The Drax Power (Generating Stations) Order

Land at, and in the vicinity of, Drax Power Station, near Selby, North Yorkshire

Habitats Regulations Assessment Report

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

Drax Power Limited

Drax Repower Project

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1 INTRODUCTION

This report provides information to enable an appropriate assessment under the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations) of the Drax Repower Project, hereafter referred to as the 'Proposed Scheme'.

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

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

This report cross-references reports and assessments (and its associated figures and appendices) provided to support the DCO Application. Particular reference is made to ES (document reference 6.1) Chapter 9 (Biodiversity), Chapter 6 (Air Quality), Chapter 17 (Cumulative Effects) and Chapter 12 (Water Resources, Quality and Hydrology).

1.1 Proposed Scheme Description

1.1.1. Drax Power Station originally comprised six coal-fired units. Three of these units have since been converted to biomass units (Units 1, 2 and 3) and this is assessed as the current baseline in the ES. By the latter half of 2018, four units (Units 1-4) will run on biomass with only two units (Units 5 and 6) running on coal. This is assessed as the future baseline in the ES.

1.1.2. The Proposed Scheme is to repower up to two of the existing coal-powered generating units (Units 5 and 6) at the Existing Drax Power Station Complex with new gas turbines that can operate in both combined cycle and open cycle modes. The term "repower" is used as existing infrastructure, such as the steam turbine and cooling towers, that are currently used for the coal fired units would be reutilised for the new gas fired generating units/stations.

1.1.3. The repowered units (which each constitute a new gas fired generating station) would have a new combined capacity of up to 3,600 MW in combined cycle mode (1,800 MW each), replacing existing units with a combined capacity to generate up to 1,320 MW (660 MW each).

1.1.4. Each gas generating station (or unit) would have up to two gas turbines, with each gas turbine powering a dedicated generator of up to 600 MW in capacity. The gas turbines in each generating station (or unit), therefore, would have a combined capacity of up to 1,200 MW. The gas turbines in each generating station (or unit), in combined cycle mode, would provide steam to the existing steam turbine (through Heat Recovery Steam Generators (HRSGs)) which would generate up to 600 MW per generating station (or unit). Each generating station (or unit) would have up to two HRSGs. This results in a capacity for each generating station of up to 1,800 MW and, should both Units 5 & 6 be repowered, a combined capacity of up to

3,600 MW. The new gas turbine generating stations (or units) have been designated the terms "Unit X" and "Unit Y".

1.1.5. Each of Unit X and Unit Y would have (subject to technology and commercial considerations) a battery energy storage facility with a capacity of up to 100 MW per Unit, resulting in a combined battery energy storage capacity of up to 200 MW. The two battery energy storage facilities would be stored in a single building.

1.1.6. The total combined capacity of the two gas fired generating stations, Unit X and Unit Y, and two battery storage facilities (i.e. the total combined capacity of the Proposed Scheme) is therefore 3,800 MW.

1.1.7. The DCO seeks consent for the following flexibility:

- Repowering of either Unit 5 or 6 and construction of Unit X as a gas fired generating station (this would leave either Unit 5 or 6 (depending on which had been repowered) as a coal-fired unit); or
- Repowering of both Units 5 and 6 and construction of Unit X and Unit Y as two gas fired generating stations.

1.1.8. In the event that a single unit is repowered and Unit X constructed, up to two gas turbines and up to two HRSGs and (subject to technology and commercial considerations) a battery energy storage facility of up to 100 MW storage capacity would be constructed. The size of the building housing the battery storage facility would not change, as the building could house sufficient battery capacity to allow the 100 MW output to be sustained for a longer duration. However, the fuel gas station and gas insulated switchgear required for the Gas Pipeline would be smaller.

1.1.9. In the event that two units are repowered and Unit X and Unit Y are constructed, then construction works would be undertaken consecutively rather than concurrently. It is assumed for the purposes of this ES that there would be a gap of a year between construction periods, but this could be longer depending on commercial considerations. Unit Y would mirror Unit X, with up to two gas turbines and up to two HRSGs and (subject to technology and commercial considerations) a battery energy storage facility of up to 100 MW storage capacity which would be housed in the building constructed for the battery for Unit X.

1.1.10. In order to repower to gas, a new Gas Pipeline would be constructed from the Existing Drax Power Station Complex to the National Transmission System (NTS) operated by National Grid. Pipeline infrastructure would be the same whether Unit X was constructed or whether Unit X and Unit Y was constructed. The Gas Pipeline would be approximately 3 km in length and would cross agricultural land to the east of the existing Drax Power Station Complex.

1.1.11. A gas receiving facility (GRF) comprising Pipeline Inspection Gauge (PIG) Trap Facility (PTF), Pressure Reduction and Metering Station (PRMS) and compressor station is proposed south of woodland to the east of New Road.

1.1.12. At the connection to the NTS there will be an above ground installation (AGI) south of Rusholme Lane. The AGI involves a Pig Trap Launching station (PTF-L) which will be operated by Drax, and a Minimum Offtake Connection (MOC), which will be operated by National Grid.

1.1.13. The Power Station Site (located within the Existing Drax Power Station Complex), Pipeline Area and Carbon capture readiness reserve space are collectively referred to as the Site for the Proposed Scheme (refer to ES Figures 1.1 and 1.3).

Power Station Site and Carbon Capture Readiness Reserve Space

1.1.14. The new gas turbine generating units (Unit X and Unit Y) would be constructed on land which is currently occupied by contractor outage cabins, car parking, the Turbine Outage Store (TOS), the Learning Centre, sludge lagoons and other ancillary buildings along the western boundary of the Power Station Site.

1.1.15. To accommodate the new infrastructure, it will also be necessary to remove two existing 132 kV pylons on the Power Station Site and de-string the adjacent pylons.

1.1.16. The main elements of each of the new gas-fired generating stations (Unit X and Unit Y) are described below (which are identified as Work Number 1 and Work Number 3A in respect of Unit X and Work Number 2 and Work Number 3B in respect of Unit Y in Schedule 1 to the draft DCO (Document Reference 3.1)):

- **Gas turbines** - It is proposed to construct up to four separate gas turbines (up to two for Unit X and up to two for Unit Y). Air will be drawn into the compressor of the gas turbine and compressed. Fuel is injected into the combustion chamber. The mixture of fuel and compressed air is ignited, producing gases at high temperatures. As the gas expands, it rotates the turbine to produce electricity.
- **Heat Recovery Steam Generators and stacks** - It is proposed to construct up to four HRSGs (up to two for Unit X and up to two for Unit Y). When operating in CCGT mode, the HRSGs recover the heat from hot flue gases from the gas turbines. The heat is used to produce steam that will drive the existing steam turbines. Each HRSG will have a main stack, expected to be up to 120 m in height. When operating in open cycle, the HRSG will be bypassed and the exhaust gas from the gas turbine will be sent to the atmosphere through a bypass stack (one stack for each turbine) of up to 120 m in height. Accordingly, Unit X will have up to four stacks and Unit Y will have up to four stacks (a total of up to eight stacks if both Unit X and Unit Y are developed). In OCGT mode the efficiency of the plant would be lower but higher exhaust temperatures would result in improved dispersion of pollutants.
- **NOx abatement technology** – An assessment of Best Available Techniques (BAT) will be undertaken for the Proposed Scheme as part of the applicant's application for an environmental permit. This will determine whether NOx abatement technology, such as Selective Catalytic Reduction (SCR), will be built into the facility to reduce emissions of nitrogen oxides from the plant or whether BAT can be achieved without SCR. Any NOx abatement technology, such as SCR, would only operate in CCGT mode. We have therefore assessed the effect of the Proposed Scheme with and without an SCR capability in Chapter 6 (Air Quality) and Chapter 9 (Biodiversity) of the ES.
- **Cooling solution** - Cooling for Unit X and Unit Y will be provided by the existing condensers for the steam turbines and existing cooling water infrastructure including reuse of the existing northern group of cooling towers, cooling water make-up intake and cooling water outfall and other associated infrastructure. Drax currently uses hyperbolic (natural draught) cooling towers to transfer heat and condense steam from the existing units; heat is expelled to the atmosphere. River water is abstracted from the River Ouse and pumped to the station where it is treated to remove solids and other material. The

treated river water is then used in the cooling water circuit to remove heat from the steam cycle and condense the pure water generated in the steam cycle, so it can be re-used. There will be no change to the existing water abstraction and discharge as a result of the Proposed Scheme.

- **Operation/maintenance and control -** Unit X and Unit Y would be operated and controlled from the current Drax control room, which is situated onsite. The proposed generating equipment would be capable of responding to requests from National Grid to provide short-term additional generating capacity, as well as selling electricity into the market and other ancillary grid services. Gas generation allows the new units to respond rapidly to changing demands of the electricity market.
- **Battery storage** - Each of Unit X and Unit Y would (subject to technology and commercial considerations) be connected to its own battery energy storage facility, which would have a capacity of up to 100 MW and which would support the Unit X and Unit Y in providing fast and flexible electricity export and other ancillary services to the NTS. The battery energy storage facility for each of Unit X and Unit Y would be housed in a single building.

1.1.17. It is proposed that each of Unit X and Unit Y and their battery energy storage facility will be connected to the existing National Grid 400 kV substation. Works will be required within the existing 400 kV National Grid switchyard in order to accommodate the new connections.

1.1.18. Unit X and Unit Y have been designed to be carbon capture ready and a suitable area of land has been identified for the installation of carbon capture equipment that can accommodate both Unit X and Unit Y.

1.1.19. Additional construction activities required as part of the Proposed Scheme on the Power Station Site include implementation of security and lighting infrastructure and other necessary works.

Pipeline Area

1.1.20. Unit X and Unit Y will require a new gas connection from the NTS. The connection would comprise a new pipeline approximately 3 km in length extending eastwards from the Power Station Site with a diameter of up to 600 mm nominal bore. The Gas Pipeline route has been updated since the publication of the PEIR but still lies entirely within the study area presented in that report.

1.1.21. The Gas Pipeline would begin at NTS feeder gas pipeline, Feeder 29, south of the River Ouse. This connection would run into a new Above Ground Installation (AGI) south of Rusholme Lane. A permanent access to the AGI would be constructed off Rusholme Lane. From this point, the Gas Pipeline route would head north, away from Feeder 29, before crossing Rusholme Lane.

1.1.22. The route would then continue west where it crosses a stream, before continuing up to Main Road. The route turns north-west to cross Main Road and a field drain. The route continues north-west to avoid Woodcock Wood before turning west. The route then runs south of the dismantled railway, to avoid woodland protected by a Tree Preservation Order. It heads west and crosses a field drain. The route continues west, south of Carr Lane, crossing Wren Hall Lane and connecting to a new Gas Receiving Facility (GRF) east of New Road.

1.1.23. The GRF will be installed in order to receive the natural gas from the Gas Pipeline. The GRF has been chosen to be sited on arable land of limited ecological value, located east of the Power Station Site.

Construction Activities

1.1.24. In order to construct Unit X and Unit Y and associated facilities on the Power Station Site, it is proposed to demolish, remove and relocate existing facilities at the Power Station Site. These works are known as the Site Reconfiguration Works or Stage 0 and will be completed prior to the commencement of any further construction activities. The Site Reconfiguration Works are identified as Work No. 15 in the draft DCO submitted with the DCO Application.

1.1.25. Several areas within the Power Station Site have been identified as being suitable for use as construction parking and laydown areas for Units X and Y during construction. These areas will be used during construction for the temporary locating of construction offices, warehouses, workshops, open air storage areas and car parking. The areas will be reinstated to their original use following construction and Areas A and B (Figure 1.3) will be safeguarded for carbon capture equipment as explained above.

1.1.26. For the construction of the Gas Pipeline, temporary contractors' compounds, measuring approximately 100 m x 100 m and a storage yard, measuring approximately 150 m x 60 m, are also required. The locations for these are not yet confirmed, however, they would be sited within the Pipeline Construction Area and are likely to be located at the start of the Gas Pipeline off Rusholme Lane. For the construction of the AGI, there will be one construction laydown for National Grid and one for Drax with a shared temporary construction access road off Rusholme Lane.

1.1.27. To construct the Gas Pipeline, as passing place is required which will be provided on land to the side of Rusholme Lane (the Rusholme Lane Area).

1.1.28. Unit X and Unit Y will be constructed in stages which are referred to as Stages 1 and 2 in the ES. During Stage 1, Unit X will be constructed. Once Unit X is ready for connection into the steam turbine, one existing coal-fired unit will be turned off so as to allow the steam turbine to be used for Unit X. At this point, there would be one remaining coal-fired unit in operation. During Stage 2, Unit Y will be constructed while Unit X is operational as a gas-fired unit. Again, once Unit Y is ready for connection into the steam turbine, the remaining coal-fired unit will be turned off so as to allow the steam turbine to be used for Unit Y. At this point, there would no remaining coal-fired units in operation at the Existing Drax Power Station Complex.

1.1.29. If both units are repowered and Units X and Y are constructed, then construction works would be undertaken consecutively rather than concurrently. Each construction stage would take approximately 34 months followed by commissioning. It is anticipated that the two construction stages would be separated by up to a year, but this could be longer depending on commercial considerations.

1.1.30. It is assumed that construction of Unit X will commence in 2019/2020 with Open Cycle Gas Turbine (OCGT) capability by 2021/2022 and Combined Cycle Gas Turbine (CCGT) ready by 2022/2023. If both Unit X and Unit Y are built, the construction of Unit Y would likely commence in 2024 and be completed in 2027.

1.1.31. Trenchless construction techniques are to be used where practicable when constructing the gas pipeline trench through specific areas, e.g. under roads, minor watercourses and ditches, and specific hedgerows.

1.1.32. All construction activities would be undertaken within a temporarily fenced-off strip of land, which is referred to as the "working width". This is equivalent to the Site Boundary for the Pipeline Area shown in Figure 1.1.

1.1.33. The anticipated working hours during the construction phases would be Monday to Friday 07:00 – 19:00 and Saturday, 07:00 – 13:00.

1.1.34. Construction materials would be delivered to the Proposed Scheme by the existing road network from Junction 36 of the M62.

1.1.35. The Proposed Scheme would be designed to operate for up to 25 years, after which the continued operation of the infrastructure would be reviewed. If decommissioned, it is envisaged that the majority of above ground plant structures would be demolished whilst the underground gas pipeline would remain in situ. Some above ground infrastructure, such as the AGI, may need to remain in place, such as the MOC which will be owned and operated by National Grid.

1.2 Habitats Regulations Assessment

1.2.1. Under the requirements of the European Council Directive 92/43/EEC 'The Habitats Directive'[1] and the Council Directive 2009/147/EEC 'The Birds Directive'[2] it is necessary to consider whether the Proposed Scheme is likely to have significant effects upon areas of nature conservation importance designated/classified under the Directives ('Natura 2000 Sites'). Should likely significant effects be identified it would be necessary to further consider the potential impacts by way of an 'appropriate assessment' (AA).

1.2.2. The Conservation of Habitats and Species Regulations 2017[3] (The Habitats Regulations) implements the Habitats Directive. Regulation 24 of the Habitats Regulations (relevantly) provides that where a project is likely to have a significant effect on a European site (either alone or in combination with others plans or projects), an appropriate assessment of the implications for that site in view of that site's conservation objectives. The 'appropriate assessment' is described within this document as the Habitats Regulations Assessment (HRA). Regulation 24 further provides that in light of the conclusions of the HRA, consent may only be given for the project if it will not adversely affect the integrity of the site.

1.2.3. The Habitats Regulations defines "European site" as:

a) a special area of conservation;

[1] Council of the European Union, 1992. *Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora*. [online] Accessed 04/05/2018.

[2] Council of the European Union, 2009. *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds*. [online] Accessed 04/05/2018.

[3]

b) a site of Community importance which has been placed on the list referred to in the third sub-paragraph of Article 4(2) of the Habitats Directive (list of sites of Community importance);

c) a site hosting a priority natural habitat type or priority species protected in accordance with Article 5(4) of the Habitats Directive (a site in respect of which consultation has been initiated under Article 5(1) of that Directive, during the consultation period or pending a decision of the Council under Article 5(3));

d) an area classified pursuant to Article 4(1) or (2) of the old Wild Birds Directive or the new Wild Birds Directive (classification of special protection areas); or

e) a site which has been proposed to the European Commission under regulation 12, until such time as—

i. the site is placed on the list of sites of Community importance referred to in the third sub-paragraph of Article 4(2) of the Habitats Directive; or

ii. agreement is reached or a decision is taken pursuant to Article 4(2) of that Directive not to place the site on that list.

1.2.4. The Habitats Regulations reflects the Directives in this respect, Natura 2000 is a network of areas designated/classified to conserve natural habitats and species that are rare, endangered, vulnerable or endemic within the European Community, listed under the Birds Directive and Habitats Directive. This includes Special Areas of Conservation (SAC) designated under the Habitats Directive for their habitats and/or species of European importance and Special Protection Areas (SPA) classified under the Conservation of Wild Birds Directive to protect the habitats for rare, vulnerable and regularly occurring migratory bird species. In addition, it is a matter of law that candidate SAC (cSAC) are considered in this process. It is a matter of UK Government policy[4] that sites designated under the 1971 Ramsar Convention for their internationally important wetlands (commonly known as Ramsar sites), and potential SACs (pSACs) and potential SPAs (pSPA) are also considered. All such sites considered in the HRA process are collectively termed 'European sites' in this report.

1.2.5. The European commission guidance on the Habitats Directive sets out four distinct stages for HRA[5]. These are:

- Stage 1 Screening[6]: the process which initially identifies the likely effects of a plan or project (either alone or in combination with other plans/projects) upon a Natura 2000 site, and considers whether these potential effects are likely to be significant. Following the recent European Court of Justice case in People Over Wind and Sweetman v Coillte Teoranta (Case 323/17), the Stage 1 screening has been carried out without taking

[4] Department for Communities and Local Government, 2012. *National Planning Policy Framework*, Paragraph 118. [online] Accessed 04/05/2018.

[5] European Commission, 2001. *Assessment of plans and projects significantly affecting Natura 2000 sites.* [online] Accessed 04/05/2018.

[6] In the case of R (Champion) v North Norfolk DC [2015] 1 W.L.R. 3710 the Supreme Court ruled that "the Habitats Directive and Regulations contain no equivalent to "screening" under the EIA Regulations" and that "there is nothing in the language of the Habitats Directive to support a separate stage of "screening" in any formal sense." The first stage under *Article 6(3*) is best seen as a "trigger" e.g. where there is a likely significant effect an appropriate assessment is triggered. Despite this, given the Commission guidance, in this document the use of the words "screening" and "screened" will continue to be used but bearing in mind what was said about this by the Supreme Court.

account of the measures intended to avoid or reduce the harmful effects of the project on European sites.

- Stage 2 Habitats Regulations Assessment (HRA): the more detailed consideration of the potential effects of a plan or project (either alone or in combination with other plans/projects), required if Stage 1 screening has concluded likely significant effects on European sites. The HRA examines whether such effects could constitute an adverse effect on the integrity of the Natura 2000 sites, having regard to the site's conservation objectives, structure and function. The HRA should determine whether adverse effects on the integrity of the site can be ruled out or mitigated, on the basis of information that is available or can be reasonably obtained. Unlike the Stage 1 screening stage, proposed mitigation measures are taken into account for the purposes of the HRA.
- Stage 3 Assessment of alternative solutions: Where adverse effects on the integrity of a Natura 2000 site cannot be ruled out, this stage requires an examination of alternative ways of achieving the objectives of the plan or project that can avoid such adverse impacts.
- Stage 4 Assessment: where no alternative solutions exist and where adverse effects remain: an assessment of whether the plan or project is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of the compensatory measures needed to maintain the overall coherence of the Natura 2000 network.

1.3 Consultation

1.3.1. The scope of the HRA was also developed in consultation with Natural England. It was agreed with NE that:

- Designated sites for assessment in the air quality modelling would include European sites within 15 km of the Proposed Scheme stack locations;
- The most sensitive habitat feature of each relevant European site would be used to determine critical levels and loads unless robust evidence suggested that this was not appropriate;
- The use of the 1% of critical load threshold for Project emissions remained appropriate for screening out the potential for likely significant effects; and
- Sensitivity testing should be used to support the in-combination assessment of air quality impacts. This would include sensitivity testing of the predicted improvements in baseline nitrogen deposition that would result from the forthcoming closure of the Eggborough coal-fired power station.

1.3.2. In accordance with best practice, Natural England (NE) will also be further consulted over the findings of this report, which has been submitted to them for comment. Active engagement with NE is planned for the Acceptance period, with a further meeting scheduled for June 2018. It is intended that the outcomes of further discussions with NE and their review of this iteration of the HRA report be recorded in a Statement of Common Ground

2 SCREENING FOR LIKELY SIGNIFICANT EFFECTED

2.1 Approach to HRA Screening

2.1.1. The Proposed Scheme has been subject to Stage 1: HRA screening (refer to paragraph 1.2.2) to assess the potential for likely significant effects (LSE)[7]. This involved considering whether there were any clear cause-effect pathways between the Proposed Scheme and European sites.

