified in air quality modelling.

Stage 1 Matrix 5: Humber Estuary Ramsar Site

	Name of European site: Humber Estuary Ramsar Site														
	Distance to NSIP 6.13 km E														
European site features	**Likely Effects of NSIP**														
	Emissions (Oxy-mode)			*Emissions (Air-mode 100%)*			*Emissions (Air-mode 56%)*			*Jetty Works*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Ramsar Criterion 1 - near-natural estuary with component habitats	**n/a**	**×a**	**×b**	**n/a**	**×j**	**×b**	**n/a**	**×j**	**×b**	**×h**	**×h**	**×h**	**×i**	**× e**	**×b**
Ramsar Criterion 3 - breeding colony of grey seals *Halichoerus grypus* and breeding site for natterjack toad *Bufo calamita*	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**× e**	**×b**
Ramsar Criterion 5 – assemblage of international importance of 153,934 waterfowl	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**× e**	**×b**
Ramsar Criterion 6 – species/populations of international importance in spring/autumn of Eurasian golden plover *Pluvialis apricaria altifrons,* Red knot *Calidris canutus islandica* , Dunlin *Calidris alpina alpina,* Black-tailed godwit *Limosa limosa islandica,* Common	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**× e**	**×b**

redshank *Tringa totanus brittanica* species/ populations of international importance in winter of Common shelduck *Tadorna tadorna,* Golden plover *Pluvialis apricaria altifrons,* Red knot *Calidris canutus islandica,* Dunlin *Calidris alpina alpina,* Black-tailed godwit *Limosa limosa islandica,* Bar-tailed godwit, *Limosa lapponica lapponica,* Common redshank *Tringa totanus brittanica*															
Ramsar Criterion 8 - important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*	**n/a**	**×a**	**×b**	**n/a**	**×f**	**×b**	**n/a**	**×f**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**

Evidence supporting conclusions*:*

a. Project operating in oxy-mode will not result in release of significant pollutants to atmosphere - *Section 4.4.5*.
b. Decommissioning of the Project will not result in release of significant pollutants to atmosphere.
e. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.
f. Not sensitive to air pollutants in concentrations modelled- *Section 4.4.3*.
h. European site and its features will not be affected by jetty works.
i. No direct impacts from the Project and therefore no potential for in combination effects – *Section 4.5*.

j. Sensitive dune habitat qualifying interest features at least 67 km from the Project and therefore no effects predicted – *Section 4.4.6*.

Stage 1 Matrix 6: Skipwith Common SAC

	Name of European site: Skipwith Common SAC														
	Distance to NSIP 8.00 km N														
European site features	**Likely Effects of NSIP**														
	Emissions (Oxy-mode)			*Emissions (Air-mode 100%)*			*Emissions (Air-mode 56%)*			*Jetty Works*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Northern Atlantic wet heaths with *Erica tetralix*	**n/a**	**×a**	**×b**	**n/a**	**✓k, l, m**	**×b**	**n/a**	**✓l, o**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**
European dry heaths	**n/a**	**×a**	**×b**	**n/a**	**✓k, l, m**	**×b**	**n/a**	**✓l, o**	**×b**	**×h**	**×h**	**×h**	**×i**	**×e**	**×b**

Evidence supporting conclusions*:*

a. Project operating in oxy-mode will not result in release of significant pollutants to atmosphere - *Section 4.4.5*.
b. Decommissioning of Project will not result in release of significant pollutants to atmosphere.
e. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.
h. European site and its features will not be affected by jetty works.
i. No direct impacts from the Project and therefore no potential for in combination effects – *Section 4.5*.
k. No Unacceptable impacts identified in the Emissions to Air Technical Report other than acid deposition and SO_2.
l. Acid deposition process contribution exceeds 1% of annual mean critical load and 70% PEC during both the 3 year commissioning phase (operating in air mode for 100% of the time) and routine operation (i.e. 56% of the time in air mode), therefore taken forward to Stage 2 AA - see *Section 4.4.6*.

m. SO_2 process contribution exceeds 1% of annual mean critical level during 3 years of commissioning (at 100% air mode), therefore taken forward to Stage 2 AA – see *Section 4.4.6*.
o. No Unacceptable impacts identified in the Emissions to Air Technical Report other than acid deposition.

Stage 1 Matrix 7: Thorne Moor SAC

	Name of European site: Thorne Moor SAC														
	Distance to NSIP 9.37 km SE														
European site features	**Likely Effects of NSIP**														
	Emissions (Oxy-mode)			*Emissions (Air-mode 100%)*			*Emissions (Air-mode 56%)*			*Jetty Works*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Degraded raised bogs still capable of natural regeneration	**n/a**	**✕a**	**✕b**	**n/a**	**✓o, l**	**✕b**	**n/a**	**✓o, l**	**✕b**	**✕h**	**✕h**	**✕h**	**✕i**	**✕e**	**✕b**

Evidence supporting conclusions:

a. Project operating in oxy-mode will not result in release of significant pollutants to atmosphere - *Section 4.4.5*.
b. Decommissioning of Project will not result in release of significant pollutants to atmosphere.
e. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.
h. European site and its features will not be affected by jetty works.
i. No direct impacts from the Project and therefore no potential for in combination effects – *Section 4.5*.

l. Acid deposition process contribution exceeds 1% of annual mean critical load and 70% PEC during both the 3 year commissioning phase (operating in air mode for 100% of the time) and routine operation (i.e. 56% of the time in air mode), therefore taken forward to Stage 2 AA - see *Section 4.4.6*.

o. No Unacceptable impacts identified in the Emissions to Air Technical Report other than acid deposition.

4.7 *SUMMARY OF STAGE 1: SCREENING OF ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS*

The screening assessment has shown that an AA is needed to assess the effects of the Project on the integrity of three European sites. The following paragraphs summarise the issues that will need to be considered further in the HRA Report Stage 2: Appropriate Assessment to determine whether the integrities of the European sites are affected.

The Project will result in emissions to atmosphere that exceed 1% of the Critical Level or Critical Load (CL) and 70% of the Predicted Environmental Concentration (PEC) across sensitive receptor qualifying interest feature habitats at three sites as follows.

During the first three years at 100% air mode (worst case), the following impacts have been identified by the emissions modelling:

- River Derwent SAC – SO_2;
- Skipwith common SAC – acid deposition and SO_2; and
- Thorne Moor SAC – acid deposition.

During the rest of the operational life of the Project at 56% air mode (worst case), the following impacts have been identified by the emissions modelling:

- Skipwith common SAC – acid deposition; and
- Thorne Moor SAC – acid deposition.

No likely significant effects are predicted for any of the other qualifying features of the other European sites considered during Stage 1: Screening. No in-combination effects have been identified during Stage 1: Screening.

5 STAGE 2: APPROPRIATE ASSESSMENT

5.1 INTRODUCTION

The findings of the Screening Assessment reported in *Chapter 4* showed that an Appropriate Assessment (AA) was required for likely significant effects on three European Sites. The likely significant effects all result from emissions to air on sensitive Annex I habitat qualifying interest features.

This chapter assesses the impacts of the Project on the relevant qualifying interest features of each site. In accordance with guidance on HRA (1) it is intended to inform the Planning Inspectorate when preparing the Report on the Implications for European Sites (RIES). Its aim is to identify whether no adverse effect on the integrity of the European sites can be concluded as described in *Chapter 2* (see *Section 2.1*) or whether adverse effects on the integrity of the European sites will result.

5.2 RIVER DERWENT SAC

5.2.1 Qualifying Features

The River Derwent SAC is designated for one Annex I habitat and four Annex II species as follows:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; Rivers with floating vegetation often dominated by water-crowfoot;
- *Petromyzon marinus* (sea lamprey);
- *Lampetra fluviatilis* (river lamprey);
- *Cottus gobio* (bullhead); and
- *Lutra lutra* (otter).