2.1.2. In accordance with recent case law (Ref 9.51 of the ES Biodiversity Chapter), the HRA screening stage was completed without taking into account mitigation measures designed to avoid or reduce harm to European Sites. Specifically, the following mitigation measures were not considered in the HRA screening:

- Implementation of a Construction Environmental Management Plan (CEMP) during construction.
- Implementation of a Decommisioning Environmental Management Plan (DEMP) during decommissioning.
- The use, where practicable, of trenchless construction techniques for installation of the gas pipeline.
- Targeted mitigation measures to avoid or minimise disturbance of otters that may form part of the River Derwent SAC or Lower Derwent Valley SAC populations.
- Pollution control measures that would be incorporated into the Surface Water Drainage Strategy for the operational Proposed Scheme, secured by a requirement to the DCO;
- An ecologically sensitive lighting design for the Proposed Scheme, secured by a requirement to the draft DCO.
- Combustion control processes during operation of the Gas Generating Stations, in order to achieve low NOx emissions.
- The setting of an annualised ammonia (NH_3) budget to limit emissions of this pollutant, should the Proposed Scheme operate with Selective Catalytic Reduction (SCR).

2.1.3. The HRA screening assessment undertaken identified an initial zone of influence (ZoI) within which possible impact pathways could potentially allow significant effects to arise as a result of the Proposed Scheme, either alone or in-combination with other policies, plans and projects.

2.1.4. The zone of influence for potential impacts on European sites was set at 15 km from the centre of the stacks of the proposed gas turbines (within the boundary of the Proposed Scheme). This was taken to correspond to the maximum extent of air quality modelling, with air quality impacts predicted to have the largest zone of influence of all potentially identified impacts. Beyond 15 km, the air quality impacts of the Project become effectively indiscernible from background air quality.

2.2 Findings of HRA Screening

2.2.1. Ten European sites were located within the 15 km zone of influence and were considered during Stage 1: HRA Screening:

[7] A possible significant effect; one whose occurrence cannot be excluded on the basis of objective information (C-127/02).

- Lower Derwent Valley SAC.
- Lower Derwent Valley SPA.
- Lower Derwent Valley Ramsar.
- River Derwent SAC.
- Humber Estuary SAC.
- Humber Estuary SPA.
- Humber Estuary Ramsar.
- Skipwith Common SAC.
- Thorne and Hatfield Moors SPA.
- Thorne Moor SAC.

2.2.2. Some of the European Sites identified fall entirely within the 15km ZoI for air quality effects, whilst only part of some European Sites fall within the 15km ZoI. The River Derwent SAC, Lower Derwent Valley SAC, SPA and Ramsar site and The Humber Estuary SAC, SPA and Ramsar site boundaries extend beyond the 15km ZoI. The other European Sites (Thorne Moor SAC, Thorne and Hatfield Moor SPA, and Skipwith Common SAC) are entirely within the 15km ZoI.

2.2.3. The qualifying criteria for designation (the 'qualifying features') of the identified European sites and their Conservation Objectives are described in Section 3 below. In accordance with Articles 4(4), 6.1 and 6.2 of the Habitats Directive, Member States are required to establish Conservation Objectives to support the maintenance or restoration of a European Sites qualifying interests (i.e the Annex I habitats or Annex II species for which a European Site has been designated). Conservation Objectives for European Sites in England are determined by Natural England. Conservation Objectives identify the overall target for the species and/or habitat types for which a European site is designated in order for it to contribute to maintaining or reaching favourable conservation status[8]. Refer to ES Figures 3.1b and 9.1 for the locations of the above European sites.

2.2.4. Having identified European sites within the ZoI and assessed their interest features and Conservation Objectives, the HRA screening discounted a number of potential impacts (for example, direct physical impacts within the boundary of European Sites). The HRA screening also identified a range of impacts from the Proposed Scheme that could give rise to likely significant effects on European sites, as follows:

- Disturbance to qualifying features in functionally-linked habitat (light/noise/vibration/visual).
- Hydrological changes to European Site habitats and functionally-linked habitat (quality/flow).
- Air quality changes.

2.2.5. Functionally-linked habitats are as described by Natural England (Ref 9.59 - Natural England, 2016). In this context, land is considered 'linked' to the European site in question because it provides an important role in maintaining or restoring the population of qualifying species at favourable conservation status.

[8] European Commission Note on setting conservation objectives of Natura 2000 sites, accessed online 10.05.18.

2.2.6. These impacts have been identified as likely to result in significant effects, either alone or in-combination with other plans and projects (as presented in Table 3.1) at one or more of the European Sites. In the absence of avoidance and mitigation measures, all ten European sites were considered to require further assessment either as a result of LSE or due to a lack of certainty in the effects and therefore the potential for LSE:

- Lower Derwent Valley SAC.
- Lower Derwent Valley SPA.
- Lower Derwent Valley Ramsar.
- River Derwent SAC.
- Humber Estuary SAC.
- Humber Estuary SPA.
- Humber Estuary Ramsar.
- Skipwith Common SAC.
- Thorne and Hatfield Moors SPA.
- Thorne Moor SAC.

2.2.7. It was determined that these European sites required further consideration through Stage 2 of the HRA process, to establish if adverse effects on the integrity of these sites from the Proposed Scheme could be ruled out. It was also determined that should the potential for adverse effects be identified, consideration of mitigation would be necessary.

2.2.8. The screening matrices provided as Appendix 1 to this HRA Report detail the potential impacts and LSE resulting from the Proposed Scheme; these are summarised in Tables 2.1 - 2.8 below.

Table 2-1 - Results of HRA Screening for Lower Derwent Valley SAC

Lower Derwent Valley SAC **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in HRA**			
Unitary Authority	**East Yorkshire and Northern Lincolnshire, North Yorkshire**				
Centroid*	**SE703441**				
Latitude	**53.88805556**				
Longitude	**-0.930555556**				
SAC EU code	**UK0012844**				
Status	**Designated Special Area of Conservation (SAC)**				
Area (ha)	**921.26**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex I Habitat 6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**X**	**X**
	The structure and function (including typical species) of qualifying natural habitats	**O**	**O**	**X**	**X**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**O**	**X**	**X**
Annex I Habitat 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**X**	**X**
	The structure and function (including typical species) of qualifying natural habitats	**O**	**O**	**X**	**X**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**O**	**X**	**X**

Lower Derwent Valley SAC		**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in HRA**			
Country	**England**				
Unitary Authority	**East Yorkshire and Northern Lincolnshire, North Yorkshire**				
Centroid*	**SE703441**				
Latitude	**53.88805556**				
Longitude	**-0.930555556**				
SAC EU code	**UK0012844**				
Status	**Designated Special Area of Conservation (SAC)**				
Area (ha)	**921.26**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex II Species 1355 Otter (*Lutra lutra*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**O**	**O**
	The structure and function of the habitats of qualifying species	**O**	**X**	**X**	**X**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**X**	**X**	**X**
	The populations of qualifying species	**X**	**X**	**O**	**O**
	The distribution of qualifying species within the site	**X**	**X**	**O**	**O**

Table 2-2 - Results of HRA Screening for Lower Derwent Valley SPA (and Ramsar[9])

Lower Derwent Valley SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**East Yorkshire and Northern Lincolnshire, North Yorkshire**				
SPA Status	**Classified 08061993**				
Latitude	**53 53 04 N**				
Longitude	**00 55 34 W**				
SPA EU code	**UK9006092**				
Area (ha)	**915.45**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
A037 Bewick's Swan (*Cygnus columbianus bewickii*) (non-breeding).	The extent and distribution of the habitats of the qualifying features	O	O	O	O
	The structure and function of the habitats of the qualifying features	O	O	X	X
	The supporting processes on which the habitats of the qualifying features rely	O	O	X	X
	The population of each of the qualifying features	O	O	X	X
	The distribution of the qualifying features within the site	O	O	X	X
	The extent and distribution of the habitats of the qualifying features	O	O	O	O

[9] Conservation Objectives are not available for Ramsar sites. As such, the screening summary for LSE is combined with the equivalent SPA.

Lower Derwent Valley SPA		Impact with the Potential to Result in LSE O No LSE X Likely Significant Effects X* Not Enough Information Available to Discount LSE – Further Information Required in AA)			
Country	England				
Unitary Authority	East Yorkshire and Northern Lincolnshire, North Yorkshire				
SPA Status	Classified 08061993				
Latitude	53 53 04 N				
Longitude	00 55 34 W				
SPA EU code	UK9006092				
Area (ha)	915.45				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
A050 Eurasian wigeon (*Anas penelope*) (non-breeding).	The structure and function of the habitats of the qualifying features	O	O	X	X
	The supporting processes on which the habitats of the qualifying features rely	O	O	X	X
	The population of each of the qualifying features	O	O	X	X
	The distribution of the qualifying features within the site	O	O	X	X
A052 Eurasian teal (*Anas crecca*) (non-breeding).	The extent and distribution of the habitats of the qualifying features	O	O	O	O
	The structure and function of the habitats of the qualifying features	O	O	X	X
	The supporting processes on which the habitats of the qualifying features rely	O	O	X	X
	The population of each of the qualifying features	O	O	X	X

Lower Derwent Valley SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**East Yorkshire and Northern Lincolnshire, North Yorkshire**				
SPA Status	**Classified 08061993**				
Latitude	**53 53 04 N**				
Longitude	**00 55 34 W**				
SPA EU code	**UK9006092**				
Area (ha)	**915.45**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A056 Northern shoveler (*Anas clypeata*) (breeding).	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A140 European golden plover (*Pluvialis apricaria*) (non-breeding).	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**

Lower Derwent Valley SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**East Yorkshire and Northern Lincolnshire, North Yorkshire**				
SPA Status	**Classified 08061993**				
Latitude	**53 53 04 N**				
Longitude	**00 55 34 W**				
SPA EU code	**UK9006092**				
Area (ha)	**915.45**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A151 Ruff (*Philomachus pugnax*) (non-breeding).	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**

Lower Derwent Valley SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**East Yorkshire and Northern Lincolnshire, North Yorkshire**				
SPA Status	**Classified 08061993**				
Latitude	**53 53 04 N**				
Longitude	**00 55 34 W**				
SPA EU code	**UK9006092**				
Area (ha)	**915.45**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Waterbird Assemblage	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**

Table 2-3 - Results of HRA Screening for River Derwent SAC

River Derwent SAC		**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Country	**England**				
Unitary Authority	**North Yorkshire**				
Centroid*	**SE704474**				
Latitude	**53.9175**				
Longitude	**-0.927777778**				
SAC EU code	**UK0030253**				
Status	**Designated Special Area of Conservation (SAC)**				
Area (ha)	**397.87**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex I Habitat 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**X**	**X**
	The structure and function (including typical species) of qualifying natural habitats	**O**	**X**	**X**	**X**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**X**	**X**	**X**
Annex II Species 1355 Otter (*Lutra lutra*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**O**	**O**
	The structure and function of the habitats of qualifying species	**O**	**X**	**X**	**X**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**X**	**X**	**X**
	The populations of qualifying species	**X**	**X**	**O**	**O**

	The distribution of qualifying species within the site	**X**	**X**	**O**	**O**
Annex II Species 1095 Sea Lamprey (*Petromyzon marinus*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**O**	**O**
	The structure and function of the habitats of qualifying species	**O**	**X**	**X**	**X**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**X**	**X**	**X**
	The populations of qualifying species	**O**	**X**	**O**	**O**
	The distribution of qualifying species within the site	**O**	**X**	**O**	**O**
Annex II Species 1163 Bullhead (*Cottus gobio*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**O**	**O**
	The structure and function of the habitats of qualifying species	**O**	**X**	**X**	**X**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**X**	**X**	**X**
	The populations of qualifying species	**O**	**X**	**O**	**O**
	The distribution of qualifying species within the site	**O**	**X**	**O**	**O**

Table 2-4 - Results of HRA Screening for Humber Estuary SAC

Humber Estuary SAC		**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Country	**England**				
Unitary Authority	**East Yorkshire and Northern Lincolnshire, Extra-Region, Lincolnshire**				
Centroid*	**SE838110**				
Latitude	**53.58916667**				
Longitude	**-0.734722222**				
SAC EU code	**UK0030170**				
Status	**Designated Special Area of Conservation (SAC)**				
Area (ha)	**36657.15**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex I Habitat 1130 Estuaries	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**O**	**O**
	The structure and function (including typical species) of qualifying natural habitats	**O**	**O**	**O**	**O**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**O**	**O**	**O**
Annex I Habitat 1140 Mudflats and sandflats not covered by seawater at low tide	The extent and distribution of qualifying natural habitats and habitats of qualifying species	**O**	**O**	**O**	**O**
	The structure and function (including typical species) of qualifying natural habitats	**O**	**O**	**O**	**O**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	**O**	**O**	**O**	**O**

Humber Estuary SAC		Impact with the Potential to Result in LSE O No LSE X Likely Significant Effects X* Not Enough Information Available to Discount LSE – Further Information Required in AA)			
Country	England				
Unitary Authority	East Yorkshire and Northern Lincolnshire, Extra-Region, Lincolnshire				
Centroid*	SE838110				
Latitude	53.58916667				
Longitude	-0.734722222				
SAC EU code	UK0030170				
Status	Designated Special Area of Conservation (SAC)				
Area (ha)	36657.15				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex I Habitat 1110 Sandbanks which are slightly covered by sea water all the time	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function (including typical species) of qualifying natural habitats	O	O	O	O
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	O	O
Annex I Habitat 1150 Coastal lagoons * Priority feature	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function (including typical species) of qualifying natural habitats	O	O	O	O
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	O	O
Annex I Habitat 1310	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O

Humber Estuary SAC		Impact with the Potential to Result in LSE O No LSE X Likely Significant Effects X* Not Enough Information Available to Discount LSE – Further Information Required in AA)			
Country	**England**				
Unitary Authority	**East Yorkshire and Northern Lincolnshire, Extra-Region, Lincolnshire**				
Centroid*	**SE838110**				
Latitude	**53.58916667**				
Longitude	**-0.734722222**				
SAC EU code	**UK0030170**				
Status	**Designated Special Area of Conservation (SAC)**				
Area (ha)	**36657.15**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Salicornia and other annuals colonizing mud and sand	The structure and function (including typical species) of qualifying natural habitats	O	O	O	O
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	O	O
Annex I Habitat 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function (including typical species) of qualifying natural habitats	O	O	O	O
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	O	O
Annex I Habitat 2110 Embryonic shifting dunes	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function (including typical species) of qualifying natural habitats	O	O	O	O

Humber Estuary SAC		Impact with the Potential to Result in LSE O No LSE X Likely Significant Effects X* Not Enough Information Available to Discount LSE – Further Information Required in AA)			
Country	England				
Unitary Authority	East Yorkshire and Northern Lincolnshire, Extra-Region, Lincolnshire				
Centroid*	SE838110				
Latitude	53.58916667				
Longitude	-0.734722222				
SAC EU code	UK0030170				
Status	Designated Special Area of Conservation (SAC)				
Area (ha)	36657.15				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	O	O
Annex I Habitat 2120 "Shifting dunes along the shoreline with Ammophila arenaria (""white dunes"")"	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function (including typical species) of qualifying natural habitats	O	O	O	O
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	O	O
Annex I Habitat 2130 "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function (including typical species) of qualifying natural habitats	O	O	O	O
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	O	O

Humber Estuary SAC		Impact with the Potential to Result in LSE O No LSE X Likely Significant Effects X* Not Enough Information Available to Discount LSE – Further Information Required in AA)			
Country	England				
Unitary Authority	East Yorkshire and Northern Lincolnshire, Extra-Region, Lincolnshire				
Centroid*	SE838110				
Latitude	53.58916667				
Longitude	-0.734722222				
SAC EU code	UK0030170				
Status	Designated Special Area of Conservation (SAC)				
Area (ha)	36657.15				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex I Habitat 2160 Dunes with Hippopha• rhamnoides	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function (including typical species) of qualifying natural habitats	O	O	O	O
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	O	O
Annex II Species 1364 Grey Seal (*Halichoerus grypus*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function of the habitats of qualifying species	O	O	X	X
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	O	X	X
	The populations of qualifying species	O	O	O	O
	The distribution of qualifying species within the site	O	O	O	O

Humber Estuary SAC		Impact with the Potential to Result in LSE O No LSE X Likely Significant Effects X* Not Enough Information Available to Discount LSE – Further Information Required in AA)			
Country	England				
Unitary Authority	East Yorkshire and Northern Lincolnshire, Extra-Region, Lincolnshire				
Centroid*	SE838110				
Latitude	53.58916667				
Longitude	-0.734722222				
SAC EU code	UK0030170				
Status	Designated Special Area of Conservation (SAC)				
Area (ha)	36657.15				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex II Species 1095 Sea Lamprey (*Petromyzon marinus*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function of the habitats of qualifying species	O	X	X	X
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	X	X	X
	The populations of qualifying species	O	X	O	O
	The distribution of qualifying species within the site	O	X	O	O
Annex II Species 1099 River Lamprey (*Lampetra fluviatilis*)	The extent and distribution of qualifying natural habitats and habitats of qualifying species	O	O	O	O
	The structure and function of the habitats of qualifying species	O	X	X	X
	The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	O	X	X	X
	The populations of qualifying species	O	X	O	O

Humber Estuary SAC		Impact with the Potential to Result in LSE O No LSE X Likely Significant Effects X* Not Enough Information Available to Discount LSE – Further Information Required in AA)			
Country	England				
Unitary Authority	East Yorkshire and Northern Lincolnshire, Extra-Region, Lincolnshire				
Centroid*	SE838110				
Latitude	53.58916667				
Longitude	-0.734722222				
SAC EU code	UK0030170				
Status	Designated Special Area of Conservation (SAC)				
Area (ha)	36657.15				
Qualifying Interest Feature	Conservation Objectives (to maintain or restore):	Disturbance; Noise Vibration and/or Visual	Hydrological Changes (Quality/ Flow)	Air Quality Changes	In-Combination
	The distribution of qualifying species within the site	O	X	O	O

Table 2-5 - Results of HRA Screening for Humber Estuary SPA (and Ramsar)

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
A021 *Botaurus stellaris*; Great bittern (Non-breeding)	The extent and distribution of the habitats of the qualifying features	O	O	O	O
	The structure and function of the habitats of the qualifying features	O	O	X	X
	The supporting processes on which the habitats of the qualifying features rely	O	O	X	X
	The population of each of the qualifying features	O	O	X	X
	The distribution of the qualifying features within the site	O	O	X	X
A021 *Botaurus stellaris*; Great bittern (Breeding)	The extent and distribution of the habitats of the qualifying features	O	O	O	O

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A048 *Tadorna tadorna*; Common shelduck (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**

Humber Estuary SPA		Impact with the Potential to Result in LSE O No LSE X Likely Significant Effects X* Not Enough Information Available to Discount LSE – Further Information Required in AA)			
Country	England				
Unitary Authority	City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire				
SPA Status	Classified 31/08/2007				
Latitude	53.5497				
Longitude	0.0569				
SPA EU code	UK9006111				
Area (ha)	37,630.24 ha				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The population of each of the qualifying features	O	O	X	X
	The distribution of the qualifying features within the site	O	O	X	X
A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)	The extent and distribution of the habitats of the qualifying features	O	O	O	O
	The structure and function of the habitats of the qualifying features	O	O	X	X
	The supporting processes on which the habitats of the qualifying features rely	O	O	X	X
	The population of each of the qualifying features	O	O	X	X
	The distribution of the qualifying features within the site	O	O	X	X

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
A082 *Circus cyaneus*; Hen harrier (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A132 *Recurvirostra avosetta*; Pied avocet (Non-breeding);	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A132 *Recurvirostra avosetta*; Pied avocet (Breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A140 *Pluvialis apricaria*; European golden plover (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A143 *Calidris canutus*; Red knot (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A149 *Calidris alpina alpina*; Dunlin (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A151 *Philomachus pugnax*; Ruff (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
A156 *Limosa limosa islandica*; Black-tailed godwit (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A157 *Limosa lapponica*; Bar-tailed godwit (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A162 *Tringa totanus*; Common redshank (Non-breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
A195 *Sterna albifrons*; Little tern (Breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
Waterbird assemblage	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**X**	**X**
	The distribution of the qualifying features within the site	**O**	**O**	**X**	**X**
Ramsar criterion 8 The Humber Estuary acts as an important migration route for both river lamprey Lampetra fluviatilis	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**X**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**X**	**X**	**X**

Humber Estuary SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire**				
SPA Status	**Classified 31/08/2007**				
Latitude	**53.5497**				
Longitude	**0.0569**				
SPA EU code	**UK9006111**				
Area (ha)	**37,630.24 ha**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
and sea lamprey Petromyzon marinus between coastal waters and their spawning areas.	The population of each of the qualifying features	**O**	**X**	**O**	**O**
	The distribution of the qualifying features within the site	**O**	**X**	**O**	**O**

Table 2-6 - Results of HRA Screening for for Skipwith Common SAC

Skipworth Common SAC		**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Country	**England**				
Unitary Authority	**North Yorkshire**				
Centroid*	**SE668362**				
Latitude	**53.82777778**				
Longitude	**-0.9975**				
SAC EU code	**UK0030276**				
Status	**Designated Special Area of Conservation (SAC)**				
294.6	**36657.15**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex I Habitat 4010 Northern Atlantic wet heaths with Erica tetralix; Wet heathland with cross-leaved heath	The extent and distribution of qualifying natural habitats	**O**	**O**	**O**	**O**
	The structure and function (including typical species) of qualifying natural habitats	**O**	**O**	**X**	**X**
	The supporting processes on which qualifying natural habitats rely	**O**	**O**	**X**	**X**
Annex I Habitat 4030 European dry heaths	The extent and distribution of qualifying natural habitats	**O**	**O**	**O**	**O**
	The structure and function (including typical species) of qualifying natural habitats	**O**	**O**	**X**	**X**
	The supporting processes on which qualifying natural habitats rely	**O**	**O**	**X**	**X**

Table 2-7 - Results of HRA Screening for Thorne and Hatfield Moor SPA

Thorne and Hatfield Moor SPA **Country**	**England**	**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Unitary Authority	**East Riding of Yorkshire, North Lincolnshire, Doncaster**				
SPA Status	**Classified 16/08/2000**				
Latitude	**53 38 16 N**				
Longitude	**00 53 53 W**				
SPA EU code	**UK9005171**				
Area (ha)	**2449.2**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
A224 *Caprimulgus europaeus*; European nightjar (Breeding)	The extent and distribution of the habitats of the qualifying features	**O**	**O**	**O**	**O**
	The structure and function of the habitats of the qualifying features	**O**	**O**	**X**	**X**
	The supporting processes on which the habitats of the qualifying features rely	**O**	**O**	**X**	**X**
	The population of each of the qualifying features	**O**	**O**	**O**	**O**
	The distribution of the qualifying features within the site	**O**	**O**	**O**	**O**

Table 2-8 - Results of HRA Screening for Thorne Moor SAC

Thorne Moor SAC		**Impact with the Potential to Result in LSE** **O No LSE** **X Likely Significant Effects** **X* Not Enough Information Available to Discount LSE – Further Information Required in AA)**			
Country	**England**				
Unitary Authority	**East Yorkshire and Northern Lincolnshire, South Yorkshire**				
Centroid*	**SE728163**				
Latitude	**53.63833333**				
Longitude	**-0.8975**				
SAC EU code	**UK0012915**				
Status	**Designated Special Area of Conservation (SAC)**				
Area (ha)	**1911.02**				
Qualifying Interest Feature	**Conservation Objectives (to maintain or restore):**	**Disturbance; Noise Vibration and/or Visual**	**Hydrological Changes (Quality/ Flow)**	**Air Quality Changes**	**In-Combination**
Annex I Habitat 7120 Degraded raised bogs still capable of natural regeneration	The extent and distribution of qualifying natural habitats	**O**	**O**	**O**	**O**
	The structure and function (including typical species) of qualifying natural habitats	**O**	**O**	**X**	**X**
	The supporting processes on which qualifying natural habitats rely	**O**	**O**	**X**	**X**

3 APPROPRIATE ASSESSMENT

3.1 Structure of Assessment

3.1.1. This HRA considers the potential effects identified during HRA screening in more detail in terms of their nature and extent. The objective of the HRA is to establish whether the Proposed Scheme will adversely affect the integrity of European sites, taking into account mitigation measures and the potential for further in-combination effects that may arise from other plans or projects.

3.1.2. The following steps have been incorporated into the HRA:

- Gathering information on, and exploring the reasons for, the relevant European site designations;
- Determining the nature of the environmental conditions required to maintain the integrity of the European sites and the trends in associated environmental processes;
- Identifying whether the Proposed Scheme could lead to an impact on any identified processes that support the European sites;
- Determining whether the identified impact could result in an adverse effect on the integrity of European sites;
- Identifying other plans and projects that might affect these European sites in-combination with the Proposed Scheme and establishing whether there are any adverse in-combination effects; and
- Developing mechanisms to enable the delivery of measures to avoid or mitigate any identified potential effects.

3.1.3. Section 4 of this report provides information on each of the European Sites. This includes:

- Information on the qualifying interests (i.e. the reasons for designation) of each European site;
- The Conservation Objectives of each European Site (i.e. the target condition for each of the qualifying features, whereby the European Site will be considered to be in favourable condition and contributing to the overall objectives of the Natura 2000 network;
- A general description of each of the European Sites and their biophysical characteristics;
- A description of the current / recent condition of each of the European Sites (where condition assessment information was available); and
- Key Issues and Threats to each European Site, as identified through NE Site Improvement Plans (SIP), condition assessment reports, and European Commission data sheets (again, where available).

3.1.4. Section five of this report provides an assessment of the impacts of the Proposed Scheme on functionally-linked habitat. This includes consideration of impacts such as noise, lighting, hydrological (water quality and quantity) and visual disturbance of European Site qualifying features, where these occur outside the boundaries of the European Sites. For example, this section includes an assessment of the potential for otters forming part of the River Derwent and Lower Derwent Valley SAC populations to be disturbed by construction activities associated with the Proposed Scheme.

3.1.5. Section 6 of this report assesses the potential for operation of the Proposed Scheme to lead to adverse effects on the integrity of European Sites as a result of air quality impacts. This

includes consideration of changes in ambient levels of nitrogen oxides (NOx) and ammonia (NH_3). Itr also includes consideration of changes in nitrogen deposition rates and associated potential acidification of European Site habitats. The assessment uses a range of infomration presented in Chapter 6 (Air Quality) of the ES. Relevant information from the Air Quality chapter has been extracted and is presented in section 6 of this report. The reader is nevertheless advised to refer to the Air Quality chapter for full details of the Air Quality impact assessment process.

3.2 Assumptions for Appropriate Assessment

3.2.1. In accordance with recent case law (Ref 9.51 of the ES Biodiversity Chapter), avoidance and mitigation measures designed to reduce harm to European Sites were not considered during the screening for LSE. At this stage in the HRA process (Stage 2: Appropriate Assessment) it is appropriate to consider mitigation measures during the assessment. This assessment has therefore been carried out assuming the implementation of mitigation measures embedded in the Proposed Scheme design and targeted measures identified to address potential effects on European Sites.

3.2.2. The following assumptions are therefore relevant:

- A Construction Environmental Management Plan (CEMP) will be implemented during construction, in accordance with a proposed requirement in the draft DCO (Doc Ref 3.1);
- Implementation of a Decommisioning Environmental Management Plan (DEMP) during decommissioning, in accordance with a proposed requirement in the draft DCO (Doc Ref 3.1);
- The use, where practicable, of trenchless construction techniques for installation of the gas pipeline between the GRF and the AGI, where crossing watercourses and ditches, with measures to address the use of trenched construction techniques if required;
- Targeted mitigation measures to avoid or minimise disturbance of otters that may form part of the River Derwent SAC or Lower Derwent Valley SAC populations;
- Pollution control measures that would be incorporated into the Surface Water Drainage Strategy for the operational Proposed Scheme, secured by a requirement to the draft DCO (Doc Ref 3.1);
- An ecologically sensitive lighting design for the Proposed Scheme, secured by a requirement to the draft DCO (Doc Ref 3.1);
- Combustion control processes during operation of the Gas Generating Stations, in order to achieve low NOx emissions equivalent to 50 mg/Nm3; and
- The setting of an annualised ammonia (NH_3) budget to limit emissions of this pollutant to an annualised budget equivalent to 120 tonnes, should the Proposed Scheme operate with Selective Catalytic Reduction (SCR).

3.2.3. Consideration has also been given in this HRA Report to how baseline air quality is likely to change in the future. Future national emissions ceilings are also likely to reduce emissions of both NOx and ammonia levels and subsequently deposition in the medium to long term. For example, The National Emissions Ceilings Regulations (2018) commit the UK to reducing ammonia emissions by 8% between 2020 and 2029 and by 16% from 2018 onwards (see paragraph 6.6.40 of the ES Air Quality Chapter). Government policy and socioeconomic factors are also promoting the uptake of ultra-low and zero emission vehicles. Current government policy is for all new car and van sales from 2040 onwards to be of ultra-low and

zero-emission vehicles, with new conventional diesel and petrol-fuelled vehicles banned from sale (see paragraph 9.6.9 of the ES Biodiversity Chapter).

3.3 In-Combination Effects on Natura 2000 and Ramsar Sites

3.3.1. It is a requirement of the Habitats Regulations that the impacts and effects of a plan or project are not considered in isolation. Where potential effects could become significant in-combination with other plans and projects, these potential effects are also considered within the HRA.

3.3.2. ES Chapter 17 identifies a number of policies, plans and projects to be considered for in-combination assessment. These were subject to an initial screening to assess whether, given the nature, location and scale of each proposal, there was an objectiuve possibility that they could combine with the effects of the Proposed Scheme to lead to LSE and / or an adverse effect on the integrity of the European Sites considered. Those of relevance are listed in Table 3.1 below and will be considered in this HRA where the potential for adverse effects has been identified.

Table 3-1 - Screening of Other Projects and Plans for Potential In-Combination Effects

Type	Name	Summary Description
Project	2016/0401/REM	Reserved matters approval is sought for the scale, layout, external appearance and landscaping of 14 dwellings, means of access was approved at outline stage
Project	2016/1124/COU	Change of Use of land to 20 pitch caravan park and camping area with conversion of existing outbuildings into shower and toilet facilities
Project	2017/1018/FULM	Construction of 40 MW battery energy storage barn to provide back-up electricity services to the National Grid for a period of 25 years from the date of commissioning and retention of building thereafter, infrastructure, bund and landscaping on paddock and field
Project	2015/1405/OUT	Outline application including access for the erection of up to 45 dwellings
Project	2017/0261/FULM	Proposed engineering operation comprising the construction of flood alleviation embankment, land engineering works, alteration and partial removal of existing flood embankment and creation of temporary construction access at land north of Temple Hirst flood defences at Street Record Main Road, Temple Hirst
Project	2017/0822/FULM	Proposed construction of new energy centre comprising of new main energy centre building and ancillary tanks, containers and services buildings
Project	2017/0272/FUL	Proposed erection of apartments on brownfield site
Project	2016/0875/FUL	Proposed Erection of 54 units
Project	2017/0842/OUTM	Outline application to include access (all other matters reserved) for the construction of up to 100 no. residential dwellings on land west
Project	2017/0542/OUTM	Outline to include access (all other matters reserved) for erection of up to 120 dwellings and associated car parking, garages, landscaping, open space and details of including demolition and removal of all structures, buildings and hard standing to facilitate future development

Type	Name	Summary Description
Project	2015/1392/EIA	Erection of a new single storey production facility for the manufacture of insulation boarding together with associated vehicle movement and parking areas.
Project	2015/0367/FUL	Proposed development of 125 no. dwellings with associated access from Barff Lane, landscaping, new footpath and drainage pond
Project	2016/0978/FULM	Proposed residential development of 53 dwellings including access and associated infrastructure
Project	2015/0389/FUL	Proposed erection of 52 residential dwellings including site access
Project	2017/0577/OUTM	Outline application for residential development for up to 68 No. dwellings with all matters reserved
Project	2015/0105/OUT	Outline application with all matters reserved for the erection of residential development 119 dwellings
Project	2014/1028/OUT	Outline planning permission for residential development including access. All other matters are reserved for future consideration 276 dwellings
Project	2015/0333/FUL	Erection of 22 No. dwellings with associated access and landscaping
Project	2015/0676/FUL	Proposed installation of 960 ground mounted PV panels
Project	2015/0007/FUL	Erection of a two storey building to accommodate new social and leisure facilities including; ten-pin bowling, adventure play, high ropes, recreational skiing, skate/BMX park and restaurant/cafe facility, complete with associated external soft and hard landscaping
Project	2016/0140/REM	"Reserved matters application relating to appearance, landscaping and scale for buildings C,D,E,F and farmhouse of approval
Project	2012/0485/OUT	Outline application to include access and layout for the erection of agricultural buildings to form a pig breeding, rearing and finishing unit and associated agricultural workers dwelling on land to the west of Thorpe Hall"

Type	Name	Summary Description
Project	2014/0202/OUT	Outline application including access for the erection of 13No. Dwellings
Project	2017/0750/OUTM	Outline planning application for the construction of up to 76 dwellings, with all matters reserved except for access
Project	2015/0517/OUT	Outline application to include access and layout for residential and associated development (35 dwellings) on land to the west of York Road (The Paddocks)
Project	2017/1055/COD	Request for written confirmation of compliance of conditions of planning approval CO/2012/1185 (8/19/1011C/PA) for outline application for the erection of 1200 dwellings (4 existing to be demolished), employment, public open space, shopping and community facilities (including up to 2,000 sq.m. of shops), together with associated footpaths, cycleways, roads, engineering
Project	2016/1408/FULM	Conversion of former courthouse building to form 16No. flats with associated management suite/office, external works including works to windows and doors including new openings with associated vehicular and cycle parking
Project	2015/0341/OUT	Hybrid application comprising outline proposals for the erection of circa 200 new dwellings including the construction of a new junction onto Flaxley Road, the laying out of open space and children's play area, pumping station, siting of electricity substation, landscaping and creation of areas for sustainable drainage including connection to water course and detailed proposals for the conversion of agricultural buildings to form 2 dwellings together with associated works including the creation of curtilages and areas of driveways/hardstanding (including external areas relating to the existing farm house) and demolition at Hempbridge Farm and land
Project	2016/0178/FUL	Construction of a new glucose syrup plant and associated storage tanks, pipebridges, roads and hardstandings within an existing industrial site
Project	2016/0528/FUL	Section 73 application to vary condition 05 (plans) of planning permission 2014/0685/FUL Proposed installation of 4 x 18 m high floodlights onto existing rugby pitch and training area

Type	Name	Summary Description
Project	17/01720/STPLF	Erection of 300 dwellings with associated access, open space, landscaping and infrastructure
Project	17/02265/STOUT	OUTLINE - Erection of Residential Development (up to 175 dwellings) (Access to be considered)
Project	17/03450/CM	Installation of an Anaerobic Digestion (AD) Plant including; AD Digester tanks; a biomethane gas to grid plant; CHP (Combined Heat and Power) unit; flare; buffer and treatment tanks; and a digestate storage lagoon with associated works
Project	17/02705/PLF	Erection of 27 dwellings with associated garages/parking
Project	16/01584/STPLF	Erection of a building consisting of 6 aircraft hangers and storage following demolition of existing buildings and creation of a new vehicular access road
Project	16/00528/PLF	Erection of 17 dwellings and associated surface water drainage
Project	16/02460/OUT	Outline - Erection of 10 dwellings with associated access and parking (access and layout to be considered)
Project	15/03487/STPLF	Erection of 94 dwellings with associated open space, drainage infrastructure and landscaping
Project	17/03359/STPLF	Erection of 92 dwellings with associated parking (with access from adopted road for Phase 1)
Project	17/00144/STREM	Erection of 138 dwellings following outline permission 13/00931/STOUT (All matters to be considered)
Project	16/04220/STREM	Erection of 30 dwellings following Outline planning permission 12/04725/STOUT (Appearance, Landscaping and Scale to be considered)
Project	17/00508/STPLF	Erection of 77 dwellings with associated garages, infrastructure and access

Type	Name	Summary Description
Project	14/01833/OUTM	Outline application for the erection of 28 dwellings on 0.72 ha of land with associated access roads, footpaths and landscaping (Some matters reserved - approval being sought for layout)
Project	15/02275/OUTM	Outline application for the erection of 79 dwellings and construction of access roads on approx. 2.48 ha of land (Approval being sought for access, layout and scale)
Project	17/01021/FULM	Proposed erection of 67 dwelling apartments with associated ancillary and parking following the demolition of the former NHS clinic
Project	16/02438/FUL	Erection of a 27 bedroom hotel with associated car parking and landscaping
Project	16/01934/MAT	Erection of 35 affordable houses on approx. 1.17 ha of land (Being Application under Regulation 4 Town and Country Planning (General) Regulations 1992)
Project	16/00898/FULM	Extra Care Development comprising of 72 flats, communal areas and associated parking and landscaping
Project	16/00771/FULM	Erection of 17 semi-detached and terrace houses on approx. 0.47ha of land
Project	15/03006/FULM	Erection of two retail units (Class A1), one drive-thru restaurant (Class A3/A5) and one commercial unit (Class A1, A2, A3, A4, A5) with associated landscaping and car parking
Project	Eggborough CCGT	Eggborough CCGT - The construction and operation of a new CCGT generating station with a capacity of up to 2,500 megawatts, new gas pipeline to the NTS and other associated development
Project	Thorpe Marsh Gas Pipeline	Thorpe Marsh Gas Pipeline - The Proposed Gas Pipeline will be a continuously welded buried steel pipeline of approximately 18 km in length
Project	Knottingley Power Project	Knottingley Power Project - A 1500 MW Combined Cycle Gas Turbine (CCGT) power station and associated infrastructure.

Type	Name	Summary Description
Project	Ferrybridge D Combined Cycle Gas Turbine (CCGT) Power Station Project	A new CCGT generating station of circa 2000 megawatts output capacity and associated development including a gas supply pipeline to the National Transmission Network.
Project	2016/0401/REM	Reserved matters approval is sought for the scale, layout, external appearance and landscaping of 14 dwellings, means of access was approved at outline stage

4 RELEVANT EUROPEAN SITES

4.1 European Site Description

4.1.1. Site data for the European sites considered in this report are summarised in Table 4.1 below. Data were collated using information contained within Natura 2000 and Ramsar data forms held by the Joint Nature Conservation Council (JNCC). Site conditions, issues and threats were determined through Natural England's Site of Special Scientific Interest (SSSI) condition reviews and the 2014/15 Site Improvement Plans.

Table 4-1 - Screening of Other Projects and Plans for Potential In-Combination Effects

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
Lower Derwent Valley SAC	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	Otter *Lutra lutra*	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining and restoring: - The extent and distribution of qualifying natural habitats and habitats of qualifying species - The structure and function (including typical species) of qualifying natural habitats - The structure and function of the habitats of qualifying species - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely on - The populations of qualifying species, and - The distribution of qualifying species within the site	The Lower Derwent Valley contains a greater area of high-quality examples of lowland hay meadows than any other site in the UK. The abundance of the rare narrow-leaved water-dropwort *Oenanhte silaifolia* is a notable feature. Traditional management has ensured that ecological variation is well-developed and in the transition between habitat types including wet and dry grassland, swamp, fen, and damp alder woodland.	H04 (H) air pollution, air-borne pollutants G01 (H) outdoor sports and leisure activities, recreational activities I01 (H) Invasive non-native species K02 (H) Biocenotic evolution, succession A04 (H) grazing
Lower Derwent Valley SPA	N/A	Qualifying species under article 4.1 (regular use by 1% or more of the GB population): Breeding: Corncrake *Crex crex* Ruff *Philomachus pugnax* Spotted crake *Porzoaa porzana* Over winter: Bewick's swan *Cyngus columbianus bewickii* Bittern *Botaurus stellaris* Golden plover *Pluvialis apricaria*	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: - The extent and distribution of the habitats and qualifying features - The structure and function of the habitats of the qualifying features - The supporting processes on which the habitats of the qualifying features rely - The population of each of the qualifying features, and - The distribution of the qualifying features within the site.	The Lower Derwent Valley is a major flood plain system in east and north Yorkshire. The valley holds a series of neutral alluvial flood meadows, fens, swamps, valley mires, alder woodlands and other fresh water habitats. It is one of the largest and most important examples of traditionally managed flood meadow habitat in the UK. The site is of outstanding importance for a diverse range of waterbirds throughout the year.	K02 (H) Biocenotic evolution, succession G01 (H) outdoor sports and leisure activities, recreational activities J02 (H) human induced changes in hydraulic conditions I01 (H) Invasive non-native species A04 (H) grazing

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
		Ruff *Philomachus pugnax* Qualifying species under article 4.2 (regular use by 1% or more of the biogeographical populations): Wintering -Teal *Anas crecca* Wintering bird assemblage of international importance including those listed above and Lapwing *Vanellus vanellus*, Pochard *Aythya ferina*, Shoveler *Anas clypeata*, Mallard *Anas platyrhynchos*, and Wigeon *Anas penelope*			
Lower Derwent Valley 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.	Criterion 2 The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates as well as a leafhopper, *Cicadula ornate* for which Lower Derwent Valley is the only known site in Great Britain. Criterion 4 The site qualifies as a staging post for passage birds in spring. Of particular note are the nationally important numbers of	N/A	The Lower Derwent Valley represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK. These grasslands, which were formerly widespread, are now very restricted in distribution due to agricultural improvement. The river and these floodlands play a substantial role in the hydrological and ecological functioning of the internationally important Humber basin.	Water diversion for irrigation/domestic/industrial use Reservoir/barrage/dam impact: flooding

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
		Ruff, *Philomachus pugnax* and Whimbrel, *Numenius phaeopus*. Criterion 5 Assemblage of international importance – peak counts in winter: 31,942 waterfowl Criterion 6 Species/populations occurring at levels of international importance – peak counts in winter: Eurasian wigeon *Anas Penelope* 8,350 (2% GB population), Eurasian teal *Anas crecca* 4,200 (1% population)			
River Derwent SAC	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. Rivers with floating vegetation often dominated by water-crowfoot.	River Lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining and restoring: - The extent and distribution of qualifying natural habitats and habitats of qualifying species - The structure and function (including typical species) of qualifying natural habitats - The structure and function of the habitats of qualifying species - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely on - The populations of qualifying species, and - The distribution of qualifying species within the site	The Yorkshire Derwent is considered to represent one of the best British examples of the classic river profile. This lowland section, stretching from Ryemouth to the confluence with the Ouse, supports diverse communities of aquatic flora and fauna. Fed from an extensive upland catchment, the lowland course of the Derwent has been considerably diverted and extended as a result of glacial action in the Vale of Pickering. The river supports an aquatic flora uncommon in Northern Britain. Several species, including river water-dropwort *Oenanthe fluviatilis*, flowering rush *Butomus umbellatus*, shining pondweed *Potamogeton lucens*, arrowhead *Sagittaria sagittifolia*, opposite-leaved pondweed *Groenlandia densa* and narrow-leaved water-parsnip *Berula erecta* are more typically found in lowland rivers in southern England	J02 (H) human induced changes in hydraulic conditions I01 (H) Invasive non-native species A02 (H) Modification of cultivation practices H02 (H) Pollution to groundwater (point sources and diffuse sources)