Likely significant effects on the Annex I habitat from SO_2 have been identified at Stage 1: Screening.

5.2.2 Conservation Objectives

The conservation objectives for the River Derwent SAC are to:

(1) The Planning Inspectorate (2013) Habitat Regulations Assessment. Advice Note Ten: Habitat Regulations Assessment relevant to nationally significant infrastructure projects.

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

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- *The extent and distribution of qualifying natural habitats and habitats of qualifying species;*
- *The structure and function (including typical species) of qualifying natural habitats;*
- *The structure and function of the habitats of qualifying species;*
- *The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;*
- *The populations of qualifying species; and*
- *The distribution of qualifying species within the site.*

5.2.3 *Effects of SO_2 on Annex I Habitats*

The air quality modelling for the three years' operating in air mode for 100% of the time results in an impact of 'unacceptable significance' using the criteria set out in EA H1 guidance. This results from the long term PC and PEC exceeding 1% and 70% respectively of the critical level for SO_2. No unacceptable impacts for SO_2 were identified by the air quality modelling for the Project operating in air mode for 56% of the time.

The SACs constituent SSSI units were reviewed between 2008 and 2013. The River Derwent is a long river system running north to south, only the final downstream quarter of which lies within 15 km of the Project site and may therefore be subject to elevated SO_2 levels from the Project. The Annex I habitat *Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation; Rivers with floating vegetation often dominated by water-crowfoot* occurs within the main channel of the River Derwent, designated as SSSI Units 3 and 4 in the lower reaches of the SAC. Both of these units are considered to be in unfavourable recovering status. Six adverse conditions contributing to the unfavourable recovering status have been identified for the site as follows:

- inappropriate weirs, dams and other structures;
- inland flood defence work;
- siltation;
- water abstraction;
- water pollution – agriculture/run off; and

- water pollution – discharge;

Neither SO_2 levels specifically or emissions to air more generally are identified as a vulnerability or threat to the site on either the River Derwent SAC Natura 2000 Standard Data Form (1) or SSSI Citation (2).

The NE and EA report Restoring the Yorkshire River Derwent (NE & EA 2010) (3) identifies three key issues for aquatic vegetation communities for the river:

- high turbidity;
- fine sedimentation of the channel bed; and
- lack of marginal habitat niches.

The report also presents the findings of vegetation surveys of the River Derwent. The findings show that in lower reaches of the River Derwent, from the confluence with the River Ouse to the Pocklington canal (stretches D19-D22 in the report including all of the SAC within 15 km of the Prioject), the channel is too deep, turbid and slow flowing to support *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.

The assessment criteria set out in *Section 4.4.4* and applied in *Section 4.4.5* use the 10 $\mu g\ m^{-3}$ criterion for SO_2 for more sensitive receptors, based on the vulnerability to direct damage of mosses, liverworts and lichens which are often sensitive to lower concentrations than those causing injury to higher plants (4).

The habitat account for *Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation* (5) only includes reference to one moss, liverwort or lichen as being part of the ecological characteristics of the habitat, the aquatic moss *Fontinalis squamosal*. NBN Gateway does not show *Fontinalis squamosal* occurring in the lower reaches of the River Derwent, and the habitat in the lower reaches is unsuitable for this species which requires rapidly flowing, acidic streams and rivers (6). None of the other characteristic species of the habitat are known to be particularly sensitive to SO_2.

(1) http://jncc.defra.gov.uk/protectedsites/sacselection/n2kforms/UK0030253.pdf
(2) http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003398.pdf
(3) Natural England and Environment Agency (2010) Restoring the Yorkshire River Derwent: River Derwent Geomorphological Assessment & Restoration Plan Technical Report.
(4) http://www.apis.ac.uk/overview/issues/overview_Cloadslevels.htm#_Toc279788054
(5) http://jncc.defra.gov.uk/protectedsites/sacselection/habitat.asp?FeatureIntCode=H3260
(6) http://www.bbsfieldguide.org.uk/sites/default/files/pdfs/mosses/Fontinalis_squamosa.pdf

Even with the conservative 10 µg m^{-3} criteria, the unacceptable impact identified by the air quality modelling equates to a PEC for the three years operating in air mode for up to 100% of the time of 7.38 µg m^{-3}. This level does not exceed the Critical Level for SO_2 of 10 µg m^{-3} for the most sensitive characteristic species of the *Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation* habitat. In addition, neither this species, nor the more general *Ranunculion fluitantis and Callitricho-Batrachion* vegetation is known to occur within the lower reaches of the River Derwent. As a result, the increase in SO_2 will not result in any effects on the vegetation of the Annex I qualifying interest feature habitat, and therefore will not result in an adverse effect on the integrity of the site.

5.3 SKIPWITH COMMON SAC

5.3.1 Qualifying Features

Skipwith Common SAC supports two Annex I habitat qualifying interest features;

- Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath; and
- European dry heaths.

Likely significant effects on both habitats from acid deposition and SO_2 have been identified at Stage 1: Screening.

5.3.2 Conservation Objectives

The conservation objectives for Skipwith Common SAC are to:

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

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- *the extent and distribution of the qualifying natural habitats;*
- *the structure and function (including typical species) of the qualifying natural habitats; and*
- *the supporting processes on which the qualifying natural habitats rely.*

5.3.3 *Effects of Acid Deposition on Annex I Habitats*

The air quality modelling (both for three years operating in air mode for 100% of the time and assuming a worst case normal operating scenario of the Project operating in air mode for 56%of the time) results in an impact of unacceptable significance for acid deposition using the criteria set out in EA H1 guidance. This results from the long term PC and PEC exceeding 1% and 70% respectively of the critical load for acid deposition.

The level of background acid deposition at Skipwith Common SAC is currently 1.67 keq ha^{-1} yr^{-1}, which exceeds the critical load for both of the SAC Annex I habitat qualifying features which are sensitive to acid deposition (*European dry heaths* and *Northern Atlantic wet heaths with Erica tetralix*) of 0.802 keq ha^{-1} yr^{-1}.

During the first three years of operation, the process contribution from the Project (0.0417 keq ha^{-1} yr^{-1}) equates to 2.5% of background levels. The process contribution from the Project operating in air mode for 56% of the year (0.0234 keq ha^{-1} yr^{-1}) equates to 1.4% of background levels.

The SACs constituent Skipwith Common Site of Special Scientific Interest (SSSI) units were reviewed in January 2014, with 58% of the site being in favourable status and 42% in unfavourable recovering status. No reason for the unfavourable status is provided in the condition review; however the Natura 2000 Standard Data Form states that the site has suffered a lack of management resulting in scrub encroachment at the expense of heathland communities. Acid deposition is not identified as a vulnerability or threat to the site on either the Skipwith Common SAC Natura 2000 Standard Data Form (1) or SSSI Citation (2). Given the current background levels of acid deposition which do not appear to be affecting the site, and the very small increase (2.5% of background levels for 3 years followed by1.4% of background levels) predicted, the Project will not result in any adverse effect on the integrity of the site..

5.3.4 *Effects of SO_2 on Annex I Habitats*

The emissions to atmosphere modelling for the three years' operating in air mode for 100% of the time, results in an impact of unacceptable significance for SO_2 using the criteria set out in EA H1 guidance. This results from the long term PC and PEC exceeding 1% and 70% respectively of the critical level for SO_2. No unacceptable impacts for SO_2 were identified by the air quality modelling for the Project operating in air mode for 56% of the time.

(1) http://jncc.defra.gov.uk/ProtectedSites/SACselection/n2kforms/UK0030276.pdf accessed September 2014
(2) http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003243.pdf accessed September 2014

SO_2 is not identified as a vulnerability or threat to the site on either the Skipwith Common SAC Natura 2000 Standard Data Form (1) or SSSI Citation (2).

The assessment criteria set out in *Section 4.4.4* and applied in *Section 4.4.5* use the 10 µg/m^3 criterion for SO_2 for more sensitive receptors, based on the vulnerability to direct damage of mosses, liverworts and lichens which are often sensitive to lower concentrations than those causing injury to higher plants (3).

Skipwith common supports two Annex I habitats, *Northern Atlantic wet heaths with Erica tetralix* and *European dry heaths*. The Euopean dry heaths habitat supported by the SAC is an example of the H9 *Calluna vulgaris –Deschampsia flexuosa* vegetation community. Rodwell *et al* (eds) (1991) (4) suggests that the community found on Skipwith common is the *Molinia caerulea* sub-community, which supports a poorly developed ground layer commonly featuring only two mosses, *Pohlia nutans* and *Campylopus paradoxus* and few or no bryophytes and lichens. As a result the community would be expected to be more resilient to low levels of SO_2 than a habitat with a higher number of mosses, lichens and bryophytes.

The *Northern Atlantic wet heaths with Erica tetralix* habitat is an example of the M16 *Erica tetralix – Sphagnum compactum* wet heath vegetation community. The community can support a number of bryophytes and lichens, but the ground layer is dominated by *Sphagnum* mosses (Rodwell *et al* (eds) 1991). The Skipwith Common SSSI citation states that the *Northern Atlantic wet heaths with Erica tetralix* habitat on the site supports three moss species, all of which are bog moss species, *Sphagnum palustre, S. squarrosum and S. recurvum.* The site supports other bryophytes and lichens, however these are occasional and not characteristic of the M16 habitat (Rodwell *et al* (eds) 1991). Sphagnum growth is known to be inhibited by SO_2, however fumigation experiments have shown that growth of the most sensitive *Sphagnum* species was not inhibited at levels below 131 µg m^{-3} and Apis gives the critical level for Sphagnum as 20 µg m^{-3} (5).

Even with the conservative 10 µg m^{-3} criteria, the unacceptable impact identified by the air quality modelling equates to a PEC for the three years operating in air mode for up to 100% of the time of 7.04 µg m^{-3}. This level does

(1) http://jncc.defra.gov.uk/ProtectedSites/SACselection/n2kforms/UK0030276.pdf accessed September 2014
(2) http://www.sssi.naturalengland.org.uk/citation/citation_photo/1003243.pdf accessed September 2014
(3) http://www.apis.ac.uk/overview/issues/overview_Cloadslevels.htm#_Toc279788054
(4) Rodwell, J S, (ed) (1991a) British Plant Communities. Volume 2. Mires and heaths. Cambridge University Press, Cambridge.
(5) http://www.apis.ac.uk/node/1099

not exceed the Critical Level for SO_2 of 10 μg m^{-3} for the most sensitive species, and is well above the critical level for the characteristic *Sphagnum* species which occur on the site. Other characteristic species of the habitat (*Erica tetralix, Calluna vulgaris*) are less sensitive to SO_2 and will also not be affected by the levels of SO_2 which will result from commissioning and operation of the Project. As a result, the increase in SO_2 will not result in any effects on the vegetation of the Annex I qualifying interest feature habitats, and therefore will not result in an adverse effect on the integrity of the site.

5.4 THORNE MOOR SAC

5.4.1 Qualifying Features

Thorne Moor SAC supports one Annex I habitat qualifying interest feature;

- Degraded raised bogs still capable of natural regeneration.

Likely significant effects on this habitat from acid deposition and SO_2 have been identified at Stage 1: Screening.

5.4.2 Conservation Objectives

The conservation objectives for Thorne Moor SAC are to:

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

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- *The extent and distribution of qualifying natural habitats;*
- *The structure and function (including typical species) of qualifying natural habitats; and*
- *The supporting processes on which qualifying natural habitats rely.*

5.4.3 Effects of Acid Deposition on Annex I Habitats

The air quality modelling (both for three years operating in air mode for 100% of the time and assuming a worst case normal operating scenario of the Project operating in air mode for 56%of the time) results in an impact of unacceptable significance for acid deposition using the criteria set out in EA H1 guidance.

This results from the long term PC and PEC exceeding 1% and 70% respectively of the critical load for acid deposition.

The level of background acid deposition at Thorne Moor SAC is currently 1.71 keq ha^{-1} yr^{-1}, which exceeds the critical load of the SAC qualifying feature which is sensitive to acid deposition (Degraded raised bog still capable of natural regeneration) of 0.462 keq ha^{-1} yr^{-1}. During the first three years of operation, the process contribution from the Project (0.0310 keq ha^{-1} yr^{-1}) equates to 1.8% of background levels. The process contribution from the Project operating in air mode for 56% of the year (0.0174 keq ha^{-1} yr^{-1}) equates to 1% of background levels.

The SACs constituent Thorne Crowle and Goole Moors SSSI units were reviewed in 2012, with 96% of the site in unfavourable recovering status, 3% unfavourable no change, and 1% unfavourable declining. The reasons for the unfavourable status of SSSI units were given as scrub encroachment and drying out of the site. Acid deposition was not identified as a vulnerability or threat to the habitats present in the condition assessment, or on either the Thorne Moor SAC Natura 2000 Standard Data Form (1) or Thorne Crowle and Goole Moors SSSI Citation (2) and given the current background levels, and the very small increase (1.8% of background levels for 3 years followed by 1% of background levels) predicted, the Project will not result in any adverse effect on the integrity of the site.

5.5 STAGE 2: INTEGRITY MATRICES

During the first three years at 100% air mode, the following impacts have been identified by the emissions modelling:

- River Derwent SAC – SO_2;
- Skipwith common SAC – acid deposition and SO_2; and
- Thorne Moor SAC – acid deposition.

During the rest of the operational life of the Project at 56% air mode, the following impacts have been identified by the emissions modelling:

- Skipwith common SAC – acid deposition; and
- Thorne Moor SAC – acid deposition.

(1) http://jncc.defra.gov.uk/ProtectedSites/SACselection/n2kforms/UK0012915.pdf accessed September2014
(2) http://www.sssi.naturalengland.org.uk/citation/citation_photo/1001467.pdf accessed September 2014

Potential impacts upon the European site(s) and their features, which are considered in this Habitats Regulations Assessment report are provided in *Table 5.1* below.

Table 5.1 Impacts Considered within the Integrity Matrices

Designation	Impacts in submission information	Presented in integrity matrices as
River Derwent SAC • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	SO_2 concentrations due to emissions to air from the power station while operating in air-mode 100% of the time during three years of commissioning.	SO_2 concentrations due to emissions operating in air-mode 100% of the time.
Skipwith Common SAC • Northern Atlantic wet heaths with *Erica tetralix* • European dry heaths	Acid deposition due to emissions to air from the power station while operating in air-mode for 100% of the time during three years of commissioning and for 56% of the time during the rest of its operational life.	Acid deposition due to emissions operating in air-mode 100% of the time and air-mode 56% of the time.
	SO_2 concentrations due to emissions to air from the power station while operating in air-mode at 100% of the time during three years of commissioning.	SO_2 concentrations due to emissions operating in air-mode 100% of the time.
Thorne Moor SAC • Degraded raised bogs still capable of natural regeneration	Acid deposition due to emissions to air from the power station while operating in air-mode for 100% of the time during three years of commissioning and for 56% of the time during the rest of its operational life.	Acid deposition due to emissions operating in air-mode 100% of the time and air-mode 56% of the time.