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
Humber Estuary SAC	Estuaries Mudflats and sandflats not covered by seawater at low tide Sandbanks which are slightly covered by sea water all the time Coastal lagoons *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* "white dunes" Fixed coastal dunes with herbaceous vegetation "grey dunes" Dunes with *Hippopha rhamnoides*	Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining and restoring: - The extent and distribution of qualifying natural habitats and habitats of qualifying species - The structure and function (including typical species) of qualifying natural habitats - The structure and function of the habitats of qualifying species - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely on - The populations of qualifying species, and - The distribution of qualifying species within the site	The Humber is the second largest coastal plain Estuary in the UK, and the largest coastal plain estuary on the east coast of Britain. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seals, vascular plants and invertebrates.	J02 (H) human induced changes in hydraulic conditions M01 (H) changes in abiotic conditions M02 (H) changes in biotic conditions E02 (H) Industrial or commercial areas K01 (H) Abiotic (slow) natural processes
Humber Estuary SPA	N/A	Qualifying species under article 4.1 (regular use by 1% or more of the GB population): Breeding – Bittern *Botuarus stellaris*, Marsh harrier *Circus aeruginosus*, Avocet *Recurvirostra avosetta*, Little tern *Sterna albifrons*. Migratory – Ruff *Philomachus pugnax* Wintering – Avocet, Bittern, hen harrier *Circus cyaneus*, Golden plover *Pluvialis apricaria*	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: - The extent and distribution of the habitats and qualifying features - The structure and function of the habitats of the qualifying features - The supporting processes on which the habitats of the qualifying features rely - The population of each of the qualifying features, and - The distribution of the qualifying features within the site.	The Humber Estuary is located on the east coast of England and comprises extensive wetland and coastal habitats covering 37,630.24 ha. The inner estuary supports extensive areas of reedbed, with areas of saltmarsh, grazing marsh, sand dunes, marshy slacks and brackish pools. The estuary supports important numbers of waterbirds throughout the year.	I01 (H) Invasive non-native species M02 (H) changes in biotic conditions M01 (H) changes in abiotic conditions K01 (H) Abiotic (slow) natural processes G01 (H) outdoor sports and leisure activities, recreational activities

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
		Qualifying species under article 4.2 (regular use by 1% or more of the biogeographical populations): Migratory – Knot *Calidris canutus*, Dunlin *Calidris alpine*, black-tailed godwit *Limosa limosa*, redshank *Tringa totanus* Wintering – shelduck *Tadorna tadorna*, knot, dunlin, black-tailed godwit, redshank Assemblage qualification under article 4.2 or use of over 20,000 waterbirds in any season.			
Humber Estuary 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	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*.	N/A	The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and	Disturbance to vegetation through cutting/clearing – reedbeds cleared for angling Vegetation succession – reed bed loss to scrub encroachment Water diversion for irrigations/domestic/industrial use Overfishing – substantial lamprey by-catch in eel nets in River Ouse Pollution – domestic sewage Pollution – agricultural fertilisers Recreational/tourism disturbance (unspecified) – due to illegal access with motorised vehicles and craft Other factor – coastal squeeze causing loss of intertidal habitats and saltmarsh due to sea level rise and fixed defences.

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
	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 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	Criterion 5 Assemblages of international importance – 153,934 waterfowl (non-breeding season) Criterion 6 Species/populations occurring at levels of international importance Migratory: Eurasian golden plover *Pluvialis apricaria altifrons* 17,996 (2.2% population) Red knot *Calidris canutus islandica* 18,500 (4.1% population) Dunlin *Caldris alpina alpina* 20,269 (1.5% population) Black-tailed godwit *Limosa limosa islandica* 915 (2.6% population) Redshank *Tringa totanus brittanica* 7,462 (5.7% population) Wintering: Common shelduck *Tadorna tadorna* 4,464 (1.5% population) Eurasian golden plover 30,709 (3.8% population) Red knot 28,165 (6.3% population) Dunlin 22,222 (1.7% population) Black-tailed godwit 1,113 (3.2% population)		nationally important breeding populations in summer.	

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
	site there are good examples of four of the five physiographic types of saline lagoon.	Bar-tailed godwit *Limosa lapponica lapponica* 2,752 (2.3% population) Redshank 4,632 (3.6% population) Criterion 8 The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.			
Skipwith Common SAC	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths	N/A	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining and restoring: - The extent and distribution of qualifying natural habitats - The structure and function (including typical species) of qualifying natural habitats, and - The supporting processes on which qualifying natural habitats rely	The wet heath at Skipwith Common is the most extensive of its type in the north of England. The *Erica tetralix* – *Sphagnum compactum* community is dominated by cross-leaved heath *Erica tetralix* and purple moor-grass *Molinia caerulea*. There is a small population of marsh gentian *Gentiana pneumonanthe*. The wet heath is part of transitions from open water, fen, reed and swamp to dry heaths and other habitats. The dry heath element is a representative of *Calluna vulgaris – Deschampsia flexuosa* heath dominated by heather *Calluna vulgari*s.	K02 (H) Biocenotic evolution, succession J02 (H) human induced changes in hydraulic conditions H04 (H) Air pollution, air-borne pollutants G01 (H) Outdoor sports and leisure activities, recreational activities
Thorne and Hatfield Moors SPA	N/A	Qualifying species under Article 4.1 for regular use of at least 1% of the GB population: Nightjar *Caprimulgus europeaus* 66 breeding pairs (1.9%)	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: - The extent and distribution of the habitats and qualifying features - The structure and function of the habitats of the qualifying features	Thorne and Hatfield Moors SPA is an extensive lowland raised mire system adjacent to the Humber estuary on the north-east coast of England and is the largest remaining lowland peatland in England. Despite a long history of extensive peat extraction since the late nineteenth century, the site retains substantial areas of *Sphagnum* bog, which has been changed by succession to wet scrub woodland dominated by Birch *Betula*	E06 (H) Other urbanisation, industrial and similar activities G01 (H) Outdoor sports and leisure activities, recreational activities

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
			- The supporting processes on which the habitats of the qualifying features rely - The population of each of the qualifying features, and - The distribution of the qualifying features within the site.	sp., sallows and Alder *Alnus glutinosa*. Where the peat surface has been removed, subsequent restoration of active bog has depended upon shallow flooding to allow *Sphagnum* and other bog plants to re-colonise. The mire communities are dominated by Hare's-tail *Eriophorum vaginatum* and Common Cottongrass *E. angustifolium*, Cross-leaved Heath *Erica tetralix*, Soft-rush *Juncus effusus* and *Sphagnum* mosses, and include a variety of scarcer bog plants such as Bog-rosemary *Andromeda polifolia* and Cranberry *Vaccinium oxycoccos*. Drier heath is dominated by Heather *Calluna vulgaris*, Bracken *Pteridium aquilinum* and Purple Moor-grass *Molinia caerulea*. Birch *Betula* sp. scrub, some of it dense, occurs throughout both moors. The diverse mosaic of habitats contribute greatly to the ornithological interest, which comprises breeding species, notably Nightjar *Caprimulgus europaeus*, hen harrier *Circus cyaneus*, merlin *Falco columbarius* and short-eared owl *Asio flammeus,* and hobby *Falco subbuteo*. Also notable are breeding nightingales *Luscinia megarhynchos*.	
Thorne Moor SAC	Degraded raised bogs still capable of natural regeneration	N/A	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining and restoring: - The extent and distribution of qualifying natural habitats - The structure and function (including typical species) of qualifying natural habitats, and - The supporting processes on which qualifying natural habitats rely	Thorne Moor is England's largest area of raised bog, lying a few kilometres from the smaller Hatfield Moors, both within the former floodplain of the rivers feeding the Humber estuary (Humberhead Levels), and includes the sub-components Goole Moors and Crowle Moors. Although management has increased the proportion of active raised bog at Thorne Moors, the inclusion of Goole Moors, where peat-extraction has now ceased, means that the site is still predominantly degraded raised bog. The restored secondary surface is rich in species of bog-mosses *Sphagnum* spp.,	K02 (H) Biocenotic evolution, succession I01 (H) Invasive non-native species G05 (H) Other human intrusions and disturbances H04 (H) Air pollution, air-borne pollutants J02 (H) Human induced changes in hydraulic conditions

Site	Qualifying Feature		Conservation Objectives	Site Description and Current Conditions	Key Issues and Threats
	Habitats	Species			
				common and hare's-tail cotton grasses *Eriophorum angustifolium* and *E. vaginatum*, heather Calluna vulgaris, cross-leaved heath *Erica tetralix*, round-leaved sundew *Drosera rotundifolia*, cranberry *Vaccinium oxycoccos* and bog-rosemary *Andromeda polifolia*.	

5 EFFECTS OF IMPACTS TO FUNCTIONALLY LINKED HABITAT

5.1 Introduction

5.1.1. Qualifying features originating from European sites may occupy functionally linked habitat[10] within and adjacent to the Proposed Scheme and may therefore be impacted as a result of visual, light, noise and vibration disturbance, habitat loss, habitat modification and habitat degradation.

5.2 Relevant European Sites

5.2.1. The qualifying features of the European sites identified in the screening assessment as sensitive to impacts within functionally linked habitat and the potential impact pathways resulting from the Proposed Scheme are described in Table 5.1 below.

Table 5-1 - Relevant European Sites and Disturbance Pathway

European Site	European Site Vulnerability / Impact Pathway Identified in HRA Screening
Lower Derwent Valley SAC	Otters are a qualifying feature of the SAC. Otters originating from the SAC may utilise the habitats within and adjacent to the Proposed Scheme (both aquatic and associated riparian and bankside areas and terrestrial habitat providing connectivity to such features). Otters may therefore be indirectly impacted as a result of disturbance (light, noise, vibration and visual) where the Proposed Scheme is located in proximity (disturbance may be prevalent up to 30 m from a holt and up to 200 m from a natal den[11]). Otters utilising such habitats may also be impacted upon by habitat loss and/or habitat modification. However, this is only potentially likely to materialise within riparian/bankside or terrestrial areas, as the Proposed Scheme is expected to employ trenchless techniques to cross all waterbodies and current survey data excludes the presence of potential holts within the ditch network crossed by the Proposed Scheme and within approximately 100 m from it). Pollution arising from the construction of the Proposed Scheme, and drainage from the operation of the Proposed Scheme may also result in habitat degradation and impact upon the availability of otter food sources. It was determined through HRA screening that LSE may arise at functionally linked habitat as a result of: • habitat loss or degradation in or near water bodies;

[10] Functional linkage is taken as described by Natural England (Natural England, 2016. Functional linkage: How areas that are functionally linked to European sites have been considered when they may be affected by plans and projects (NECR207). [online] accessed 08.05.18). In this context, land is considered 'linked' to the European site in question because it provides an important role in maintaining or restoring the population of qualifying species at favourable conservation status.

[11] Specific measures for otter have been taken from Scottish Natural Heritage, Protected Species Advice (A195316, 2017), accessed online 10.05.18.

	• holts and resting places being disturbed; • light, noise, vibration, visual disturbance to resting and feeding places; and • changes to water quality which could also affect food sources[12].
River Derwent SAC	Otters are a qualifying feature of the SAC. It was determined through HRA screening that LSE may arise (as described above for the Derwent Valley SAC). Sea lamprey, river lamprey and bullhead fish are qualifying features of the SAC and are sensitive to water quality changes and may also be impacted by disturbance (in particular noise and vibration during spawning). It was determined through screening that (due to their migratory nature) sea and river lamprey may use the River Ouse (c. 85 m to the closest area of construction) and potentially may also be present within connecting watercourses and ditches in closer proximity to the Proposed Scheme footprint. These species may therefore be significantly impacted by changes to water quality / flow potentially arising from the construction and operation of the Proposed Scheme. As a result of the expected use of trenchless techniques across all waterbodies and the c. 85 m distance from the closest area of construction to the River Ouse, it was not considered likely that there would be any impact as a result of disturbance to fish. Even in the event that trenchless techniques are not used for installation of the Gas Pipeline, the distance from the River Ouse means that noise and vibration impacts on the watercourse would be negligible. Furthermore, spawning (the life stage potentially most significantly disturbed) in proximity to the Proposed Scheme is unlikely as a result of the habitat assessments undertaken and saline influences of the River Ouse in the area[13]. LSE were considered unlikely for bullhead, as this species inhabits freshwater habitats and therefore is unlikely to be found in the zone of influence (for water quality or disturbance impacts) of the Proposed Scheme.
Humber Estuary SAC/Ramsar Site	Sea Lamprey and River Lamprey are qualifying features of the SAC and Ramsar site. It was determined through HRA screening that LSE may arise (as described above for the River Derwent SAC).

[12] Otters: Surveys and Mitigation for Development Projects, UK Government Standing Advice for local planning authorities to assess the impacts of development on otters, access online 10.05.18.
[13] The EA identify saline intrusion as a potential water quality issue for groundwater at the Site (paragraph 12.5.15 of the Water Resources, Quality and Hydrology Chapter). Tidal influences also raise the level of the River Ouse by approximately 4.2 m (paragraph 12.5.12 of the Water Resources, Quality and Hydrology Chapter), further confirming tidal influences in the stretch of the Ouse adjacent to and downstream of the Site.

5.3 Information to inform appropriate assessment

Current Baseline – Annex II species (Otter)

5.3.1. Otters are listed as an interest feature of both the River Derwent SAC and Lower Derwent Valley SAC. Within the Lower Derwent Valley SAC, otters utilise the systems of dykes and ditches linking the ings to the River Derwent. These, combined with the abundance of flood plain habitat which include wet woodland, fen, wet grassland, and ponds, provide excellent supporting habitat for the otters. There are many suitable undisturbed areas for shelter and holts and a good fish population available in the River Derwent and its tributaries provide a food source[14].

5.3.2. The River Derwent SAC is located > 600 m from the closest point of the Proposed Scheme and the Lower Derwent Valley is located > 4,500 m distant; however, due to habitat connectivity, it is considered likely that otters originating from the SAC will utilise suitable habitats within and adjacent to the Proposed Scheme site.

5.3.3. Surveys undertaken to inform the Proposed Scheme's Environmental Impact Assessment[15] identified that within the Site Boundary and surrounding 250 m area, the River Ouse and numerous small ditches and watercourses and riparian areas provided suitable commuting, foraging and lying up /resting habitat for otter. No confirmed lying up / resting sites were identified within the boundary of the Proposed Scheme or within 50 m of it during the surveys.

5.3.4. Figure 9.5 of the ES Biodiversity Chapter provides a summary of the results of the otter surveys. It is considered likely that this species is at least intermittently present within and in proximity to the Proposed Scheme, associated with the River Ouse and connecting watercourses and ditches.

5.3.5. As a result of existing levels of disturbance, in accordance with current understanding[16], it is considered very unlikely that any maternal holt sites (i.e. holts used by female otters to bring up their young) are present within 250 m of the Power Station Site. It is, however, possible (although still relatively unlikely due to the presence of the recreational Trans Pennine Trail along the northern bank of the Ouse) that a maternal holt could be present along the River Ouse within 250 m of the Pipeline Area.

5.3.6. On the basis that these habitats within the Site Boundary and surrounding area may provide an important role in maintaining or restoring the SAC's otter and fish populations at a favourable conservation status[17], they are considered to potentially comprise functionally linked habitat.

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[14] European Site Conservation Objectives: Draft Supplementary Advice on Conserving and Restoring Site Features, Lower Derwent Valley Special Area of Conservation (SAC) Site Code: UK0012844, Natural England, 29.06.2016, accessed online 08.05.18.
[15] Refer to EIA Chapter 9, Biodiversity.
[16] Natural England Species Information Note SIN006, accessed online 100518.
[17] In accordance with European Commission guidance (2007), accessed online 10.05.18, FCS can be described as a
situation where a habitat type or species is doing sufficiently well in terms of quality and quantity and has good prospects of continuing to do so in future. The fact that a habitat or species is not threatened (i.e. not faced by any direct extinction risk) does not necessarily mean that it has favourable conservation status. The target of the Directive is defined in a positive way, as a 'favourable' situation to be reached and maintained, which needs to be defined based on the best available knowledge. Therefore, the obligation of a Member State is

Current Baseline – Annex II Species (Fish)

5.3.7. The sea lamprey and river lamprey are listed as qualifying features of the River Derwent SAC and Humber Estuary SAC. In addition, bullhead is listed as a qualifying feature of the River Derwent SAC.

5.3.8. The sea lamprey occurs in estuaries and easily accessible rivers, and is an anadromous species (i.e. spawning in freshwater but completing its life cycle in the sea). Like the other species of lamprey, sea lampreys need clean gravel for spawning, and marginal silt or sand for the burrowing juvenile ammocoetes. Sea lampreys have a preference for warm waters in which to spawn. Features such as weirs and dams, as well as polluted sections of river, may impede migration to spawning grounds. In comparison to the river lamprey, sea lampreys seem to be relatively poor at ascending obstacles to migration, and are frequently restricted to the lower reaches of rivers. The river lamprey is also found in coastal waters, estuaries and accessible rivers. The species is normally anadromous (i.e. spawning in freshwater but completing part of its life cycle in the sea), and pollution or artificial obstacles such as weirs or dams impede migration[18].

5.3.9. The bullhead is a small bottom-living fish that inhabits a variety of rivers, streams and stony lakes. It appears to favour fast-flowing, clear shallow water with a hard substrate (gravel/cobble/pebble) and is frequently found in the headwaters of upland streams. However, it also occurs in lowland situations on softer substrates so long as the water is well-oxygenated and there is sufficient cover. It is not found in badly polluted rivers or saltwater[19].

5.3.10. It is considered likely that river and sea lamprey are at least intermittently present within the Site Boundary, associated with the River Ouse and/or connecting watercourses and ditches (although spawning is not considered likely on the basis of current survey information and likely saline habitat conditions). It is unlikely that any of the SAC species regularly utilise the minor watercourses and ditches crossed by the Proposed Scheme (the Pipeline Area), due to the low water volume and small sizes of these watercourses.

Potential Effects on Integrity due to Changes to Baseline resulting from the Proposed Scheme

5.3.11. As a result of the minimum 600 m distance, there will be no direct impacts on the Annex II species otters or qualifying fish located within the River Derwent SAC, Derwent Valley SAC or Humber Estuary SAC.

5.3.12. In addition, on the basis of current survey information, there will be no direct impacts on potential otter holts or potential fish spawning habitat located within the Site Boundary due to the lack of positive survey results relating to potential otter resting sites and fish spawning habitat.

5.3.13. However, during construction and operation there is potential for indirect impacts to otters, sea lamprey and river lamprey occupying functionally-linked habitat located adjacent to the

more than just avoiding extinction. All measures taken under the Directive must aim to reach or maintain a favourable conservation status.

[18] Description and ecological characteristics of SAC Annex II species JNCC, accessed online 10.05.18

[19] Description and ecological characteristics of SAC Annex II species JNCC, accessed online 10.05.18

Proposed Scheme as a result of pollution to watercourses. In addition, there is potential for disturbance impacts to otters as a result of light, visual, noise and vibration disturbance.

5.3.14. During construction, there is also risk of mortality to otters moving through terrestrial habitat through collision with moving construction vehicles or interaction with construction materials and compounds and excavations.

5.3.15. Such impacts may result in the killing or injury of otters, the reduction and degradation of available otter and fish habitat and food sources and/or displacement of otters from areas used for commuting, foraging, resting and breeding. This may impact upon the FCS of otters, sea lamprey and river lamprey and ultimately compromise the ability to achieve the conservation objectives underpinning the integrity of the River Derwent SAC, Derwent Valley SAC and Humber Estuary SAC.

Avoidance and Mitigation Measures

5.3.16. The following avoidance measures[20] will be implemented through the Landscape and Biodiversity Strategy (to be prepared substantially in accordance with the Outline Landscaping and Biodiversity Strategy (Document Reference 6.1) and approved and implemented as required by a requirement to Schedule 2 of the draft DCO (Document Reference 3.1)) to avoid/minimise the above described disturbance to otters and potential pollution/hydrological impacts to functionally-linked habitat for otters and qualifying fish located within habitat adjacent to the Proposed Scheme:

- Pre-construction surveys to reconfirm the status of otter habitat usage of the Site and surrounding watercourses up to 250 m from the Proposed Scheme.
- Avoidance of any obstructions to established otter paths and access to open water.
- Avoidance of work in the vicinity of otter habitat during the hours of darkness and within the period two hours after sunrise and two hours before sunset March to October (inclusive) and due to the more limited daylight between one hour after sunrise and one hour before sunset November to February (inclusive).
- The marking of, and adherence to, 30 m exclusion zones around any holts and shelters identified as a result of updated survey prior to site clearance and construction activities occurring. If otters are known or suspected to be breeding, the exclusion zone could be extended to at least a 200 m radius. However, it could be reduced to 100 m depending on the nature of the works, topography and natural screening. This will require judgement from an experienced ecologist.
- If breeding was confirmed and exclusion zones of the size set out above were not possible, works would be undertaken in accordance with a European Protected Species (EPS) Mitigation licence to derogate the legislation protecting otter (except during periods of active breeding). As part of the licence, appropriate compensation would be provided to ensure that alternative habitat is provided in advance of the impact occurring. This would ensure no net loss in available habitat that may be considered to provide functional linkage for the SAC21.