These sites have been subject to further assessment in order to establish if the Project could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices 1-3 below. The key to the Screening Matrix is summarised in *Box 5.1*

Box 5.1 Screening Matrix Key

✓ = Effect on integrity of the site **cannot** be excluded
✗ = Effect on integrity of the site **can** be excluded

C = construction
O = operation
D = decommissioning

Where effects are not applicable to a particular feature the matrix cell is formatted as follows: n/a

Stage 2 Matrix 1: River Derwent SAC

Name of European site: River Derwent SAC						
Distance to NSIP: 0.66 km NE						
European site features	**Adverse effect on integrity**					
	SO_2 concentrations due to emissions operating in air-mode 100% of the time			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	**n/a**	**×a**	**×b**	**×n/a**	**×c**	**×b**

Evidence supporting conclusions

a. Neither SO_2 levels specifically or emissions to air more generally are identified as a vulnerability or threat to the site on either the River Derwent SAC Natura 2000 Standard Data Form or SSSI Citation. The assessment criteria set out in *Section 4.4.4* and applied in *Section 4.4.5* use the 10 µg m^{-3} criterion for SO_2 for more sensitive receptors, based on the vulnerability to direct damage of mosses, liverworts and lichens which are often sensitive to lower concentrations than those causing injury to higher plants. The characteristic water moss *Fontinalis squamosal* does not occur in the lower reaches of the River Derwent, which are unsuitable for the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation for which the SAC is designated. Even with the conservative 10 µg m^{-3} criteria, the unacceptable impact identified by the air quality modelling equates to a PEC for the three years operating in air mode for up to 100% of the time of 7.38 µg m^{-3}. This level does not exceed the Critical Level for SO_2 of 10 µg m^{-3} for the most sensitive characteristic species of the *Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation* habitat. The habitat itself does not occur in

the lower reaches of the River Derwent. As a result, the increase in SO_2 will not result in any effects on the vegetation of the Annex I qualifying interest feature habitat, and therefore will not result in an adverse effect on the integrity of the site.

b. Decommissioning of power station will not result in release of significant pollutants to atmosphere.

c. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.

Stage 2 Matrix 2: Skipwith Common SAC

Name of European site: Skipwith Common SAC									
Distance to NSIP: 8.00 km N									
European site features	**Adverse effect on integrity**								
	SO_2 concentrations due to emissions operating in air-mode 100% of the time.			*Acid deposition due to emissions operating in air-mode 100% of the time and air-mode 56% of the time.*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Northern Atlantic wet heaths with *Erica tetralix*	**n/a**	**×d**	**×b**	**n/a**	**×e**	**×b**	**×n/a**	**×c**	**×b**
European dry heaths				**n/a**	**×e**	**×b**	**×n/a**	**×c**	**×b**

Evidence supporting conclusions

b. Decommissioning of power station will not result in release of significant pollutants to atmosphere.

c. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.

d. SO_2 is not identified as a vulnerability or threat to the site on either the Skipwith Common SAC Natura 2000 Standard Data Form or SSSI Citation. The assessment criteria set out in *Section 4.4.4* and applied in *Section 4.4.5* use the 10 µg/m^3 criterion for SO_2 for more sensitive receptors, based on the vulnerability to direct damage of mosses, liverworts and lichens which are often sensitive to lower concentrations than those causing injury to higher plants. The Annex I habitat *Northern Atlantic wet heaths with Erica tetralix and European dry heaths* vegetation sub-community which occurs on Skipwith Common supports a poorly developed moss community and would be expected to be more resilient to low levels of SO_2 than a habitat with a higher number of mosses, lichens and bryophytes. The Annex I habitat *Northern Atlantic wet heaths with Erica tetralix* community supports three characteristic species of *Sphagnum* moss *Sphagnum palustre, S. squarrosum* and *S. recurvum* which are less sensitive to SO_2 than some moss, liverwort and lichen species and have a critical level for SO_2 of 20 µg m^{-3}.

e. The site vulnerabilities are listed as a lack of management activities resulting in scrub encroachment. Acid deposition is not reported to be a significant factor. Current background levels of acid deposition at Skipwith Common SAC (1.67 keq ha^{-1} yr^{-1}) exceed the critical load for acid deposition at the site (0.802 keq ha^{-1} yr^{-1}) by 108% without showing any impacts on the integrity of the site. During the first three years of operation, the process contribution from the Project (0.0417 keq ha-1 yr-1) equates to 2.5% of background levels. The process contribution from the Project operating in air mode for 56% of the year (0.0234 keq ha-1 yr-1) equates to 1.4% of background levels. Given the current background levels of acid deposition which do not appear to be affecting the site, and the very small increase (2.5% of background levels for 3 years followed by 1.4% of background levels) predicted, the Project will not result in any adverse effect on the integrity of site.

Stage 2 Matrix 3 Thorne Moor SAC

Name of European site: Thorne Moor SAC		
Distance to NSIP: 9.37 km SE		
European site features	**Adverse effect on integrity**	
	Acid deposition due to emissions operating in air-mode 100% of the time and air-mode 56% of the time.	*In combination effects*

Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
Degraded raised bogs still capable of natural regeneration	**n/a**	**×f**	**×b**	**×n/a**	**×c**	**×b**

Evidence supporting conclusions

b. Decommissioning of power station will not result in release of significant pollutants to atmosphere.

c. No projects with potential in combination effects identified within the air quality in combination effects study area as set out in *Section 4.5*.

f. The site vulnerabilities describe how while much of the raised bog has been successfully restored to active bog through maintenance of water levels, a large area is classed as degraded because restoration to its previous habitat is still in early stages. The vulnerabilities which affect the ability to successfully restore the degraded bog include peat-cutting, water abstraction from the underlying aquifer (and surrounding agricultural drainage). Acid deposition is not reported to be a significant factor. Current background levels of acid deposition at Thorne Moor SAC (1.71 keq ha^{-1} yr^{-1}) exceed the critical load for acid deposition at the site (0.462 keq ha^{-1} yr^{-1}) by 270% without showing any impacts on the integrity of the site. During the first three years of operation, the process contribution from the Project (0.0310 keq ha^{-1} yr^{-1}) equates to 1.8% of background levels. The process contribution from the Project operating in air mode for 56% of the year (0.0174 keq ha^{-1} yr^{-1}) equates to 1% of background levels. Given the current background levels of acid deposition which do not appear to be affecting the site, and the very small increase (1.8% of background levels for 3 years followed by 1% of background levels) predicted, the Project will not result in any adverse effect on the integrity of site.

5.6 CONCLUSIONS OF HRA STAGE 2: APPROPRIATE ASSESSMENT

The assessment of the projects effects on the integrity of the European sites presented in *Section 5.2-5.4* above have concluded that the Project will not result in any impacts on the integrity of any of the European sites.

5.7 MITIGATION MEASURES

As no impacts on the integrity of any European sites will occur, no mitigation measures are proposed and no residual impacts on the integrity of any European sites are predicted.

It should be noted that the higher emissions experienced if the project were to operate in air mode for 100% of the time during commissioning will be controlled through the implementation of the Emissions Performance Standard during the rest of the operational life of the project (see *Section 4.4.6*).

5.8 CONSULTATION WITH STATUTORY NATURE CONSERVATION BODIES

Consultation has been undertaken with NE throughout the HRA process. Evidence of consultation and agreement with NE on the scope of the HRA document is presented in *Annex A*.