[20] Specific measures for otter have been taken from Scottish Natural Heritage, Protected Species Advice (A195316, 2017), accessed online 10.05.18.

[21] It should be noted that all such measures are compensatory in nature to the extent that otter habitat would be created so as to make up for existing habitat outside the SAC which would be lost, this does not mean that they are to be regarded as compensatory measures under Regulation 63. The measures described would prevent or avoid any impact on the integrity of the SAC.

- As a minimum, light spill will be minimised and dark corridors will be maintained to ensure that otters can continue to commute and forage without undue disturbance during construction. In addition, defined site compounds and access roads with slow speed limits, will limit the risk of otter collisions during construction.
- Screening with fencing or planting of thicket-type vegetation to reduce noise and visual disturbance to otter commuting routes during operation, as per the outline Landscape and Biodiversity Strategy;
- The use of trenchless techniques where practicable when cutting through watercourses for the Pipeline Area. Update surveys will be completed prior to any open-cut techniques being employed. These surveys will determine the need for further mitigation to be implemented for otters (see 4.3.20).
- The capping of any exposed pipe systems when contractors are off site, and providing exit ramps from any exposed trenches or holes (to prevent otters entering and becoming trapped);
- Screening with fencing or planting of thicket-type vegetation to reduce noise, lighting and visual disturbance to otter commuting routes;
- Existing drainage measures during operation have been proposed in ES Chapter 12 as appropriate for the Power Station Site. The Above Ground Installation area and associated access road will be routed through an appropriate oil separator prior to discharge. Such measures have been assessed as appropriate to negate potential drainage-related water quality impacts (ES Chapter 12, Sections 12.6.51 – 12.6.53).
- The use of construction best practice measures to avoid pollution including pollution prevention guidance[22] would be followed to prevent pollution of water courses by silt or chemicals.

5.3.17. The Construction Environmental Management Plan (CEMP) (to be prepared substantially in accordance with the Outline CEMP (Document Reference 6.5), and which will be approved and implemented as required by a requirement in Schedule 2 to the draft DCO (Document Reference 3.1)) will identify the construction site management which will be implemented to avoid/minimise generation of excessive litter, dust noise and vibration, pollution control and avoidance of hydrological impacts.

5.3.18. The CEMP will also provide detailed method statements as necessary to ensure the protection of otters and fish detailed above. Monitoring and management of the ecologically-related CEMP measures to ensure efficacy will be undertaken by an experienced Environmental Manager and Ecological Clerk of Works (ECoW).

5.3.19. The CEMP will identify measures that will be implemented to avoid/minimise the potential for pollution, for example, fuel and chemical spills and spill kits will be ready to hand in the unlikely event of a fluid spill. There will be no storage of potentially contaminating materials in areas of ecological / hydrological sensitivity. A Pollution Incident Response Plan will be included as part of the CEMP to ensure that impacts from any potential accidental spills can be reduced to a minimum.

5.3.20. Updated pre-construction and during-construction survey information will inform the need to provide compensation for the destruction of any newly created resting sites within the

[22] Formerly provided by the Environment Agency, described by the UK Government as Pollution Prevention for Business, access online 10.05.18.

Proposed Scheme footprint. The destruction of an otter resting site would need to be undertaken under an EPS mitigation licence and likely require the construction of an artificial holt. Such measures would ensure no net loss in available habitat that may be considered to provide functional linkage for the SAC.

Efficacy of Mitigation Measures and Residual Effects

5.3.21. The above described mitigation-measures are appropriate, proven avoidance and mitigation measures and no residual, significant effects are envisaged. There may be some minor residual effects on otters' use of habitats within and adjacent to the Proposed Scheme during construction and decommissioning within the Pipeline Area. During the operational phase residual effects are expected to be neutral.

Effects in Combination with Other Plans and Projects

5.3.22. As a result of a negative assessment, it is not considered that the Proposed Scheme will act in-combination with those projects and plans listed in Table 2.1 above.

Conclusion

5.3.23. In the context of the known qualifying feature vulnerabilities and autecology, it is possible to conclude that there will be no adverse effects on the integrity of the Humber Estuary SAC, the River Derwent SAC and the Lower Derwent Valley SAC as a result of impacts upon functionally-linked habitat.

6 EFFECTS OF CHANGES TO AIR QUALITY

6.1 Introduction

6.1.1. The numerical threshold for discounting the potentially harmful effects of atmospheric nitrogen ('Critical Loads' and 'Critical Levels') have already been exceeded for many European sites in the UK, particularly in terms of critical loads for nitrogen deposition. This is reflected for the European Sites within 15 km of the Proposed Scheme, which all experience baseline nitrogen deposition rates that are within or exceed the site-specific critical loads. Potential outcomes of exceedance include changes in species composition, especially in nutrient-poor ecosystems with a shift towards species associated with higher nitrogen availability and a reduction in species richness.

6.2 Relevant European Sites

6.2.1. The European sites identified in the screening assessment as sensitive to air quality impacts and the potential impact pathways resulting from the Proposed Scheme are provided in Table 6.1 below. Critical levels for NOx and NH_3 are presented as concentrations of the pollutant per cubic metre of air. For NOx, the critical levels are independent of the habitat type; for NH_3, the critical level is 3µg/m3 for higher plants, but this decreases to 1µg/m3 if lower plants (such as bryophytes) are present as a critical part of the ecosystem. Critical levels are set at the concentrations above which significant effects on habitats and associated plant species may occur, according to present knowledge.

6.2.2. Critical loads for nitrogen deposition are presented as the deposition rates in kilogrammes of nitrogen per hectare per year. Critical loads are assigned to habitat classes of the European Nature Information System (EUNIS) to enable consistency of habitat terminology and understanding across Europe. They are given as ranges (e.g. 10-20 kgN/ha/yr) which reflect variations in ecosystem response and soil types across Europe. In the assessment, a conservative approach is adopted and impacts are compared to the lower limit of the specified range, unless site-specific assessment determines a different critical load is appropriate.

6.2.3. Acidification critical loads are specified through the definition of a critical load function (CLF) which identifies the combinations of sulphur and nitrogen deposition that will not cause harmful effects. These are also presented in kilogrammes per hectare per year, but it is the combination of the sulphur and nitrogen deposition rates which determine whether the critical load for acidification has been exceeded. This is explained in further detail in paragraphs 6.3.30 – 6.3.32 of the ES Air Quality chapter.

6.2.4. Diagram 6-1, below, shows how the CLF for acidification is applied.

Diagram 6-1 - Information provided in the ES

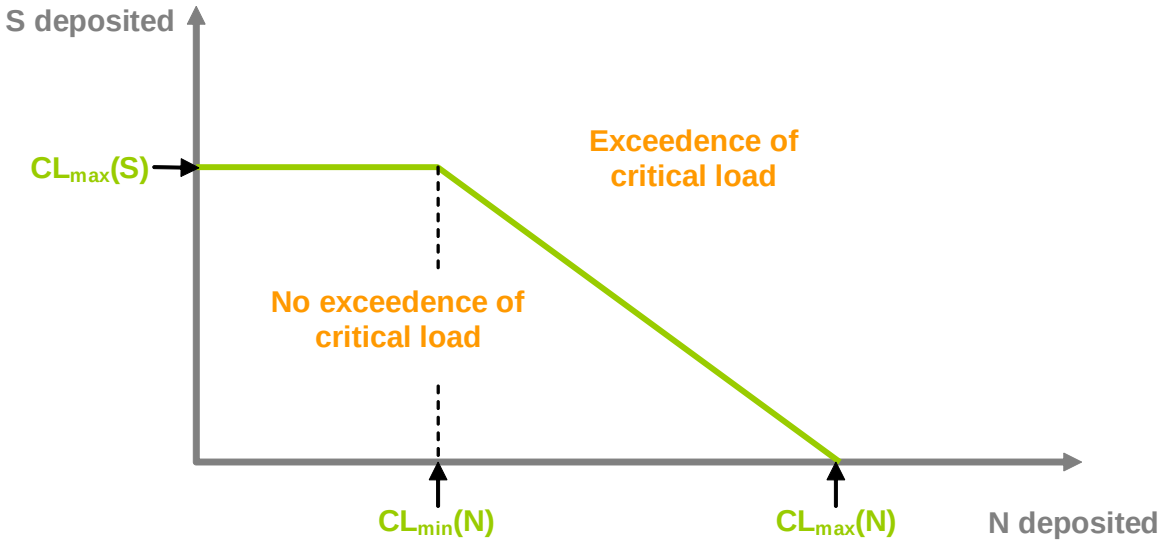

Table 6-1 - Relevant European Sites and Impact Pathways

European Site	European Site Vulnerability / Impact Pathway	Baseline Air Quality Conditions**	Site-specific Critical Loads and Levels*
River Derwent SAC	LSE could not be discounted in the screening assessment as a result of the Proposed Scheme's air emissions during operation. Sections of the SAC are located within 15 km of the Proposed Scheme, and may experience increased air quality emissions as a result of the Proposed Scheme. The SAC is not currently identified as vulnerable to nitrogen deposition in the SIP and there is no relevant critical load provided for this riverine habitat.	NOx = 13.1 – 16.3 (µg/m^3) NH_3 (µg/m^3) = 2.23 – 2.76 Nitrogen deposition (kgN/ha/yr = 14.7 – 19.18) Acid deposition (N Keq/ha/yr) = 1.05 – 1.37 Acid deposition (S Keq/ha/yr) = 0.25 – 0.29	NOx = 30µg/m^3 NH_3 = 3µg/m^3 Nitrogen deposition = none assigned Acid deposition = none assigned
Lower Derwent Valley SAC Lower Derwent Valley SPA and Ramsar	LSE could not be discounted in the screening assessment as a result of the Proposed Scheme's air emissions during operation. Sections of the SAC/SPA are located within 15 km of the Proposed Scheme, and may	NOx (µg/m3) = 13.1 – 15.3 NH_3 (µg/m3) = 2.42 – 2.81 Nitrogen deposition	NOx = 30µg/m^3 NH_3 = NH_3 = 3µg/m^3 Nitrogen deposition = 20 (min) 30 (max)

European Site	European Site Vulnerability / Impact Pathway	Baseline Air Quality Conditions**	Site-specific Critical Loads and Levels*
	experience increased air quality emissions as a result of the Proposed Scheme. The SAC/SPA is identified as vulnerable to nitrogen deposition in the SIP and is currently in exceedance of the site-relevant critical load.	(kgN/ha/yr = 17.9 – 21.0) Acid deposition (N Keq/ha/yr) = 1.37 – 1.50 Acid deposition (S Keq/ha/yr) = 0.28 – 0.30	Acid deposition = 0.856 (CLminN); 4.856 (CLmaxN); and 4.0 (CLmaxS)
Skipwith Common SAC	LSE could not be discounted in the screening assessment as a result of the Proposed Scheme's air emissions during operation. Sections of the SAC are located within 15 km of the Proposed Scheme, and may experience increased air quality emissions as a result of the Proposed Scheme. The SAC is identified as vulnerable to nitrogen deposition in the SIP and is currently in exceedance of the site-relevant critical load.	NOx (µg/m3) = 13.8 – 14.8 NH_3 (µg/m3) = 2.34 – 2.42 Nitrogen deposition (kgN/ha/yr) = 19.2 Acid deposition (N Keq/ha/yr) = 1.37 Acid deposition (S Keq/ha/yr) = 0.28 – 0.29	NOx = 30µg/m^3 NH_3 = 1µg/m^3 Nitrogen deposition = 10 (min) 10 (max) Acid deposition = 0.642 (CLminN); 1.524 (CLmaxN); and 0.810 (CLmaxS)
Humber Estuary SAC Humber Estuary SPA and Ramsar	LSE could not be discounted in the screening assessment as a result of the Proposed Scheme's air emissions during operation. Sections of the SAC/SPA/Ramsar site are located within 15 km of the Proposed Scheme, and may experience increased air quality emissions as a result of the Proposed Scheme. The SAC/SPA is identified as vulnerable to nitrogen deposition in the SIP and is currently in exceedance of the site-relevant critical load.	NOx (µg/m3) = 15.0 – 23.2 NH_3 (µg/m3) = 2.09 – 2.92 Nitrogen deposition (kgN/ha/yr) = 17.9 – 20.7 Acid deposition (N Keq/ha/yr) = 1.27 – 1.48 Acid deposition (S Keq/ha/yr) = 0.28 – 0.29	NOx = 30µg/m^3 NH_3 = 3µg/m^3 Nitrogen deposition = 20 - 30 Acid deposition = not sensitive

European Site	European Site Vulnerability / Impact Pathway	Baseline Air Quality Conditions**	Site-specific Critical Loads and Levels*
Thorne Moor SAC	LSE could not be discounted in the screening assessment as a result of the Proposed Scheme's air emissions during operation. Sections of the SAC/SPA are located within 15 km of the Proposed Scheme, and may experience increased air quality emissions as a result of the Proposed Scheme. The SAC/SPA is identified as vulnerable to nitrogen deposition in the SIP and is currently in exceedance of the site-relevant critical load.	NOx (µg/m3) = 15.1 – 18.6 NH_3 (µg/m3) = 1.43 – 2.39 Nitrogen deposition (kgN/ha/yr) = 14.7 – 18.9 Acid deposition (N Keq/ha/yr) = 1.05 – 1.35 Acid deposition (S Keq/ha/yr) = 0.25 – 0.26	NOx = 30µg/m^3 NH_3 = 1µg/m^3 Nitrogen deposition = 5 - 10 Acid deposition = 0.321 (CLminN); 0.462 (CLmaxN); and 0.141 (CLmaxS)
Thorne and Hatfield Moor SPA			

* As taken from Tables 6.8 and 6.9 in the ES Air Quality chapter. In most instances, the air quality assessment has used the critical load or level with the lowest (i.e. most stringent) value, in line with the precautionary principle. Less stringent critical loads or levels have only been used where evidence suggests this is appropriate – for example where citation information reports that the most sensitive feature only occurs in parts of the European Site in excess of 15km from the Proposed Scheme.

** As taken from Table 6.12 in the ES Air Quality Chapter.

6.3 Information to Inform Appropriate Assessment

6.3.1. Table 6.1 and the accompanying text above and Chapter 6 of the ES, Air Quality describe the current baseline for the European sites assessed in this report for air quality impacts.

Potential Effects of Changes to Baseline Resulting from the Construction and Operation of the Proposed Scheme

6.3.2. A qualitative assessment of construction dust during the construction of the Proposed Scheme was undertaken as part of the air quality assessment, reported in the ES Chapter 6 (Air Quality). This was informed by a specific Construction Dust Assessment, which forms Appendix 6.2 of the ES Air Quality chapter. The assessment concluded that there were no ecological receptors sufficiently close to the Proposed Scheme, that they could experience significant construction dust impacts. As such, construction phase dust impacts would not lead to any LSE or adverse effects on the integrity of any European Site.

6.3.3. A quantitative assessment of emissions of NO_X, NO_2, ammonia (NH_3), CO, SO_2, PM_{10} and HCl from the operation of the Power Station Site was also undertaken to inform the Proposed Scheme's ES (Chapter 6 (Air Quality)). The assessment considered both OCGT and CCGT

operation of the proposed Gas Generating Stations. Furthermore, with CCGT operation, operation without and with the use of exhaust gas treatment to reduce NOx emissions (Selective Catalytic Reduction, SCR) was modelled.

6.3.4. To ensure a realistic worst case scenario, the generating units were assumed to run at full load continuously. Combined cycle is the more likely operating scenario and the results presented in the ES Air Quality chapter for operation without exhaust gas treatment assume operation at all times in this mode. For operation with exhaust gas treatment, to meet the ammonia emissions budget cap (of 120 tonnes NH_3 per year), the plant is assumed to operate in open cycle for 1,500 hours and the remainder in combined cycle. The atmospheric emissions from the operation of the Proposed Scheme were quantified by obtaining information from relevant plant suppliers.

The air quality modelling methodology and the results for each of the different modelled scenarios are presented in Sections 6.3 and 6.5 of the ES Air Quality chapter respectively. Tables 6.18 to 6.23 of the ES Air Quality chapter set out the realistic worst case impacts from the Proposed Scheme on designated sites, including European Sites. Tables 6.24 to 6.28 of the ES set out the realistic worst case cumulative air quality impacts of the Proposed Scheme, which has been used to inform the assessment of in-combination air quality effects on European Sites. The findings of the air quality modelling for each scenario are presented and referred to in the following sections of this report, where appropriate.

6.3.5. The ES Air Quality chapter includes a quantitative assessment of potential cumulative effects from emissions of NO_X and ammonia from the Eggborough Power Station and Thorpe Marsh Power Station. These developments were included in the quantitative air quality modelling as it was concluded that Eggborough and Thorpe Marsh Power Stations were the only processes with significant potential for in-combination air quality impacts with the Proposed Scheme on ecological receptors from those detailed in Table 2.1. In Addition to those short listed developments within 15 km, due to their scale and nature, Knottingley Power Project and Ferrybridge D CCGT (located beyond 15 km from the Proposed Scheme but located within 15 km of European Sites located within 15 km of the Proposed Scheme) have been considered qualitatively within the air quality assessment.

6.3.6. For the purpose of this HRA, the realistic worst case outcomes from the air quality assessment are presented only (rather than detailed analysis of all potential scenarios) and these have been taken forward for the conclusions made with regard to adverse effects below. It follows that where it can be concluded that there would be no adverse effect for the worst case scenario assessed, any scenario generating reduced levels of emissions, would also not lead to adverse effects. Full analysis of each scenario is presented in the ES Chapter 6 (Air Quality), Section 6.5.

6.3.7. The results of the air quality modelling for European Sites are presented in Tables 6.2 to 6.10, below.

Table 6-2 - Maximum Operational Impact at Ecological Receptors – Annual Mean NH_3

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m3)						
River Derwent SAC	3	2.76	0.00	0.0%	2.76	92%
Lower Derwent SAC/SPA/Ramsar site	3	2.81	0.00	0.0%	2.81	94%
Thorne Moor SAC & Thorne and Hatfield Moor SPA	1	2.39	0.00	0.0%	2.39	239%
Skipwith Common SAC	1	2.42	0.00	0.0%	2.42	242%
Humber Est. SAC/SPA/Ramsar site	3	2.92	0.00	0.0%	2.92	97%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	3	2.76	0.03	1.1%	2.79	93%
Lower Derwent SAC/SPA/Ramsar site	3	2.81	0.02	0.6%	2.83	94%
Thorne Moor SAC & Thorne and Hatfield Moor SPA	1	2.39	0.00	0.5%	2.39	239%
Skipwith Common SAC	1	2.42	0.00	0.4%	2.42	242%
Humber Est. SAC/SPA/Ramsar site	3	2.92	0.01	0.3%	2.93	98%

Table 6-3 - Maximum Operational Impact at Ecological Receptors – Annual Mean NO_X

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m3)						
River Derwent SAC	30	16.26	2.15	7.18%	18.41	61%
Lower Derwent SAC/SPA/Ramsar site	30	15.32	1.25	4.15%	16.57	55%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	30	18.56	0.32	1.06%	18.88	63%
Skipwith Common SAC	30	14.75	0.30	1.00%	15.05	50%

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Humber Est. SAC/SPA/Ramsar site	30	23.19	0.54	1.81%	23.73	79%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	30	16.26	1.11	3.7%	17.37	58%
Lower Derwent SAC/SPA/Ramsar site	30	15.32	0.65	2.2%	15.97	53%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	30	18.56	0.17	0.6%	18.73	62%
Skipwith Common SAC	30	14.75	0.16	0.5%	14.91	50%
Humber Est. SAC/SPA/Ramsar site	30	23.19	0.28	0.9%	23.47	78%

Table 6-4 - Maximum Operational Impact at Ecological Receptors – Daily Mean NO_X

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m3)						
River Derwent SAC	75	32.52	36.8	49.1%	69.3	92%
Lower Derwent SAC	75	30.64	16.7	22.2%	47.3	63%
Thorne Moor SAC & Thorne and Hatfield Moors SPA	75	37.12	8.0	10.7%	45.1	60%
Skipwith Common SAC	75	29.5	6.9	9.2%	36.4	48%
Humber Est. SAC/SPA/Ramsar site	75	46.38	9.1	12.2%	55.5	74%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	75	32.5	22.4	29.9%	54.9	73%
Lower Derwent SAC/SPA/Ramsar site	75	30.6	12.6	16.8%	43.3	58%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	75	37.1	5.7	7.6%	42.8	57%

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Skipwith Common SAC	75	29.5	4.8	6.4%	34.3	46%
Humber Est. SAC/SPA/Ramsar site	75	46.4	6.3	8.4%	52.7	70%

Table 6-5 - Maximum Operational Impact at Ecological Receptors – Nitrogen Deposition

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m^3)						
River Derwent SAC	No critical load set					
Lower Derwent SAC/SPA/Ramsar site	20	21.0	0.12	0.6%	21.1	106%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	5	19.2	0.03	0.6%	19.2	384%
Skipwith Common SAC	10	19.2	0.03	0.3%	19.2	192%
Humber Est. SAC/SPA/Ramsar site	20	20.7	0.05	0.3%	20.8	104%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	No critical load set					
Lower Derwent SAC	20	21.0	0.16	0.8%	21.2	106%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	5	19.2	0.04	0.8%	19.2	384%
Skipwith Common SAC	10	19.2	0.04	0.4%	19.2	192%
Humber Est. SAC/SPA/Ramsar site	20	20.7	0.07	0.3%	20.8	104%

Table 6-6 - Maximum Operational Impact at Ecological Receptors – Acid Deposition

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m^3)						