White Rose Carbon Capture and Storage (CCS) Project

The White Rose CCS (Generating Station) Order

Land within and adjacent to the Drax Power Station site, Drax, near Selby, North Yorkshire

Annex A HRA Consultation

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure)

Applicant: Capture Power Limited
Date: November 2014

Table A.1 Statutory Consultation Correspondence Relating to HRA

Source	Consultee Comment	Response
PINS Scoping Opinion Report (dated 01/2013)	PINS recommends potential effects on international and nationally designated sites should be addressed as well as county level and local sites.	Potential effects on international, national, county level and local sites have been assessed as part of the EIA (*See ES Section 4)* and this HRA Report.
	The SoS notes the presence of a number of Natura 2000 sites within the vicinity of the Project and the recommendations made by Natural England (NE) with respect to the assessment of effects on designated sites within the EIA and with respect to the potential need for appropriate assessment under the Habitats Regulations. The SoS also draws to the attention of the applicant the need for further information on Habitat Regulations Assessment (HRA) within *Section 4* of this Opinion.	Potential effects on Natura 2000 sites have been assessed as part of this EIA, including the potential need for HRA / Appropriate Assessment (AA) under the Habitats Regulations. An HRA has been prepared and will be submitted separately to PINS (*See Volume 3* of the ES) and this HRA Report).
Environment Agency (dated 07/01/2013)	The key ecological issue surrounding this scheme will be the potential for air pollution to affect the European protected site at Thorne Moor.	Potential effects on protected sites from pollutants emitted to the atmosphere have been assessed as part of the EIA (*See Chapter 11*) and within this HRA Report.
	The Environment Agency note that a great deal of work has already been conducted for the Ouse Project and Lytag scheme, and we would agree in principle with their findings.	Comment noted. A review of previous studies in the Project area has been undertaken as part of the EIA (*Section 4*) and reference to the Ouse project has been made during consultation with Natural England.
Natural England (dated 02/01/2013)	The ES should thoroughly assess the potential for the Project to affect designated sites. European sites (e.g. designated Special Areas or Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2010. In addition, paragraph 169 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse effects on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites.	Potential effects on designated sites (including potential / possible sites and compensation sites, where applicable) have been assessed as part of the EIA (*See Section 4*).
	Under Regulation 61 of the Conservation of Habitats and Species Regulations 2010 an Appropriate Assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to	The requirement for an HRA / AA has been assessed as part of this EIA. This HRA has being prepared to address this point and will be submitted separately to PINS.

Source	Consultee Comment	Response
	the management of the site. Should a Likely Significant Effect on a European / Internationally designated site be identified or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an Appropriate Assessment, in addition to consideration of effects through the EIA process.	
	The Environmental Statement should include a full assessment of the direct and indirect effects of the Project on the features of special interest within the River Derwent SSSI / SAC and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects.	Potential effects on the River Derwent SSSI / SAC have been assessed as part of the EIA (*See Section 4*) and effects on the SAC have been included within this HRA Report.
North Yorkshire County Council (dated 07/01/2013)	The following ecological work is required in order to assess the potential effect of the Project upon important habitats and species. This assessment should include an appraisal of the data held at the North and East Yorkshire Ecological Data Centre to identify: • statutory designated sites such as SSSI, SACs and SPAs; • non-statutory designated sites in North Yorkshire such as Sites of Importance for Nature Conservation (SINC); and Ancient Woodland Inventory (AWI) sites. • records of protected species including bats, badgers, otter, water vole, great crested newt, birds etc; and • records of species included as priorities within the UK Biodiversity Action Plan.	Contact has been established with the Yorkshire Wildlife Trust (YWT) and North East Yorkshire Ecological Data Centre (NEYEDC) and all relevant information from these sources has been used to inform the EIA (*See Section 3*) and this HRA Report.
Natural England (dated 10/07/2014)	Internationally and nationally designated sites: NE note the intention to carry out a HRA screening study to determine whether there are likely significant effects on any European sites, in accordance with Regulations 61 and 62 of the Habitats Regulations, as indicated in Section 4.4 of the Ecology Technical Report. NE specify they are satisfied that the analysis of emissions effects on ecological receptors has been carried out to an appropriate methodology, as set out in the Emissions to Atmosphere report, and that there will not be any significant impacts resulting from the proposed power station operating in oxy mode. However, NE note from Section 6.2 of the report that the power station could cause harm to designated sites, including Skipwith Common, Thorne Moor and River Derwent Special Areas of Conservation (SACs) if it were to operate in air-mode for extended periods. NE would expect the HRA to consider how such impacts can be avoided; possibly through restricting the annual number of operating hours in air-mode.	The issues raised by NE were discussed during a meeting on 24/09/14 and have been addressed in an HRA screening report which was submitted to NE on 01/09/14 for consideration and comment. NE commented on 16/09/14 that they were satisfied with the content of the HRA. This HRA report has been prepared and will be submitted separately to PINS (*See ES Volume 3*).

Source	Consultee Comment	Response
	NE state that with regard to impacts from hydrogen fluoride, it should be noted that the River Derwent SAC is designated for its riparian habitats (water courses of plain to montane levels) as well as for lamprey, otter and bullhead. NE stipulates the need for the HRA to consider potential impacts alone, cumulatively across the project and in combination with other plans and projects. NE welcomes the inclusion of other power projects within the cumulative effects assessment.	
Natural England (dated 18/07/2014	In relation to the list of projects considered for cumulative impacts, commented that the list was sufficient and that "*As mentioned in our response to the Section 42 consultation, we welcome the inclusion of other power projects in the cumulative effects assessment. This would include other coal or oil fired power stations within 15 km of any of the designated sites which have been included in the emissions assessment, and other significant combustion sources with 10 km*".	Noted
Natural England (e-mail correspondence) 15/09/2014	Thank you for consulting us on the HRA screening report. Natural England is satisfied that an appropriate methodology has been used in accordance with the Habitats Regulations, and we agree that an appropriate list of sites has been taken forward to the appropriate assessment stage as a result of likely significant effects from the power station operating in air mode.	Noted – see below
Planning Inspectorate (19/09/2014)	Section 1 of the draft HRSA sets out in brief the legislative context in which the draft HRSA has been produced. This section includes a reference to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009. The Inspectorate reminds the applicant that the consideration of impacts to European sites and their features is required by The Conservation of Habitats and Species Regulations 2010 (the Habitat Regulations) and is separate from the EIA Regulations. Therefore, the applicant may wish to clarify this issue in completing the final report.	Noted – Reference added to *Section 1.1.2* of the HRA
	Section 1.1.3 of the draft HRSA contains a description of the project and refers to the 'upgrading of an exsisting jetty adjacent to the River Ouse, east of the main Drax'. The purpose of the jetty and details of when it would be used has not been identified in te draft HRSA, although the Inspectorate notes that the draft HRSA state the land adjacent to the	A description of the use of the jetty based on the most up to date project description is provided in *Section 1.1.3* of the HRA report. Impacts of the works are assessed in *Section 4.3* of HRA report

Source	Consultee Comment	Response
	jetty would be reinstated after the construction phase. The Inspecorate is unclear as to whether the jetty would be used during the operational phase of the project and advises the applicant to clarify these points. The applicant is also reminded of the need to ensure they assess all of the impacts associated with the jetty within the HRSA.	
	Section 2.1.2 of the draft HRSA states that the screening has sought to conclude on one of the following three outcomes: 1. No likely significant effect 2. A likely significant effect and; 3. It cannot be concluded that there will be no likely significant effect. It is not immediately apparent how conclusions 2 and 3 differ and what impact this may have on the level of assessment required. The Inspectorate recommends that the possible outcomes are wither rationalised or clarified in preparing the final report. Section 2.1.3 of the draft HRSA provided a bullet point list of the information that should be included for Stage 2 – Appropriate Assessment. The Inspectorate notes there is no equivalent list of information to be provided for Stage 1 – Screening. The Inspectorate draws the applicant's attention to Advice Note 10: Habitat Regulations Assessment for nationally significant infrastructure projects (version 5) (April 2013) which details the information applicants should include within their HRA screening assessment.	Additional clarification is provided in *Section 2.1.2* of the HRA Report. The list of issues for the applicant to consider and include in HRA Stage 1: Screening from the Planning Inspectorate Advice Note 10 Habitat Regulations Assessment has been provided in Section 2.1.3
	The Inspectorate recommends that decisions taken by the applicant to refine the scope of the assessment are clearly explained and justified. For example, Section 3.1 of the draft HRSA states that European sites within a 15km radius of the Project site have been identified. There is no explanaition / justification provided as to why a 15km study area is appropriate in this instance. The Inspectorate recommends that justification is provided to explain why this study area was used. The Inspectorate welcomes the inclusion of Table 3.1 which presents the sites and their qualifiying features that have been considered in the assessment. It is noted that the qualifying features that have been considered in the assessment. It is noted that the qualifying features for the Lower Derwent Valley SPA do not correlate with those in the SPA Review site accounts on the JNCC website	The HRA has been updated to provide additional explanation on the scope and approach to the HRA. Justification of the area of influence has been provided in Section 3. NE confirmed on 6th October 2014 that they were happy to use the list of qualifying features for SPAs presented in the Natura 2000 data forms rather than the SPA Review (see below).