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
River Derwent SAC	No critical load set					
Lower Derwent SAC/SPA/Ramsar site	4.856	1.5	0.008	0.2%	1.51	31%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	0.462	1.37	0.002	0.5%	1.37	297%
Skipwith Common SAC	0.820	1.37	0.002	0.3%	1.37	167%
Humber Est. SAC/SPA/Ramsar site	Not sensitive					
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	No critical load set					
Lower Derwent SAC/SPA/Ramsar site	0.453	1.50	0.011	0.2%	1.51	31%
Thorne Moor SAC and Thorne and Hatfield Moor SPA	0.462	1.37	0.003	0.6%	1.37	297%
Skipwith Common SAC	0.820	1.37	0.003	0.3%	1.37	167%
Humber Est. SAC/SPA/Ramsar site	Not sensitive					

Table 6-7 - Maximum Cumulative Operational Impact at Ecological Receptors – Annual Mean NH_3

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Scenario C – Combined cycle operation with low NOx emissions (50mg/m^3)						
River Derwent SAC	3	2.76	0.00	0.0%	2.76	92%
Lower Derwent SAC/SPA/Ramsar site	3	2.81	0.00	0.0%	2.81	94%
Thorne Moor SAC and Thorne and Hatfield Moor SPA	1	2.39	0.00	0.0%	2.39	239%
Skipwith Common SAC	1	2.42	0.00	0.0%	2.42	242%

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Humber Est. SAC/SPA/Ramsar site	3	2.92	0.00	0.0%	2.92	97%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	3	2.76	0.06	2.1%	2.82	94%
Lower Derwent SAC	3	2.81	0.04	1.4%	2.85	95%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	1	2.39	0.01	1.3%	2.40	240%
Skipwith Common SAC	1	2.42	0.03	2.7%	2.45	245%
Humber Est. SAC/SPA/Ramsar site	3	2.92	0.02	0.7%	2.94	98%

Table 6-8 - Maximum Cumulative Operational Impact at Ecological Receptors – Annual Mean NO_X

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Scenario C – Combined cycle operation with low NOx emissions (50mg/m^3)						
River Derwent SAC	30	16.26	2.79	9.3%	19.05	64%
Lower Derwent SAC/SPA/Ramsar site	30	15.32	1.82	6.1%	17.14	57%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	30	18.56	0.87	2.9%	19.43	65%
Skipwith Common SAC	30	14.75	0.79	2.6%	15.54	52%
Humber Est. SAC/SPA/Ramsar site	30	23.19	1.02	3.4%	24.21	81%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	30	16.26	1.57	5.2%	17.83	59%
Lower Derwent SAC/SPA/Ramsar site	30	15.32	1.06	3.5%	16.38	55%
Thorne Moor SAC and Thorne and Hatfield Moor SPA	30	18.56	0.66	2.2%	19.22	64%
Skipwith Common SAC	30	14.75	0.50	1.7%	15.25	51%

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Humber Est. SAC/SPA/Ramsar site	30	23.19	0.68	2.3%	23.87	80%

Table 6-9 - Maximum Cumulative Operational Impact at Ecological Receptors – Daily Mean NO_X

Receptor	Critical Level	Back-ground (µg/m3)	PC (µg/m3)	PC as % of Obj.	PEC (µg/m3)	PEC as % of Obj.
Scenario C – Combined cycle operation with low NOx emissions (50mg/m^3)						
River Derwent SAC	75	32.5	36.8	49.1%	69.3	92%
Lower Derwent SAC/SPA/Ramsar site	75	30.6	16.7	22.3%	47.4	63%
Thorne Moor SAC and Thorne and Hatfield Moor SPA	75	37.1	8.6	11.5%	45.7	61%
Skipwith Common SAC	75	29.5	7.2	9.6%	36.7	49%
Humber Est. SAC/SPA/Ramsar site	75	46.4	10.1	13.4%	56.4	75%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	75	32.5	22.4	29.9%	54.9	73%
Lower Derwent SAC/SPA/Ramsar site	75	30.6	12.6	16.9%	43.3	58%
Thorne Moor SAC and Thorne and Hatfield Moor SPA	75	37.1	6.1	8.1%	43.2	58%
Skipwith Common SAC	75	29.5	5.1	6.8%	34.6	46%
Humber Est. SAC/SPA/Ramsar site	75	46.4	6.9	9.3%	53.3	71%

Table 6-10 - Maximum Cumulative Operational Impact at Ecological Receptors – Nitrogen Deposition

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
Scenario C – Combined cycle operation with low NOx emissions (50mg/m^3)						

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
River Derwent SAC	No critical load set					
Lower Derwent SAC/SPA/Ramsar site	20	21.0	0.17	0.9%	21.2	106%
Thorne Moor SAC and Thorne and Hatfield Moor SPA	5	19.2	0.09	1.7%	19.3	385%
Skipwith Common SAC	10	19.2	0.08	0.8%	19.3	193%
Humber Est. SAC/SPA/Ramsar site	20	20.7	0.10	0.5%	20.8	104%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	No critical load set					
Lower Derwent SAC/SPA/Ramsar site	20	21.0	0.32	1.6%	21.3	107%
Thorne Moor SAC and Thorne and Hatfield Moor SPA	5	19.2	0.13	2.7%	19.3	386%
Skipwith Common SAC	10	19.2	0.19	1.9%	19.4	194%
Humber Est. SAC/SPA/Ramsar site	20	20.7	0.17	0.9%	20.9	104%

Table 6-11 - Maximum Cumulative Operational Impact at Ecological Receptors – Acid Deposition

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
Scenario C – Combined cycle operation with low NOx emissions (50mg/m^3)						
River Derwent SAC	No critical load set					
Lower Derwent SAC/SPA/Ramsar site	4.856	1.5	0.012	0.3%	1.51	31%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	0.462	1.37	0.006	1.3%	1.38	298%
Skipwith Common SAC	0.820	1.37	0.006	0.7%	1.38	168%

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
Humber Est. SAC/SPA/Ramsar site	Not sensitive					
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC	No critical load set					
Lower Derwent SAC/SPA/Ramsar site	4.856	1.50	0.023	0.5%	1.52	31%
Thorne Moor SAC and Thorne and Hatfield Moors SPA	0.462	1.37	0.010	2.1%	1.38	299%
Skipwith Common SAC	0.820	1.37	0.013	1.6%	1.38	169%
Humber Est. SAC/SPA/Ramsar site	Not sensitive					

River Derwent SAC

6.3.8. The air quality modelling demonstrated that the Proposed Scheme would not lead to any exceedances of air quality standards for NOx or NH_3 concentrations. An extract of the air quality modelling results for the River Derwent is presented in Tables 6.2 to 6.10, above.

6.3.9. The River Derwent (and the hydrologically connected downstream River Ouse) is not considered to be sensitive to the effects of nitrogen deposition and associated acidification, due to the rivers water quality. Environment Agency (EA) monitoring data indicates that the River Derwent is strongly phosphate limited. In phosphate limited systems, additional inputs of nitrogen have limited effects on plant productivity, as phosphate is the primary limiting nutrient. As such, additional inputs would be unlikely to lead to any perceptible eutrophication effects on SAC freshwater habitats.

6.3.10. It is to be noted that despite the significant ongoing inputs of nitrogen to the River Derwent SAC from other, pre-existing sources, the constituent SSSI Units of the River Derwent SAC (River Derwent SSSI and Newton Mask SSSI) within 15 km of the Site Boundary, were all assessed as being in 'favourable', 'unfavourable recovering' or 'unfavourable no change' condition when last assessed. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments of the Site. This suggests that existing high levels of nutrient nitrogen input are likely to be having a limited if any effect on habitats within the SAC.

6.3.11. In light of the information presented above, no adverse effects to the integrity of the SAC are predicted.

Lower Derwent Valley SAC

6.3.12. The air quality modelling shows that the Proposed Scheme will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations. Furthermore, the Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto the Lower Derwent Valley SAC. There is a maximum modelled process contribution of 0.8% and 0.2% for nitrogen and acid deposition respectively. The process contribution from the Proposed Scheme also reduces with increasing distance from the stacks. For example, the maximum process contribution for nitrogen deposition onto the Breighton Meadows SSSI component of the SAC (the closest part of the site), is predicted to be 0.8%. The maximum process contribution for nitrogen deposition onto the Derwent Ings SSSI component of the SAC (approximately 2 km further north than Breighton Meadows SSSI), is predicted to be 0.5%.

6.3.13. In light of the information presented above, no adverse effects to the integrity of the SAC are predicted.

Lower Derwent Valley SPA and Ramsar

6.3.14. The air quality modelling shows that the Proposed Scheme will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations. The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto the Lower Derwent Valley SPA. There is a maximum modelled process contribution of 0.8% and 0.2% for nitrogen and acid deposition respectively (see Table 6.5 and 6.6 of this report, respectively). The process contribution from the Proposed Scheme also reduces with increasing distance from the stacks. For example, the maximum process contribution for nitrogen deposition onto the Breighton Meadows SSSI component of the SPA (the closest part of the site), is predicted to be 0.8%; the maximum process contribution for nitrogen deposition onto the Derwent Ings SSSI component of the SPA (approximately 2 km further north than Breighton Meadows SSSI), is predicted to be 0.5%.

In light of the information presented above, no adverse effects to the integrity of the SAC are predicted.

Skipwith Common SAC

6.3.15. The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations when operating with SCR (see Table 6.2 of this report). The Proposed Scheme would generate a maximum Process Contribution of 0.4% of the critical level for NH_3. This is in the context of an existing exceedance of 242% of critical level, with the Proposed Scheme contributing the equivalent of up to 0.17% of background levels. There are no exceedances of critical levels for NOx, see Tables 6.3 and 6.4 of this report). The Proposed Scheme will not lead to significant nitrogen or acid deposition onto Skipwith Common SAC. There is a maximum modelled process contribution of 0.4% and 0.3% for nitrogen and acid deposition respectively (see Table 6.5 and 6.6). The process contribution also reduces with increasing distance from the Proposed Scheme.

In light of the information presented above, no adverse effects to the integrity of the SAC are predicted.

Thorne Moor SAC

6.3.16. ES Chapter 6 (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.2 to 6.6 set out the predicted numerical air quality impacts of the Proposed Scheme, These include the predicted impact of the Proposed Scheme on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification.

6.3.17. The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations when operating with SCR (see Table 6.2 of this report). The Proposed Scheme would generate a maximum Process Contribution of 0.5% of the critical level for NH_3. This is in the context of an existing exceedance of 239% of critical level, with the process contribution from the Proposed Scheme equivalent to approximately 0.2% of background levels. There are no exceedances of critical levels for NOx (see Tables 6.3 and 6.4). The Proposed Scheme would not lead to significant nitrogen or acid deposition onto Thorne Moor SAC. There is a maximum modelled process contribution of 0.8% and 0.6% for nitrogen and acid deposition respectively (see Tables 6.5 and 6.6 respectively). The process contribution also reduces with increasing distance from the Proposed Scheme.

In light of the information presented above, no adverse effects to the integrity of the SAC are predicted.

Thorne and Hatfield Moor SPA

6.3.18. The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations when operating with SCR, (see Tables 6.2. The Proposed Scheme would generate a maximum Process Contribution of 0.5% of the critical level for NH_3. This is in the context of an existing exceedance of 239% of critical level, with the process contribution from the Proposed Scheme equivalent to approximately 0.2% of background levels. There are no exceedances of critical levels for NOx see Tables 6.3 and 6.4. The Proposed Scheme would not lead to significant nitrogen or acid deposition onto Thorne and Hatfield Moor SPA. There is a maximum modelled process contribution of 0.8% and 0.6% for nitrogen and acid deposition respectively (see Tables 6.5 and 6.6, respectively). The process contribution also reduces with increasing distance from the Proposed Scheme.

In light of the information presented above, no adverse effects to the integrity of the SAC are predicted...

Humber Estuary SAC, SPA and Ramsar site

6.3.19. The air quality modelling shows that the Proposed Scheme will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations (see Tables 6.2, 6.3, and 6.4). The Proposed Scheme will not lead to significant nitrogen or acid deposition onto the Humber Estuary. There is a maximum modelled process contribution of 0.3% of critical load for nitrogen deposition and the Humber Estuary habitats are not considered to be sensitive to acidification (see Table 6.5 and 6.6 of this report, respectively). The process contribution from the

Proposed Scheme also reduces with increasing distance from the Proposed Scheme, with the 0.3% of critical load the modelled process contribution at the point of greatest impact.

Avoidance and Mitigation Measures

6.3.20. The Proposed Scheme allows for primary mitigation of impacts during operation through the control of NOx emissions. Two scenarios have been considered for the control of NOx emissions:

- Combustion Control – Low NOx emissions (<50mg/Nm3 in the exhaust gases) can be achieved via optimisation of the combustion process in the Gas Generating Stations. This reduces the maximum efficiency of the units slightly but does not require exhaust gas treatment.
- Exhaust Gas Treatment – The use of exhaust gas treatment such as SCR can further reduce NOx emissions (<30mg/Nm3) but may result in emissions of ammonia where un-reacted ammonia passes through the system (so called 'ammonia slip'). To mitigate the impacts of the use of treatments such as SCR whilst maintaining operational flexibility and allowing for future technological improvements, the Proposed Scheme is based on an annual emissions ceiling of 120 tonnes of ammonia.

Efficacy of Mitigation Measures and Residual Effects

6.3.21. During operation, the realistic worst-case scenarios assessed (with or without SCR, as set out in section 3.2) have been taken into account in the assessment. The residual effects are discussed in both the alone and in-combination assessment sections.

6.3.22. The contribution of the Proposed Scheme, whether assessed alone (see below) or in combination with other industrial processes, is largely insignificant and a relatively small proportion of the total deposition. The risk of exceedance of critical loads and the level of exceedance of the critical loads is a function of the rates of background deposition rather than the result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of critical loads and levels for the European Sites within 15km of the Proposed Scheme.

Effects in Combination with Other Plans and Projects

River Derwent SAC

6.3.23. As a result of a negative assessment, it is not considered that the Proposed Scheme will act in-combination with those projects and plans listed in Table 2.1 above.

Lower Derwent Valley SAC

6.3.24. The maximum predicted cumulative impact of the Proposed Scheme would be 1.6% for nitrogen deposition and 0.3% for acidification (see Tables 6.10 and 6.11). The cumulative acid deposition impact is predicted to lead to a de minimus in-combination effect, which will lead to no perceptible vegetative change of SAC habitats. The cumulative impacts on nitrogen deposition exceed 1% of critical load. The cumulative nitrogen deposition impact reduces with increasing distance from site. Whilst a maximum impact of 1.6% of critical load is predicted over the Breighton Meadows SSSI component of the SAC, the maximum impact over the more distant Derwent Ings SSSI component is 1.4%, declining further with increasing distance from the Proposed Scheme. The Breighton Meadows SSSI has an area of 38.79 ha, representing approximately 4.2% by area of the SAC.

6.3.25. It is to be noted that despite the significant ongoing inputs of nitrogen to the SAC from other, pre-existing sources, the constituent SSSI Units of the Lower Derwent SAC (Breighton Meadows SSSI and Derwent Ings SSSI) within 15 km of the Site, were all assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed. A copy of the last SSSI unit condition assessment is provided in Appendix 3. 92.86% of the Breighton Meadows SSSI was reported as being in 'favourable' condition, with the remaining 7.14% recorded as being in 'unfavourable – recovering' condition. For the Derwent Ings SSSI, 59.7% of the SSSI units are reported to be in 'favourable' condition, with the remaining 40.3% of the SSSI units in 'unfavourable – recovering' condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments of the Site. This suggests that there are no evident adverse effects of background deposition levels on the SAC habitats.

6.3.26. The contribution of the Proposed Scheme, whether assessed alone or in combination with other industrial processes, is largely insignificant and a relatively small proportion of the total deposition. The risk of exceedance of critical loads and the level of exceedance of the critical loads is a function of the rates of background deposition rather than the result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of critical loads and levels for the European Sites within 15km of the Proposed Scheme.

6.3.27. Taking into account the conservatism built into the air quality assessment including:

- Continuous full load operation for the year.
- 70% conversion of NOx to NO_2.
- Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum and the presence of particular habitats.
- Assessment against the lower threshold of recommended critical loads.
- Assessment of maximum impacts across 5 modelled years.
- Emissions continually at the limit set in the IED / Bref Conclusions and or recommended emissions ceiling.

6.3.28. The impacts of the Proposed Scheme both alone and in combination with other relevant development proposals will be small overall and likely imperceptible.

6.3.29. In light of the information presented above, no adverse effects to the integrity of the Lower Derwent Valley SAC are predicted to arise.

Lower Derwent Valley SPA and Ramsar

6.3.30. The maximum predicted cumulative impact of the Proposed Scheme would be 1.6% for nitrogen deposition and 0.3% for acidification (see Tables 6.10 and 6.11) for the neutral grassland habitats assessed. The cumulative acid deposition impact is predicted to lead to a de minimus in-combination effect, which would lead to no perceptible vegetative change of SPA habitats. The cumulative impacts on nitrogen deposition therefore exceed 1% of critical load. The cumulative nitrogen deposition impact reduces with increasing distance from site. Whilst a maximum impact of 1.6% of critical load (Process Contribution from the Proposed Scheme up to 0.6%) is predicted over the Breighton Meadows SSSI component of the SPA, the maximum impact over the more distant Derwent Ings SSSI component is 1.4% (Process Contribution from the Proposed Scheme up to 0.4%), with the Process Contribution from the

Proposed Scheme declining further with increasing distance from the Proposed Scheme. The Breighton Meadows SSSI has an area of 38.79 ha, representing approximately 4.2% by area of the SPA.

6.3.31. It is to be noted that despite the significant ongoing inputs of nitrogen to the SAC from other, pre-existing sources, the constituent SSSI Units of the Lower Derwent SPA (Breighton Meadows SSSI and Derwent Ings SSSI) within 15 km of the Site, were all assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed. A copy of the last SSSI unit condition assessment is provided in the Appendix 3. 92.86% of the Breighton Meadows SSSI was reported as being in 'favourable' condition, with the remaining 7.14% recorded as being in 'unfavourable – recovering' condition. For the Derwent Ings SSSI, 59.7% of the SSSI units are reported to be in 'favourable' condition, with the remaining 40.3% of the SSSI units in 'unfavourable – recovering' condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments. This suggests that there are no evident effects of background deposition levels on the SAC habitats.

6.3.32. The Site relevant critical loads for the Derwent Valley SPA described on APIS (reference 9.54 of the ES Biodiversity Chapter) includes advice on the application of critical loads and levels to several of the bird species for which the SPA is designated (golden plover, tundra swan, ruff and Eurasian teal). The advice on critical loads identifies that 'no expected negative impact on species due to impacts on the species' broad habitat' for Eurasian teal and Ruff. For tundra swan a potential negative impact is identified for standing water habitats, dependent on whether waterbodies are nitrogen or phosphate-limited. Environment Agency (EA) monitoring data indicates that the River Derwent is strongly phosphate limited (see ES Chapter 9 (Biodiversity)). In phosphate limited systems, additional inputs of nitrogen have limited effects on plant productivity, as phosphate is the primary limiting nutrient. As such, additional inputs would be unlikely to lead to any perceptible eutrophication effects on standing water habitats within the SPA.

6.3.33. The contribution of the Proposed Scheme, whether assessed alone or in combination with other processes, is largely insignificant and a relatively small proportion of the total deposition. The risk of exceedance of critical loads and the level of exceedance of the critical loads is a function of the rates of background deposition rather than the result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of critical loads and levels for the European Sites within 15km of the Proposed Scheme.

6.3.34. Taking into account the conservatism built into the air quality assessment including:

- Continuous full load operation for the year.
- 70% conversion of NOx to NO_2.
- Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum and the presence of particular habitats.
- Assessment against minimum recommended critical loads.
- Assessment of maximum impacts across 5 modelled years.
- Emissions continually at the limit set in the IED / Bref Conclusions and or recommended emissions ceiling.

6.3.35. The impacts of the Proposed Scheme both alone and cumulatively with other relevant development proposals will be small overall and likely imperceptible.

6.3.36. In light of the information presented above, no adverse effects to the integrity of the Lower Derwent Valley SPA and Ramsar site are predicted to arise.

Skipwith Common SAC

6.3.37. The maximum predicted in-combination impact of the Proposed Scheme would be 2.7% of the critical level for NH_3, with the Proposed Scheme contributing up to 0.4% of this. This represents an additional contribution to the existing exceedance of the NH_3 critical level at this Site. There would be an in-combination impact of up to 1.9% of critical load for nitrogen deposition and up to 1.6% for acidification, with the Proposed Scheme contributing 0.4% and 0.3% respectively. The upper critical load range is exceeded at this European Site (see Table 6.1) The in-combination impacts on NH_3 concentrations and nitrogen and acid deposition therefore exceed 1% of critical load / critical levels (see Tables 6.7, 6.10 and 6.11).

6.3.38. To support the assessment of the implications of this deposition on Skipwith Common SAC, published research into the effects of nitrogen deposition on heathland habitats was reviewed. This included a review of existing scientific knowledge covering several studies (Ref 9.52) and a study of how ecosystem functions could be used as indicators for heathland response to nitrogen deposition (Ref 9.53). These studies suggest that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because nitrogen is already in excess the plants present within the habitats have limited capacity to respond. In the Natural England study (Ref 9.52)), with background deposition rates of 20 kgN/ha/yr (comparable to estimated baseline deposition rates at Skipwith common SAC), adding a further 1 kg N/ha/yr was shown to decrease species richness by between 1.4% and 1.9%. Graminoid (grass) cover was found to increase by between 0.8% and 1.1%. The maximum species richness recorded across the studies examined in Caporn et al., (2016) varied between 16 and 32.