Source	Consultee Comment	Response
	http://jncc.defra.gov.uk/default.aspx?page=1994. The Inspectorate recommends that the applicant consults with the relevant statutory nature conservation body to agree the features to be assessed.	
	The potential impacts considered within the screening assessment are detailed in Table 4.1 but no information is provided to explain how they will / have been assessed. The Inspectorate advises that the HRSA should include a methodology section with details of the criteria used to determine whether there would be a likely significant effect. The main impact considered in the draft HRSA is emissions to air from the operational phase of the power station. The Inspectorate understands and supports the aspiration to restrict duplication within the application. However, the Inspectorate considers that details of the air quality modelling undertaken should be provided and advises that as a minimum the following information is included in the HRSA • An overview of the assessment methodology, including the air quality model used and any relevant input data for example the stack height and explanation of the worst case scenario (s) considered (i.e air mode and / or oxy – mode; please see the conclusions section of this review for further comments regarding the operational mode) and an explanation of how significance has been determined with reference to any guidance used; • Clear identification of whether each of the qualifying features of the European sites is sensitive to emissions, along with their critical loads and an explanation of how these have been identified; and • A clear presentation of the modelled process contributions and, if relevant, the predicted environmental concentrations applicable to each qualifying feature and clear identification of features at which critical loads are exceeded. Section 4.1.1 of the draft HRSA provides some discussion on potential impacts with reference to the Summary Preliminary Environmental Information Report (PEIR), however the Inspectorate considers that the final HRSA to be submitted with the application should include up to date data, for example results of the finalised air quality modelling in the Environmental Statement (ES). As appropriate the applicant should make use of cross referencing to supporting information provided elsewhere in the application	Section 4 of the HRA Report has been updated to provide more information on how the impacts screened into the assessment have been assessed. *Section 4.4* (Assessment of Effects from Emissions to Air) has been updated to provide the requested level of detail. References in the final HRA report now refer to the ES and it's technical annex reports.

Source	Consultee Comment	Response
	including the Environmental Statement (ES).	
	The screening matrices have been used as the primary method to present the outcome of the HRSA. The Inspectorate welcomes the inclusion of the matrices and appreciates the opportunity to provide comments prior to application. The Inspectorate considers that at present the footnotes contain conclusions which have not been sufficiently justified. For example, footnote 'a' states 'Power station operating in oxy-mode will not result in release of significant pollutants to atmosphere'. In this case, the Inspectorate would expect the footnote to include a brief summary of and/or references to the results of air quality modelling which clearly justifies why the pollutants would not be significant. All footnotes should contain a robust justification to the conclusion drawn with cross reference to specific paragraphs in other application documents as appropriate (i.e. either to the HRSA itself or specific paragraphs of the ES). Furthermore, assertions such as 'it is unlikely these would have significant adverse effects on mobile qualifying features downstream of the SAC limit' (footnote 'h') should be fully justified.	Additional detail has been included in *Section 4* of the HRA to provide justification of the conclusions presented in the Screening Matrices. The footnotes have been updated so that they cross- reference the relevant sections of the Impact Assessment presented in *Section 4* of the HRA.
	The Stage 1 Matrix 1: River Derwent SAC footnote 'f' has been used to indicate a likely significant effect (i.e. a tick) for 'Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation' and also no likely significant effect (i.e. a cross) for the remaining features. The Inspectorate considers that this approach is confusing and should be avoided; the same footnote should not be used to indicate both the screening in and screening out of a likely significant effect. This point has been discussed with the applicants consultants during the meeting held on 18 September 2014. The applicant has confirmed that this will be corrected before submission of the final document. The applicant is also requested to provide both a PDF and Word copy of the matrices with the application.	All footnotes in the matrices have been updated to that they relate to a single conclusion rather than being used to both screen in and screen out a likely significant effect.
	The Inspectorate notes that Table 5.1 of the draft HRSA identifies the qualifying features of each European site where there is uncertainty remaining about the level of potential effect and notes the conclusion that these would be taken forward to Stage 2 – Appropriate Assessment. The applicant is reminded of the need to provide sufficient information to enable the competent authority to undertake an appropriate	The updated modelling and assessment of likely significant effects presented in *Section 4* of the HRA report has allowed the conclusion to be reached that there will be no likely significant effects on any European sites.

Source	Consultee Comment	Response
	assessment, should one be required. This would include consideration of adverse impacts on integrity of European sites with reference to the site's Conservation Objectives. The Inspectorate would expect such information to be provided and for the relevant integrity (Stage 2) matrices to also be completed for these features. The applicant is reminded that in this instance the report would no longer be limited to being a screening stage assessment or 'HRSA' and is advised to amend the title of the document accordingly. In the absence of such information within the draft HRSA, the Inspectorate cannot provide advice to the applicant on that stage of the assessment. The Inspectorate is committed to working with applicants during pre-application and would appreciate the opportunity to comment on these documents before they are submitted for acceptance. The Inspectorate reminds the applicant of the importance of providing sufficient evidence to support the conclusions in the HRSA. The Inspectorate considers that at present insufficient evidence has been provided in Box 4.1, Section 4.1.1 and the screening matrices of the draft HRSA to justify the conclusions reached and as detailed above advises that further justification is provided. The footnotes used in the screening matrices for these features (e.g. footnotes c, d, e, and f) should clearly justify the conclusions reached. The conclusion of the draft HRSA states that these sites and qualifying features (detailed in Table 5.1) should be taken forward to the Appropriate Assessment Stage (Stage 2 of the HRA process); however as stated above no further information has been provided in the draft HRSA.	Sufficient evidence to reach this conclusion in presented in *Section 4* of the HRA.
	As noted above, the Inspectorate advises that the HRSA provides further details on the potential operating modes of the power station. The conclusion section of the draft HRSA states that the air quality modelling has 'assumed a worst case operating scenario; namely that the plant will be operating for 8,760 hours per annum [24 hours per day 365 days per year] in both air-mode and oxy-mode'. The Inspectorate notes that the draft DCO does not reference either of these modes, but assumes that the primary operational mode of the power station would be oxy-mode. The draft HRSA continues to explain that 'The assumed	Additional information on the potential operating modes, and their likely impacts, has been provided in Section 4 of the HRA. Details of a worst case potential operating scenario, where the duration of operation in air mode throughout the year is constricted by the Emissions Performance Standard, are presented in *Section 4.4.5* of the HRA.

Source	Consultee Comment	Response
	constant operation in air mode results in predicted exceedance of critical loads / levels for a number of pollutants at the European sites within the 15km. However, the likelihood of this scenario occurring is very low as although the plant will start up / shut down in air-mode, and use air- mode should the ASU / gas processing unit or the CO2 pipeline be offline, these events are expected to be abnormal, infrequent and short term in nature. As such, the likelihood for the effects on European sites discussed in this HRA to actually occur requires the plant to only run in air-mode continuously.' The Inspectorate queries the need for the power station to be able to operate 8,760 hours per annum in air mode, particularly given that in this mode critical loads at European sites are predicted to be exceeded. The applicant confirmed at the Draft Documents meeting held on 18 September 2014 that flexibility in relation to the operational mode needs to be maintained within the DCO (though there will be some legislative control) consequently the HRSA will need assess the worst case potential operating scenario	
	The draft HRSA states that in-combination effects have not been assessed at this stage as the list of plans and projects has recently been compiled and requires air quality assessment to be completed. The Inspectorate acknowledges the HRSA is currently in its draft form and advises that the final version includes an in- combination assessment and that the 'in-combination' effects column in the screening matrices is also completed. The HRSA should describe how the 'other plans and projects' considered in the in- combination assessment have been identified i.e. what study area has been used and why. It would also be helpful to include a statement in the HRSA stating whether the list of 'other plans and projects' have been discussed and agreed with the local planning authority and Natural England. Where any 'other plans and projects' have been identified, but not included within the in-combination assessment, these should also be identified within the HRSA. The Inspectorate acknowledges that the project intends to connect to a wider proposed CCS scheme being promoted by National Grid that includes the Yorkshire CCS Pipeline onshore project (to be consented	The HRA has been updated to include an in-combination assessment, in *Section 4.5*. *Section 4.5* sets out the rationale for identifying other plans and projects considered in the in-combination assessment. The list of plans and projects included in the in-combination assessment has been agreed with NE – see below. The CCS pipeline scheme was one of the projects considered in the initial list of projects considered in the in-combination impact assessment.

Source	Consultee Comment	Response
	under the Planning Act 2008) and offshore project (to be consented in accordance with the Petroleum Act 1998 and the Energy Act 2008). The applicant is reminded of the need under the Habitats Regulations to ensure all in-combination impacts are considered including those related to the CCS pipeline scheme. The Inspectorate also advises that a plan is included with the HRSA that plots the location of 'other plans and projects' considered within the in-combination assessment.	*Figure 4.1* of the HRA report show all of the projects considered in the initial screening stage of the in-combination impact assessment, and *Figure 4.2* of the HRA report shows those taken forward for the more detailed impact assessment.
	The Inspectorate notes that the conclusion of the draft HRSA states 'An initial meeting has taken place between with Natural England (NE), CPL and ERM and NE have expressed an interest in working with CPL to develop a Statement of Common Ground on a number of matters including the basis of this HRA'. The Inspectorate welcomes this engagement and advises that, where possible, evidence of agreement of the following is provided: • all relevant European sites and features have been considered • all relevant plans and/or projects have been considered in the in-combination assessment • the conclusions of the HRSA Consultation and on-going engagement with key statutory consultees was discussed at the Round Table meeting held on 18 September 2014 with particular focus on air quality issues and European sites.	Evidence of consultation undertaken with NE to date is included in this table. Evidence of agreement on the European sites considered was provided on 15th September 2014 (see above) Evidence of agreement on the scope of the cumulative impact assessment was provided on 18th July 2014 (see above). The same list of projects has been used for the in-combination assessment. Evidence of agreement with the conclusions of the HRA will be sought following finalisation of the report.
	On a presentation matter, the Inspectorate recommends each paragraph is numbered individually to enable easier referencing.	Noted – paragraph numbering will be include in the final report.
Natural England (e-mail correspondence) 01/10/2014	As stated in our response to the HRA screening, we agree with the sites being taken forward to the Appropriate Assessment stage, as exceeding 1% of the critical load indicates likely significant effect and is a trigger for more thorough investigation. We recognise that operating in air mode for 56% of the time (i.e. the maximum allowed under the emissions performance standard) is very much a worst case scenario. We also agree that for Thorne Moor, the relatively small process contribution set against a very high rate of background deposition will mean that the proposal will not result in an	Noted – see below

Source	Consultee Comment	Response
	adverse effect on the integrity of the site (even under the worst case operating scenario). The information to support the HRA will need to demonstrate that this is the case for all the sites being taken forward to Appropriate Assessment stage.	
Natural England (e-mail correspondence) 01/10/2014	However we would be satisfied if you were able to provide sufficient justification in the Habitats Regulations screening document to demonstrate and justify why further assessment would not be required for any of the sites previously identified as LSE alone or in combination. Further assessment would then not be required and you would be able to screen out with this information upfront. If you have already written the Shadow Appropriate Assessment, you could just provide this information to rule out adverse effects in the normal way as that could make it easier with your short deadlines. This early engagement and assessment of information has helped to resolve this issue prior to submission. You will need to ensure that any legal requirements are identified to restrict the emissions to that discussed (e.g. the Emissions Performance Standard) and that reference to this information is contained within the DCO.	Noted
Natural England (e-mail correspondence) 06/10/2014	Yes, I can confirm that we would be happy for you to use the standard data form on the JNCC website, as this shows the species for which the site is currently designated.	Noted.
Natural England (e-mail correspondence) 10/10/2014	Thanks for sending this through. There are a couple of things I picked up on when looking through the report: • Critical load figures for acid deposition have changed significantly compared to the Emissions to Atmosphere Technical Report.	The draft Emissions to Atmosphere Technical Report submitted with the PEIR used the APIS maximum (MaxCLMaxN) critical load for acid deposition (which for example for the European dry heaths qualifying feature of the Skipwith Common SAC is 1.52 keq ha-1 yr-1). The updated Emissions to Atmosphere Technical Report which will be submitted with the ES (and the results of which are presented in the HRA) uses the more conservative APIS minimum (MinCLMaxN) critical load for acid deposition (which for example for the European dry heaths qualifying feature of the Skipwith Common SAC is 0.82 keq ha-1 yr-1). By using the more conservative critical loads in the updated HRA we are presenting a more robust

Source	Consultee Comment	Response
		assessment than that presented in the draft, in line with best practice.
	• Hydrogen Fluoride (weekly mean) for River Derwent is shown as 'not significant' (Tables 4.10 and 4.18). However it is shown as 'unacceptable' in Table 6.17 of the Emissions to Atmosphere Technical Report (the PC figure is the same). It is not clear why this has not been taken forward for more detailed assessment, given the criteria set out in Section 4.4.4.	For hydrogen fluoride, the draft Emissions to Atmosphere Technical Report issued with the PEIR incorrectly used the criteria for long term PC (the PC is considered insignificant if the PC is<1% of the long term environmental standard) for the weekly mean hydrogen fluoride. This has been corrected in the modelling used in the HRA so that the short term PC criteria is used for the weakly mean (the PC is considered insignificant if the PC is <10% of the short term environmental standard). The modelling in both the PEIR and the HRA shows that the PC weekly mean for HF would be 3% of the relevant Air Quality Standard and therefore is correctly assessed as Not Significant in the HRA. The updated air quality modelling presented in the HRA will be presented in the updated Emissions to Atmosphere Technical Report issued with the ES.
	I would be grateful if you could provide clarification on the above. Please also note that there is an unfinished sentence on Page 30 (beginning of Section 4.4.4).	Unfortunately on the final pdf, the final sentence of page 30 split across two pages – we can rectify this when we address any other comments which you have on this latest draft.
Natural England (e-mail correspondence) 10/10/2014	Many thanks for the clarification. I can confirm that we agree with the conclusions of the report.	Noted
PINS comments on draft NSER 31/10/2104 (new comments only)	Reference to the EIA Regulations remains in the NSER, the Inspectorate recommends removal in this document to avoid confusion.	Reference removed
	The Inspectorate notes that Figure 1 in the document is provided at low resolution and as such it is difficult to discern.	Replaced with higher resolution version
	The Inspectorate notes that in section 2.1.1 of the NSER the potential outcomes are unaltered; it is recommended that the outcomes be altered so it is clear how conclusions 2 and 3 differ.	Outcomes updated
	The applicant has indicated at the teleconference held on 23/10/14 that the qualifying features noted for this site have been agreed with NE and that this will be cross referenced in the final report.	Agreement with NE presented above.
	The Inspectorate notes that an automated reference is missing from the	Reference updated