6.3.39. Taking a worst-case species richness from the above of 16, an impact equivalent to 3.26 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted cumulative impact of the Proposed Scheme with other plans and projects is 0.19 kgN/ha/yr, equivalent to approximately 6% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls within the bounds of natural variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case in-combination impact of acid deposition is marginally above 1% (1.6%), with the contribution from the Proposed Scheme (a maximum of 0.5% from the Proposed Scheme) decreasing with increasing distance from the Proposed Scheme No perceptible vegetative change to SAC habitats is predicted to arise from this level of deposition.

6.3.40. Following EA guidance, with regard to the significance of changes in deposition rates on designated ecological sites, an impact is considered to be insignificant where the change in process contribution (PC) is 1% (or less) of the long term critical load or critical level for the ecological site under consideration. The guidance further states that the 1% threshold is based on the judgement that it is unlikely that an emission at this level will make a significant contribution to air quality since PCs will be small in comparison to background levels, even if

a standard is exceeded. The use of 1% of the critical load is also outlined within the IAQM's position statement (Ref. 6.28 of the ES Air Quality chapter) which suggests that 1% of the critical load should be used to determine either where further assessment is required or to screen out effects that are not likely to be significant (i.e. the effect is negligible).

6.3.41. The contribution of the Proposed Scheme, whether assessed alone or in combination with other industrial processes, is largely insignificant and a relatively small proportion of the total deposition. The risk of exceedance of critical loads and the level of exceedance of the critical loads is a function of the rates of background deposition rather than the result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of critical loads and levels for the European Sites within 15km of the Proposed Scheme.

6.3.42. Taking into account the conservatism built into the air quality assessment including:

- Continuous full load operation for the year.
- 70% conversion of NOx to NO_2.
- Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum and the presence of particular habitats.
- Assessment against the lower threshold of recommended critical loads.
- Assessment of maximum impacts across 5 modelled years.
- Emissions continually at the limit set in the IED / Bref Conclusions and or recommended emissions ceiling.

6.3.43. The impacts of the Proposed Scheme both alone and in combination with other relevant development proposals will be small overall and likely imperceptible.

6.3.44. In addition, the constituent SSSI Units of the Skipwith Common SAC within 15 km of the Proposed Scheme were also assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed in 2014. A copy of the last SSSI unit condition assessment is provided in Appendix 3. 47.96% of the constituent SSSI units were reported as being in 'favourable' condition, the remaining value of 52.04% was recorded as being in 'unfavourable – recovering' condition, suggesting the condition of these areas in relation to their target condition is being achieved or improving despite current inputs of nutrient nitrogen from diffuse agricultural and other sources. The predicted worst-case inputs from the Proposed Scheme are unlikely to alter that situation.

6.3.45. Data on APIS (Ref 9.56) indicates that approximately 8.6% of nitrogen deposition onto Skipwith Common SAC arises from road transport. Future reductions in emissions from the UK vehicle fleet would therefore reduce and eventually eliminate these inputs. For comparison, the source attribution data on APIS identifies the Existing Drax Power Station Complex as contributing approximately 1.5% of total nitrogen deposition.

6.3.46. Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme in combination with other plans and projects.

Thorne Moor SAC

6.3.47. The maximum predicted cumulative impact of the Proposed Scheme would be 1.3% of the critical level for NH_3, with the Proposed Scheme contributing up to 0.5% of this. The

contribution from the Proposed Scheme to cumulative NH_3 also decreases with increasing distance from the stacks. Given the cumulative exceedance is only marginally above 1% of critical level at the point of greatest predicted impact, no perceptible effects on SAC vegetation are predicted to arise. There would be a cumulative impact of up to 2.7% of critical load for nitrogen deposition and up to 2.1% for acidification, with the Proposed Scheme contributing 0.8% and 0.6% respectively. The cumulative impacts on nitrogen and acid deposition therefore exceed 1% of critical load (see Tables 6.10 and 6.11 of this report, respectively).

6.3.48. To support the assessment of the implications of this deposition, published research into the effects of nitrogen deposition on bog habitats was reviewed. This included a review of existing scientific knowledge covering several studies (Caporn et al., 2016). This study suggests that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because nitrogen is already in excess, with the plants present having limited capacity to respond. In the Natural England study (Ref 9.52), with background deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Thorne Moor SAC), adding a further 1 kg N/ha/yr was shown to decrease species richness by 0.9%. Graminoid (grass) cover was found to increase by 1.5%. The maximum species richness recorded across the studies examined in Caporn et al. (2016) was 32.

6.3.49. Taking a species richness from the above of 32, an impact equivalent to 3.3 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted in-combination impact of the Proposed Scheme with other plans and projects is 0.13 kgN/ha/yr, equivalent to approximately 3.9% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls within the bounds of natural variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case in-combination impact of acid deposition is marginally above 1% (2.1%), with the contribution from the Proposed Scheme decreasing with increasing distance from stacks. Again, no perceptible vegetative changes of SAC habitats are predicted to arise from this level of deposition, in the context of the baseline deposition levels. There is also evidence from a study completed by the Centre for Ecology and Hydrology (Ref 9.57) that suggests levels of acid deposition across Thorne Moor are reducing, with evidence of a downward trend between 2012 and 2014.

6.3.50. The contribution of the Proposed Scheme, whether assessed alone or in combination with other industrial processes, is largely insignificant and a relatively small proportion of the total deposition. The risk of exceedance of critical loads and the level of exceedance of the critical loads is a function of the rates of background deposition rather than the result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of critical loads and levels for the European Sites within 15km of the Proposed Scheme.

6.3.51. Taking into account the conservatism built into the air quality assessment including:

- Continuous full load operation for the year.
- 70% conversion of NOx to NO_2.

- Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum and the presence of particular habitats.
- Assessment against the lower threshold of recommended critical loads.
- Assessment of maximum impacts across 5 modelled years.
- Emissions continually at the limit set in the IED / Bref Conclusions and or recommended emissions ceiling.

6.3.52. The constituent SSSI Units of the Thorne Moor SAC within 15 km of the Site, were assessed as being in 'favourable', 'unfavourable recovering', 'unfavourable no change' and 'unfavourable declining' condition when last assessed. A copy of the last SSSI unit condition assessment is provided in Appendix 3. 3.85% of the Thorne Crowle and Goole Moors SSSI was reported as being in 'favourable' condition, with 91.97% recorded as being in 'unfavourable – recovering' condition. 2.94% was assessed as 'unfavourable no change' with 1.24% 'unfavourable declining'. The majority of the SAC is considered to be in 'unfavourable – recovering' condition by NE. NE identify initiatives to control scrub and manage water balance as the main factors leading to improvements. This suggests the condition of these areas in relation to their target condition is being achieved or improving despite current inputs of nutrient nitrogen from diffuse agricultural and other sources. The predicted worst-case inputs from the Proposed Scheme are unlikely to alter that situation.

6.3.53. Data on APIS (Ref 9.58) indicates that approximately 10.3% of nitrogen deposition onto Thorne Moor SAC arises from road transport. Future reductions in emissions from the UK vehicle fleet would therefore reduce and eventually eliminate these inputs. For comparison, the source attribution data on APIS identifies the Existing Drax Power Station Complex as contributing approximately 1.9% of total nitrogen deposition.

6.3.54. Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme, in combination with other plans and projects.

Thorne and Hatfield Moor SPA

6.3.55. The maximum predicted cumulative impact of the Proposed Scheme would be 1.3% of the critical level for NH_3, with the Proposed Scheme contributing up to 0.5% of this. The contribution from the Proposed Scheme to cumulative NH_3 also decreases with increasing distance from the stacks. Given the cumulative exceedance is only marginally above 1% of critical level at the point of greatest predicted impact, no perceptible effects on SAC vegetation are predicted to arise. As such, the suitability of the habitats present to support nightjar is not expected to be subject to perceptible change. There would be a cumulative impact of up to 2.7% of critical load for nitrogen deposition and up to 2.1% for acidification, with the Proposed Scheme contributing 0.8% and 0.6% respectively. The cumulative impacts on nitrogen and acid deposition therefore exceed 1% of critical load (see Tables 6.10 and 6.11).

6.3.56. To support the assessment of the implications of this deposition, published research into the effects of nitrogen deposition on heathland and bog habitats was reviewed. Although not a qualifying interest of the Thorne Moor SAC, lowland heathland habitats are present at the SAC/SPA (see Appendix 3) and will form part of the habitat mosaic by the qualifying interest of the SPA (nightjar). This included a review of existing scientific knowledge covering several studies (Ref 9.52) and a study of how ecosystem functions could be used as indicators for

heathland response to nitrogen deposition (Ref 9.55). These studies suggest that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because nitrogen is already in excess, with the plants present having limited capacity to respond. In the Natural England study (Ref 9.52), with background deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Thorne Moor SAC), adding a further 1 kg N/ha/yr was shown to decrease species richness by around 0.9%. Graminoid (grass) cover was found to increase by 1.5%. The maximum species richness recorded across the studies examined in Caporn et al., (Ref 9.52) was 32.

6.3.57. Taking a species richness from the above of 32, an impact equivalent to 3.3 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted cumulative impact of the Proposed Scheme with other plans and projects is 0.13kgN/ha/yr, equivalent to approximately 3.9% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls within the bounds of natural variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case cumulative impact of acid deposition is marginally above 1% (2.1%), with the contribution from the Proposed Scheme decreasing with increasing distance from stacks. Again, no perceptible vegetative changes to SAC habitats are predicted to arise from this level of deposition. There is also evidence from a study completed by the Centre for Ecology and Hydrology (Ref 9.57) that suggests levels of acid deposition across Thorne Moor are reducing, with evidence of a downward trend between 2012 and 2014.

6.3.58. The contribution of the Proposed Scheme, whether assessed alone or in combination with other industrial processes, is largely insignificant and a relatively small proportion of the total deposition. The risk of exceedance of critical loads and the level of exceedance of the critical loads is a function of the rates of background deposition rather than the result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of critical loads and levels for the European Sites within 15km of the Proposed Scheme.

6.3.59. Taking into account the conservatism built into the air quality assessment including:

- Continuous full load operation for the year.
- 70% conversion of NOx to NO2.
- Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum and the presence of particular habitats.
- Assessment against the lower threshold of recommended critical loads.
- Assessment of maximum impacts across 5 modelled years.
- Emissions continually at the limit set in the IED / Bref Conclusions and or recommended emissions ceiling.

6.3.60. The constituent SSSI Units of the Thorne Moor SAC within 15 km of the Project Site, were assessed as being in ‘favourable’, ‘unfavourable recovering’, ‘unfavourable no change’ and ‘unfavourable declining’ condition when last assessed. A copy of the last SSSI unit condition assessment is provided in the screening matrices (see Appendix 3). 3.85% of the Thorne, Crowle and Goole Moor SSSI was reported as being in ‘favourable’ condition, with 91.97%

recorded as being in 'unfavourable – recovering' condition. 2.94% was assessed as 'unfavourable no change' with 1.24% 'unfavourable declining'. The majority of the SAC is considered to be in 'unfavourable – recovering' condition by NE. NE identify initiatives to control scrub and manage water balance as the main factors leading to improvements in habitat condition (see Appendix 3). This suggests the condition of these areas in relation to their target condition is being achieved or improving despite current inputs of nutrient nitrogen from diffuse agricultural and other sources. The predicted worst-case inputs from the Proposed Scheme are unlikely to alter that situation.

6.3.61. Data on APIS (Ref 9.58) indicates that approximately 10% of nitrogen deposition onto Thorne Moor SPA arises from road transport. Future reductions in emissions from the UK vehicle fleet would therefore reduce and eventually eliminate these inputs. For comparison, the source attribution data on APIS identifies the Existing Drax Power Station Complex as contributing approximately 1.7% of total nitrogen deposition.

6.3.62. Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme, either alone or in combination with other plans and projects.

Humber Estuary SAC, SPA and Ramsar site

6.3.63. Humber Estuary habitats occurring within 15 km of the Proposed Scheme are not considered to be sensitive to acidification; no in-combination assessment for this pollutant is therefore required for this European Site. There would also be no in-combination exceedances of critical levels for NOx or NH_3 (see Tables 6.7, 6.8 and 6.9 of this report).

6.3.64. The maximum predicted cumulative deposition impact of the Proposed Scheme would be 0.9% for nitrogen deposition; i.e. under 1% of the critical load (see Table 6.10 of this report).

6.3.65. Given that the cumulative impacts of the Proposed Scheme would be less than 1% of critical load or critical level for all relevant air quality standards, no adverse effects on the integrity of the Humber Estuary European sites are predicted to arise.

6.4 Summary

6.4.1. In the context of the known qualifying feature vulnerabilities, it is possible to conclude that there will be no adverse effects (alone or in-combination) on the integrity of the River Derwent SAC, the Lower Derwent Valley SAC, SPA and Ramsar, Skipwith Common SAC, Thorne Moor SAC, Thorne and Hatfield Moor SPA and Humber Estuary SAC, SPA and Ramsar site as a result of air quality changes arising from operation of the Proposed Scheme.

7 CONCLUSION

7.1.1. In accordance with the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations), an appropriate assessment (referred to in this document as an HRA) of the Drax Repower Project, hereafter referred to as the 'Proposed Scheme' has been undertaken.

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

- Lower Derwent Valley SAC.
- Lower Derwent Valley SPA.
- Lower Derwent Valley Ramsar.
- River Derwent SAC.
- Humber Estuary SAC.
- Humber Estuary SPA.
- Humber Estuary Ramsar site.
- Skipwith Common SAC.
- Thorne and Hatfield Moors SPA.
- Thorne Moor SAC.

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

7.1.4. Having identified European sites within the ZoI and assessed their interest features and Conservation Objectives, the Stage 1 screening (undertaken based on an assessment of the unmitigated Proposed Scheme) discounted a number of potential impacts (for example, direct impacts on European sites and indirect impacts through hydrological changes). The Stage 1 screening also identified a range of impacts that could arise from the Proposed Scheme, as follows:

- Disturbance to qualifying features in functionally-linked habitat (light/noise/vibration/visual).
- Hydrological changes to functionally-linked habitat (quality/flow).
- Air quality changes.

7.1.5. These effects were assessed further through the Stage 2 assessment for potential adverse effects on integrity which considered: European Site data; available environmental condition data; and the potential effects of the Proposed Scheme on its own and in-combination with other plans and projects, taking mitigation proposed for the Proposed Scheme into account.

7.1.6. It was concluded that the Proposed Scheme would not have an adverse effect on the integrity of any of the European Sites assessed.

The Drax Power (Generating Stations) Order

Land at, and in the vicinity of, Drax Power Station, near Selby, North Yorkshire

Habitat Regulations Assessment Report
Appendix 1 – Screening Matrices

The Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(g)

Drax Power Limited

Drax Repower Project

Applicant:	DRAX POWER LIMITED
Date:	May 2018
Document Ref:	6.6
PINS Ref:	EN010091

APPENDIX 1 POTENTIAL EFFECTS

Potential effects upon the European site(s)[1] which are considered within the submitted HRA Report are provided in the table below.

Effects considered within the screening matrices are set out below on a site by site basis.

[1] As defined in Advice Note 10.

Designation	Effects described in submission information	Presented in screening matrices as
River Derwent SAC	• Habitat degradation from water-borne pollution and contamination incidents • Release of silts and sediments • Increase in ambient NOx and NH_3 levels and eutrophication during operation	• Habitat degradation
	• Displacement from functionally-linked habitat due to increase in noise vibration, lighting and visual disturbance	• Species displacement
	• Risk of incidental mortality of species	• Direct mortality
Lower Derwent Valley RAMSAR	• Degradation from water-borne pollution and contamination incidents • Release of silts and sediments • Increase in ambient NOx and NH_3 levels and eutrophication during operation	• Habitat degradation
	• Displacement from functionally-linked habitat due to increase in noise vibration, lighting and visual disturbance	• Species displacement
	• Risk of incidental mortality of species	• Direct mortality
Lower Derwent Valley SAC	• Degradation from water-borne pollution and contamination incidents • Release of silts and sediments • Increase in ambient NOx and NH_3 levels and eutrophication during operation	• Habitat degradation
	• Displacement from functionally-linked habitat due to increase in noise vibration, lighting and visual disturbance	• Species displacement
	• Risk of incidental mortality of species	• Direct mortality
Lower Derwent Valley SPA	• Degradation from water-borne pollution and contamination incidents	• Habitat degradation

Designation	Effects described in submission information	Presented in screening matrices as
	• Release of silts and sediments (from plant movement) • Increase in ambient NOx and NH_3 levels and eutrophication during operation	
	• Displacement from functionally-linked habitat due to increase in noise • vibration, lighting and visual disturbance	• Species displacement
	• Incidental mortality of species	• Direct mortality
Humber Estuary SAC	• Degradation from water-borne pollution and contamination incidents • Release of silts and sediments • Increase in ambient NOx and NH_3 levels and eutrophication during operation	• Habitat degradation
	• Displacement from functionally-linked habitat due to increase in noise vibration, lighting and visual disturbance	• Species displacement
	• Incidental mortality of species	• Direct mortality
Humber Estuary SPA	• Degradation from water-borne pollution and contamination incidents • Release of silts and sediments • Increase in ambient NOx and NH_3 levels and eutrophication during operation	• Habitat degradation
	• Displacement from functionally-linked habitat due to increase in noise vibration, lighting and visual disturbance	• Species displacement
	• Incidental mortality of species	• Direct mortality
Humber Estuary Ramsar Site	• Degradation from water-borne pollution	• Habitat degradation

Designation	Effects described in submission information	Presented in screening matrices as
	and contamination incidents • Release of silts and sediments • Increase in ambient NOx and NH_3 levels and eutrophication during operation	
	• Displacement from functionally-linked habitat due to increase in noise • vibration, lighting and visual disturbance	• Species displacement
	• Incidental mortality of species	• Direct mortality
Skipwith Common SAC	• Degradation from water-borne pollution and contamination incidents • Release of silts and sediments (from plant movement) • Increase in ambient NOx and NH3 levels and eutrophication during operation	• Habitat degradation
Thorne & Hatfield Moors SPA	• Degradation from pollution and contamination incidents • Release of silts and sediments (from plant movement) • Increase in ambient NOx and NH_3 levels and eutrophication during operation	• Habitat degradation
	• Displacement from functionally-linked habitat due to increase in noise vibration, lighting and visual disturbance	• Species displacement
	• Incidental mortality of species	• Direct mortality
Thorne Moor SAC	• Degradation from water-borne pollution and contamination incidents • Release of silts and sediments • Increase in ambient NOx and NH_3 levels and eutrophication during operation	• Habitat degradation

STAGE 1: SCREENING MATRICES

The European sites included within the screening assessment are:

River Derwent SAC;

Lower Derwent Valley RAMSAR;

Lower Derwent Valley SAC;

Lower Derwent Valley SPA;

Humber Estuary SAC;

Humber Estuary SPA;

Humber Estuary Ramsar;

Skipwith Common SAC;

Thorne & Hatfield Moors SPA; and

Thorne Moor SAC.

Matrix Key:

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

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

C = construction

O = operation

D = decommissioning

HRA Screening Matrix 1: River Derwent SAC

Name of European site and designation: River Derwent SAC												
EU Code: UK0030253												
Distance to NSIP: 0.8km to the Power Station Site, 1.1km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	✓ (a)	✓ (b)	✓ (a)							✗ (g)	✓ (h)	✗ (g)
1099 River lamprey *Lampetra fluviatilis*	✓ **(a)**	✓ (b)	✓ (a)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (d)	✗ (c)	✗ (g)	✓ (h)	✗ (g)
1095 Sea lamprey *Petromyzon marinus*	✓ **(a)**	✓ (b)	✓ (a)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (d)	✗ (c)	✗ (g)	✓ (h)	✗ (g)
1163 Bullhead *Cottus gobio*	✓ **(a)**	✓ (b)	✓ (a)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (d)	✗ (c)	✗ (g)	✓ (h)	✗ (g)
1355 Otter *Lutra*	✓ (a)	✓ (b)	✓ (a)	✓ (e)	✗ (f)	✓ (e)	✓ (e)	✗ (f)	✓ (e)	✓ (g)	✓ (h)	✓ (g)

Evidence supporting conclusions:

(a) The SAC is located approximately 0.8 km from the Proposed Scheme footprint, with the River Derwent upstream of the Proposed Scheme, and no suitable habitat for any of the qualifying interests except otter recorded within 50 m of the Site. During construction and decommissioning of the Proposed Scheme activities such as vegetation clearance, demolition of structures and earthworks could result in the incidental release of silt, fuels and other chemicals. Any contaminants released could potentially be transported into the River Ouse via surface water connections. The River Derwent is directly upstream of the River Ouse. As such, changes in water quality within the Ouse could potentially be transported upstream to the River Derwent. Otters and qualifying interest fish species forming part of the River Derwent SAC populations are also likely to make use of habitats within the River Ouse (and for otter, also connecting waterbodies). These could therefore be affected if the condition of habitats within the River Ouse or River Derwent were affected. It is therefore considered that there is the potential for Likely Significant Effects (LSE) in relation to water quality and this issue will be taken forwards for Appropriate Assessment.