Source	Consultee Comment	Response
	body text in this section and recommends this is rectified in the final report.	
	The Inspectorate notes that the methodology behind defining the significance of an effect has not been presented in the NSER; it is recommended, to benefit the reader; that this is presented in this report when it is finalised. Though the sources used to derive the assessment criteria are noted in section 4.4.4 of the NSER more detail should be provided about the criteria in this report.	Sufficient methodology has been provided in the NSER, and in the ES, including the Emissions to Atmosphere report
	The Inspectorate notes that it is stated in section 4.4.5 that: 'In practice the impacts associated with long term annual means will not arise, as air-mode is not the expected primary operational mode for the Project'. It is recommended that the applicant clarify here whether this reasoning also applies to the impacts associated with the deposition of acid.	Statement updated to reflect that it does also apply to deposition of acid
	The Inspectorate notes an apparent error in the baseline NOx figure for the Humber Estuary in Table 4.1. The current figure is 180; presumably this is a typographical error and should read 18.0.	Baseline value updated
	The Inspectorate notes that cross referencing to relevant sections of the NSER and the ES has been made, however the matrices remain very high level, it is recommended wherever possible summary information is included in the footnote itself. The applicant may wish to refer to the guidance supplied in the Inspectorate's Advice Note 10.	Additional cross referencing has been added, and additional information added where relevant.
	The Inspectorate notes that the first reference to operating modes in the NSER is in section 4.2, but the difference between them is not explained here. It is recommended that a description of all the operating scenarios that have been modelled and discussed in section 4 are clearly described in the NSER enabling readers to understand why different scenarios have been modelled.	Additional explanation on the operating modes has been provided.
	The assessment has considered that 56% of operational time in air mode is the maximum possible but it is not clear how this can be secured beyond the current regulatory backstop of the Emissions Performance Standard (EPS) the Inspectorate recommends that the final report should illustrate how this can be secured beyond the EPS back-stop.	Additional consideration has been given to the running of the Project in Air Mode during commissioning. The current regulatory position which will apply to the project is set out in the NSER.
	The Inspectorate notes that the applicant refers to Annex A containing the relevant consultation information, which has not been supplied with the NSER, it is recommended that this Annex be supplied alongside the final report.	Noted
Minutes of meeting between	Summary of key points discussed and advice given:	Noted. The following memo was provided to PINS

Source	Consultee Comment	Response
PINS and CPLs representative 13/11/2014	The Planning Inspectorate advised attendees about their openness policy, that any advice given will be recorded and placed on the National Infrastructure pages of the planning portal website under section 51 of the Planning Act 2008 (as amended). Background The meeting was convened to discuss the planned submission of an application for the White Rose Carbon Capture and Storage (CCS) project. The Planning Inspectorate had already provided comments on the applicant's draft No Significant Effects Report (NSER) and received correspondence from Natural England as the Statutory Nature Conservation Body (SNCB). Natural England had expressed concern that having regard to a statutory 3 year exemption from the Emissions Performance Standard (EPS) the information provided may not be sufficient for the purposes of the Habitat Regulations Assessment process. This issue was the main focus of the discussion. No Significant Effects Report Issues The applicant's representative explained the comprehensive nature of the information provided in the Preliminary Environmental Information (PEI) and stated that during consultation none of the s.42 consultees had originally indicated that there was any information missing in regard to assessing the potential impact of air emissions on designated sites. The Planning Inspectorate explained that the relevant statutory parties during s.42 consultation were quite likely unaware of the 3 year exemption from compliance with the EPS during which time there would be no limit on air-mode operation of the plant. The applicant's representative indicated that the plant would not operate in 100% air-mode for 3 years as the commissioning phase would last no more than 6 months. The Inspectorate indicated that though the intention would be for commissioning to take no more than 6 months the 3 year exemption would be applicable to the project and there is no guarantee that it	on 18/11/2014 Further to our meeting we write to confirm our understanding of the approach to Habitats Regulation assessment to be reported in the Development Consent Order submission. This approach has been refined from previous iterations of the report based on: • A meeting with the Planning Inspectorate on 13.11.2014; • A telephone conference held between Natural England (NE), Capture Power Ltd (CPL) and ERM (14.11.2014) to define the scope of the Stage 1 & 2 Habitats Regulation Assessment Report; • An email sent by ERM to document the agreed scope of the Stage 1 & 2 Habitats Regulation Assessment Report to NE on 14.11.2014 for comment; and • An email received from NE (17.11.2014) confirming that the scope outlined in the email was "as we agreed in the call on Friday". ERM are now progressing with redrafting. We are proposing to call the report a "Habitats Regulation Assessment Report" as per PINs advice note 10. The scope of which is defined below (and this is as per emailed to NE on 14.11.2014): • In light of the fact that the project will not be constrained in its first three years by the EPS, NE require extra assessment of the Project in relation to its potential impacts on European sites identified within Stage 1 of the draft NSER. • NE are happy for impacts on the Humber SAC to be screened out at Stage 1 due to the distance between the sensitive qualifying features and the Project. • NE have recommended that impacts on

Source	Consultee Comment	Response
	might not take longer. Therefore the worst-case scenario should assume operation at 100% air-mode for the entire 3 year EPS exemption period. The applicant's representative informed the Inspectorate that they believe that even if the data was used to predict the impact on the integrity of the sites in question at 100% air-mode for 3 years no impact on integrity would be found. Natural England noted in correspondence with both the applicant and the Inspectorate dated 13 November 2014, that after reviewing the applicant's most recent No Significant Effects Report dated November 2014 there is a need for further assessment to be carried out for certain sites, proceeding to Stage 2 Appropriate Assessment. The applicant had previously suggested that the environmental permit could be used to restrict operation in air mode. However, the Inspectorate explained that it was their understanding that the 3 year exemption was enshrined in primary legislation. The Inspectorate informed the applicant's representative that the assessment should take fully into account the 3 year exemption and the extent to which operation at 100% air mode for 3 years may have on designated sites. Further, the assessment should take into account the views of the SNCB and ensure that sufficient information to allow an Appropriate Assessment (if required) is provided. The applicant was reminded that sufficiency of information for this purpose is a part of the acceptance test and if the Secretary of State (SoS) thought the information was incomplete it could lead to the application not being accepted. The applicant stated their belief that all the relevant information had been provided. The Inspectorate advised that having had regard to the information contained in the NSER and taking into account the response received by the SNCB they could not necessarily agree. The Inspectorate was unable to state how this would affect any application but did confirm that this was an important part of the acceptance test. The applicant and the Inspectorate discussed the various options available. The Inspectorate advised the applicant's representative that the preferable way to resolve this issue was prior to submission of the	Skipwith Common SAC and the River Derwent SAC from SO2 should be taken to Stage 2 of the HRA (AA), and that further information on the sensitivities of the receptors be presented. • As the assessment will be taken to Stage 2, NE would recommend that the current further information provided at Stage 1 for acid deposition impacts (for Skipworth Common SAC and Thorne Moor SAC) is also now taken forward and presented at Stage 2 (although NE are happy with the current content of the information). If the Planning Inspectorate has any comments on the above we would appreciate them at your earliest convenience.

Source	Consultee Comment	Response
	application thereby avoiding unnecessary risk at acceptance	
Natural England (e-mail correspondence) 17/11/2014	I can confirm that this is as we agreed in the call on Friday.	Noted
PINS (e-mail correspondence) 19/11/2014	Thank you for making these amendments, to reconfirm we are now satisfied with the content of the note.	Noted