(b) Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the River Derwent SAC. Air quality impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH_3. The Air Pollution Information System (APIS) is the main reference point for critical loads for habitats and designated sites in the UK. No critical loads for nitrogen deposition or acidification are identified on APIS for the River Derwent SAC. APIS identifies that no critical loads are set for river habitats, as these need considering on a site-specific basis. APIS states that '*No Critical Load has been assigned to the EUNIS classes for meso/eutrophic systems. These systems are often P limited (or N/P co-limiting), therefore decisions should be taken at a site specific level…'* (Ref. 9.53). Given the uncertainty regarding the potential effects of air quality impacts on the SAC in the absence of mitigation measures, there is considered to be potential for LSE. As such, operational air quality impacts will be taken forward for Stage 2 Appropriate Assessment.

(c) No suitable habitat for SAC fish species has been recorded within 50 m of the Proposed Scheme. The closest suitable watercourse for SAC fish species is the River Ouse, which is located approximately 85 m north of the Pipeline Area (see paragraph 9.5.56 of the ES Biodiversity Chapter). Given the absence of suitable habitat within or adjacent to the footprint of the Proposed Scheme, no displacement or mortality of SAC fish species is predicted to arise. As such, no LSE are predicted to arise in relation to displacement of SAC fish species.

(d) The existing water cooling system used within the Existing Drax Power Station Complex will continue to be used for the Proposed Scheme, with the same intake and outflow volumes and temperature of water returning to the River Ouse. As there will be no change in the cooling water infrastructure and therefore any associated risk of fish entrainment, no LSE are predicted to arise (see Paragraph 3.2.17 of Chapter 3 of the ES).

(e) Installation and decommissioning of the Gas Pipeline and Above Ground Installation (AGI) I with associated increases in noise, lighting, and human activity may lead to temporary disturbance of occasionally used otter commuting and foraging routes (see paragraph 9.6.74 of the ES Biodiversity Chapter). This would occur for up to a few months at a time (per watercourse) and as such, may temporarily limit the ability of the local otter population to commute and forage across the local landscape. There would also be a low risk of incidental mortality of otters, for example if excavations are left uncovered overnight. There is therefore the potential for LSE to arise, and this issue will be taken forward for Stage 2 Appropriate Assessment.

(f) During the fully operational phase (Stage 3), there will be no physical impacts on any areas of suitable or confirmed otter habitat (see paragraph 9.6.88 of the ES Biodiversity Chapter). Occasional maintenance visits could be required to the AGI where the Proposed Scheme connects to the natural gas National Transmission System. The AGI will be located to the north (a minimum of 5 m) from the Dickon Field Drain, a watercourse that could potentially be used by otters. Any maintenance visits would be infrequent, and in the case of planned maintenance would take place primarily during daylight hours, when otter activity would be relatively limited. There could however be a need for visits outside normal working hours for unplanned maintenance, requiring access by personnel and use of artificial lighting during the night. Any such visits would be infrequent, with any disturbance limited to the section of the Dickon Drain adjacent to the AGI. Given that no evidence of otters has been recorded within the Dickon Field Drain and that visits would be infrequent, no Likely Significant Effects are predicted to arise (see paragraph 9.6.89 of the ES Biodiversity Chapter).

(g) The potential for the effects of other Plans and Projects to combine with those of the Proposed Scheme has been considered in the Cumulative effects chapter of the ES (Chapter 17). No significant cumulative effects with other Plans and Projects have been identified during the construction and decommissioning phases of the Proposed Scheme (see the Biodiversity sections of Appendix 17.1 and 17.2 of Chapter 17 of the ES). As such no in-combination LSE are predicted to arise during the construction and decommissioning phases of the Proposed Scheme.

(h) Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the River Derwent SAC as a result of the Proposed Scheme alone (see (b) above). There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased in-combination effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE, there is also the potential for in-combination air quality effects to lead to LSE. This issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

HRA Screening Matrix 2: Lower Derwent Valley SAC

Name of European site and designation: Lower Derwent Valley SAC												
EU Code: UK0012844												
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
6510 Lowland hay meadows *Alopecurus pratensis*, *Sanguisorba officinalis*	✗ (a)	✓ (b)	✗ (a)							✗ (e)	✓ (f)	✗ (e)
91E0 Alluvial forests with Alder *Alnus glutinosa* and Ash *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	✗ (a)	✓ (b)	✗ (a)							✗ (e)	✓ (f)	✗ (e)
1355 Otter *Lutra*	✓ (a)	✓ (b)	✓ (a)	✓ (c)	✗ (d)	✓ (c)	✓ (c)	✗ (d)	✓ (c)	✗ (e)	✓ (f)	✗ (e)

Evidence supporting conclusions:

A. The SAC is located outside of the Proposed Scheme footprint (in excess of 5 km from the Proposed Scheme). At this distance construction phase air quality impacts would have no perceptible effect (see Appendix 6.2 of the ES Air Quality chapter). The SAC is also upstream of the River Ouse, and

beyond the tidal range, meaning there is no pathway by which water-borne pollutants could be transported far enough upstream to impact SAC habitats. As such, no LSE are predicted to arise.

B. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Lower Derwent Valley SAC. Air quality impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH_3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forwards for Appropriate Assessment.

C. Installation and decommissioning of the Gas Pipeline and Above Ground Installation (AGI) with associated increases in noise, lighting, and human activity may lead to temporary disturbance of occasionally used otter commuting and foraging routes (see paragraph 9.6.74 of the ES Biodiversity Chapter). This would occur for up to a few months at a time (per watercourse) and as such, may temporarily limit the ability of the local otter population to commute and forage across the local landscape. There would also be a low risk of incidental mortality of otters, for example if excavations are left uncovered overnight. There is therefore the potential for LSE to arise, and this issue will be taken forward for Stage 2 Appropriate Assessment.

D. During the fully operational phase (Stage 3), there will be no physical impacts on any areas of suitable or confirmed otter habitat (see paragraph 9.6.88 of the ES Biodiversity Chapter). Occasional maintenance visits could be required to the AGI where the Proposed Scheme connects to the natural gas National Transmission System. The AGI will be located to the north (a minimum of 5 m) from the Dickon Field Drain, a watercourse that could potentially be used by otters associated with the Lower Derwent Valley SAC population. Any such visits would be infrequent, and in the case of planned maintenance would take place primarily during daylight hours, when otter activity would be relatively limited. There could however be a need for visits outside normal working hours for unplanned maintenance, requiring access by personnel and use of artificial lighting during the night. Any such visits would be infrequent, with any disturbance limited to the section of the Dickon Drain adjacent to the AGI. Given that no evidence of otters has been recorded within the Dickon Field Drain and that visits would be infrequent, no Likely Significant Effects are predicted to arise (see paragraph 9.6.89 of the ES Biodiversity Chapter).

E. The potential for the effects of other Plans and Projects to combine with those of the Proposed Scheme has been considered in the Cumulative effects chapter of the ES (Chapter 17). No significant cumulative effects with other Plans and Projects have been identified during the construction

and decommissioning phases of the Proposed Scheme (see the Biodiversity sections of Appendix 17.1 and 17.2 of Chapter 17 of the ES). As such no in-combination LSE are predicted to arise during the construction and decommissioning phases of the Proposed Scheme.

F. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Lower Derwent Valley SAC as a result of the Proposed Scheme alone (see (b) above). There is also the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative impacts and in-combination effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE (and there is also the potential for in-combination air quality effects to lead to LSE), this issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

HRA Screening Matrix 3 Lower Derwent Valley RAMSAR

Name of European site and designation: Lower Derwent Valley RAMSAR												
EU Code: UK11037												
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
The river and flood meadows play a substantial role in the hydrological and ecological functioning of the Humber Basin)	× (a)	✓ (b)	× (a)							× (d)	✓ (e)	× (d)
Rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates as well as a leafhopper, *Cicadula ornate* for which Lower Derwent Valley is the only known site in Great Britain.	× (a)	✓ (b)	× (a)							× (d)	✓ (e)	× (d)

Staging post for passage birds in spring. Of particular note are the nationally important numbers of Ruff, *Philomachus pugnax* and Whimbrel, *Numenius phaeopus*.	✗ (a)	✓ (b)	✗ (a)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (d)	✓ (e)	✗ (d)
Regularly supports 20,000 or more waterbirds	✗ (a)	✓ (b)	✗ (a)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (d)	✓ (e)	✗ (d)
Regularly supports 1% of the individuals in a population of the following species or subspecies of waterbird: Eurasian wigeon , *Anas Penelope* and Eurasian teal , *Anas crecca*	✗ (a)	✓ (b)	✗ (a)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (c)	✗ (d)	✓ (e)	✗ (d)

Evidence supporting conclusions:

A. The Ramsar site is located outside of the Proposed Scheme footprint (in excess of 5 km from the Proposed Scheme). At this distance construction phase air quality impacts would have no perceptible effect (see Appendix 6.2 of the ES Air Quality chapter). The Ramsar site is also upstream of the River Ouse and beyond the tidal range, meaning there is no pathway by which water-borne pollutants could be transported far enough upstream to impact Ramsar site habitats. The hydrological and ecological functioning of the Ramsar site would not therefore be affected and no LSE are predicted to arise.

B. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Lower Derwent Valley Ramsar site. Air quality impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH_3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forwards for Appropriate Assessment.

C. Monthly wintering bird surveys were carried out between November 2017 and March 2018 (see paragraph 9.4.18 of the ES Biodiversity chapter). Breeding bird surveys are ongoing, with visits completed in March and April to date. None of the bird species identified on the citation for the Lower Derwent Valley Ramsar site were recorded during these surveys. This suggests that the Proposed Scheme and adjacent habitats does not include areas of important functionally-linked habitat, which support Ramsar site birds when they are outside the Ramsar site. As such, there is considered to be a negligible risk of disturbance or incidental mortality of Ramsar site birds during any stage of the Proposed Scheme and no LSE are predicted to arise.

D. The potential for the effects of other Plans and Projects to combine with those of the Proposed Scheme has been considered in the Cumulative effects chapter of the ES (Chapter 17). No significant cumulative effects with other Plans and Projects have been identified during the construction and decommissioning phases of the Proposed Scheme (see the Biodiversity sections of Appendix 17.1 and 17.2 of Chapter 17 of the ES). In addition, no effects on Ramsar site bird species are predicted to result from construction and decommissioning of the Proposed Scheme. As such no in-combination LSE would occur during the construction and decommissioning phases of the Proposed Scheme.

E. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the River Derwent SAC as a result of the Proposed Scheme alone (see (b) above). There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE, (and there is also the potential for in-combination air quality effects to lead to LSE), this issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

HRA Screening Matrix 4 Lower Derwent Valley SPA

Name of European site and designation: Lower Derwent Valley SPA												
EU Code: UK9006092												
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Supporting populations of the following Annex I species; Breeding Season: Corncrake Crex, Spotted Crake *Porzana;* Over winter: Bewick's Swan Cygnus *columbianus bewickii,* Bittern *Botaurus stellaris,* Golden Plover *Pluvialis apricaria,* Ruff *Philomachus pugnax*	× (a)	✓ (b)	× (a)	× (c)	× (c)	× (c)	× (c)	× (c)	× (c)	× (d)	✓ (e)	× (d)
Supporting populations of following migratory species; Over winter: Teal *Anas crecca*	× (a)	✓ (b)	× (a)	× (c)	× (c)	× (c)	× (c)	× (c)	× (c)	× (d)	✓ (e)	× (d)

Evidence supporting conclusions:

Drax Repowering: Habitats Regulations Assessment Report
Appendix 1 Screening Matrices

A. The designated feature is outside of the Proposed Scheme footprint with the SPA in excess of 5 km from the Proposed Scheme. At this distance construction phase air quality impacts would have no perceptible effect (see Appendix 6.2 of the ES Air Quality chapter). The SPA is also upstream of the River Ouse and beyond the tidal range, meaning there is no pathway by which water-borne pollutants could be transported far enough upstream to impact SPA habitats. There would therefore be no resultant degradation of habitats supporting SPA bird species and no LSE are predicted to arise.

B. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Lower Derwent Valley SPA. Air quality impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH_3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forwards for Appropriate Assessment.

C. Monthly wintering bird surveys were carried out between November 2017 and March 2018 (see paragraph 9.4.18 of the ES Biodiversity chapter). Breeding bird surveys are ongoing, with visits completed in March and April so far. None of the bird species identified on the citation for the Lower Derwent Valley SPA were recorded during these surveys. This suggests that the Proposed Scheme and adjacent habitats do not provide important functionally-linked habitat, which support SPA birds when they are outside the boundary of the designated site. As such, there is considered to be a negligible risk of disturbance or incidental mortality of SPA birds during any stage of the Proposed Scheme, and no LSE are predicted to arise.

D. The potential for the effects of other Plans and Projects to combine with those of the Proposed Scheme has been considered in the Cumulative effects chapter of the ES (Chapter 17). No significant cumulative effects with other Plans and Projects have been identified during the construction and decommissioning phases of the Proposed Scheme (see the Biodiversity sections of Appendix 17.1 and 17.2 of Chapter 17 of the ES). In addition, no effects on SPA bird species are predicted to result from construction and decommissioning of the Proposed Scheme. As such no in-combination LSE would occur during the construction and decommissioning phases of the Proposed Scheme.

E. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Lower Derwent Valley SPA as a result of the Proposed Scheme alone (see (b) above). There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. The air quality assessment has identified cumulative process contributions that would exceed 1% of the

critical load for nitrogen deposition (see Table 6.26 in the ES Air Quality chapter) and 1% of the critical level for annual mean ammonia concentrations (see Table 6.24 of the ES Air Quality chapter). This issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

HRA Screening Matrix 5: Humber Estuary SPA

Name of European site and designation: Humber Estuary SPA												
EU Code: UK9006111												
Distance to NSIP: 6.5 km to the Power Station Site, 6.0 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Used regularly by 1% or more of the Great Britain populations of the following Annex I species: Avocet *Recurvirostra avosetta* (breeding and wintering), Bittern *Botaurus stellaris*, Hen harrier *Circus cyaneus,* Golden plover *Pluvialis apricaria*, Bar-tailed godwit *Limosa lapponica*, Ruff *Philomachus pugnax*, Bittern *Botaurus stellaris*, Marsh harrier *Circus aeruginosus*, Little tern *Sterna albifrons*	× (a)	✓ (b)	× (a)	× (c)	× (c)	× (c)	× (c)	× (c)	× (c)	× (d)	✓ (e)	× (d)

Used regularly by 1% or more of the biogeographical populations of the following migratory species: Shelduck *Tadorna,* Knot *Calidris canutus,* Dunlin *Calidris alpine* (passage and wintering), Black-tailed godwit *Limosa,* Redshank *Tringa tetanus* (passage and wintering), Black-tailed godwit *Limosa.*	× (a)	✓ (b)	× (a)	× (c)	× (c)	× (c)	× (c)	× (c)	× (c)	× (d)	✓ (e)	× (d)

Evidence supporting conclusions:

A. The designated feature is outside of the Proposed Scheme footprint with the SPA in excess of 6 km from the Proposed Scheme. At this distance construction phase air quality impacts would have no perceptible effect (see Appendix 6.2 of the ES Air Quality chapter). The SPA is also sufficiently far downstream such that no perceptible effects on water quality are predicted to arise during any stage of the Proposed Scheme (see paragraph 12.6.82 of Chapter 12 of the ES). There would therefore be no resultant degradation of designated habitats supporting SPA bird species and no LSE are predicted to arise.

B. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Humber Estuary SPA. Air quality impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH_3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forwards for Appropriate Assessment.

C. Monthly wintering bird surveys were carried out between November 2017 and March 2018 (see paragraph 9.4.18 of the ES Biodiversity chapter). Breeding bird surveys are ongoing, with visits completed in March and April 2018. None of the bird species identified on the citation for the Humber Estuary SPA were recorded during these surveys. This suggests that the Proposed Scheme and adjacent habitats does not include areas of important functionally-linked habitat, which support SPA birds when they are outside the SPA. As such, there is considered to be a negligible risk of disturbance or incidental mortality of SPA birds during any stage of the Proposed Scheme, and no LSE are predicted to arise.

D. The potential for the effects of other Plans and Projects to combine with those of the Proposed Scheme has been considered in the Cumulative effects chapter of the ES (Chapter 17). No significant cumulative effects with other Plans and Projects have been identified during the construction and decommissioning phases of the Proposed Scheme (see the Biodiversity sections of Appendix 17.1 and 17.2 of Chapter 17 of the ES). In addition, no effects on SPA bird species are predicted to result from construction and decommissioning of the Proposed Scheme. As such no in-combination LSE would occur during the construction and decommissioning phases of the Proposed Scheme.

E. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Humber Estuary SPA as a result of the Proposed Scheme alone (see (b) above). There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative impacts. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE (and there is also the potential for in-combination air quality effects to lead to LSE), this issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

HRA Screening Matrix 6: Humber Estuary Ramsar Site

Name of European site and designation: Humber Estuary Ramsar Site												
EU Code: UK11031												
Distance to NSIP: 6.5 km to the Power Station Site, 6.0 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
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.	× (a)	✓ (b)	× (a)	× (c)	× (c)	× (c)	× (c)	× (c)	× (c)	× (d)	✓ (e)	× (d)
Ramsar criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook.	× (a)	✓ (b)	× (a)	× (c)	× (c)	× (c)	× (c)	× (c)	× (c)	× (d)	✓ (e)	× (d)

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.*												
Ramsar criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season	× (a)	✓ (b)	× (a)	× (c)	× (c)	× (c)	× (c)	× (c)	× (c)	× (d)	✓ (e)	× (d)
Ramsar criterion 6 – species/populations occurring at levels of international importance: Eurasian golden plover, *Pluvialis apricaria* Altifrons; Red knot, *Calidris canutus*; Dunlin, *Calidris alpina* Alpine; Black-tailed godwit, *Limosa* Islandica; Common redshank, *Tringa*	× (a)	✓ (b)	× (a)	× (c)	× (c)	× (c)	× (c)	× (c)	× (c)	× (d)	✓ (e)	× (d)

totanus Brittanica; Common shelduck, *Tadorna*; Bar-tailed godwit , *Limosa lapponica Lapponica*;												
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.	✓ (f)	✓ (b)	✓ (f)	× (h)	× (h)	× (h)	× (h)	× (g)	× (h)	× (d)	✓ (e)	× (d)

Evidence supporting conclusions:

A. The designated feature is outside of the Proposed Scheme footprint with the Ramsar site in excess of 6 km from the Proposed Scheme. At this distance construction phase air quality impacts would have no perceptible effect (see Appendix 6.2 of the ES Air Quality chapter). The Ramsar site is also sufficiently far downstream such that no perceptible effects on water quality are predicted to arise during any stage of the Proposed Scheme (see paragraph 12.6.82 of Chapter 12 of the ES). There would therefore be no resultant degradation of designated habitats supporting Ramsar site species and no LSE are predicted to arise.

B. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Humber Estuary Ramsar site. Air quality impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH_3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forwards for Appropriate Assessment.

C. Monthly wintering bird surveys were carried out between November 2017 and March 2018 (see paragraph 9.4.18 of the ES Biodiversity chapter). Breeding bird surveys are ongoing, with visits completed in March and April 2018. None of the bird species identified on the citation for the Humber Estuary Ramsar site were recorded during these surveys. This suggests that the Proposed Scheme and adjacent habitats does not include areas of important functional habitat, which support Ramsar site birds when they are outside the Ramsar site. Habitats within the study area for the Proposed Scheme do not provide suitable conditions for natterjack toad or grey seal, both of which are associated with coastal habitats. As such, there is considered to be a negligible risk of disturbance or incidental mortality of Ramsar site species during any stage of the Proposed Scheme, and no LSE are predicted to arise.

D. The potential for the effects of other Plans and Projects to combine with those of the Proposed Scheme has been considered in the Cumulative effects chapter of the ES (Chapter 17). No significant cumulative effects with other Plans and Projects have been identified during the construction and decommissioning phases of the Proposed Scheme (see the Biodiversity sections of Appendix 17.1 and 17.2 of Chapter 17 of the ES). As such no in-combination LSE would occur during the construction and decommissioning phases of the Proposed Scheme.

E. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Humber Estuary Ramsar site as a result of the Proposed Scheme alone (see (b) above). There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE (and there is also the potential for in-combination air quality effects to lead to LSE), this issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

F. The Ramsar Site is located approximately 6km from the Proposed Scheme. The Ramsar Site is downstream of and hydrologically connected to the Proposed Scheme via the River Ouse, which flows into the Humber Estuary. Due to the intervening distance and associated dilution of any pollution or contamination accidentally released, the Proposed Scheme would not cause any perceptible water quality impacts within the Ramsar Site (see paragraph 12.6.82 of Chapter 12 of the ES). No suitable habitat for river or sea lamprey has been recorded within 50 m of the Site. During construction and decommissioning of the Proposed Scheme activities such as vegetation clearance, demolition of structures and earthworks could result in the incidental release of silt, fuels and other chemicals. Any contaminants released could potentially be transported into the River Ouse via surface water connections, with the River Ouse approximately 85 m from the Proposed Scheme at the closest point. The River Ouse is likely to be used by lamprey migrating between the Humber Estuary and upstream breeding sites. River and sea lamprey are also qualifying interests for The River Derwent SAC, upstream of the Proposed Scheme and also hydrologically connected to the River Ouse. As such, changes in water quality within the Ouse could potentially be transported downstream to the River Derwent. River and sea lamprey forming part of the Humber Estuary Ramsar

site populations could therefore be affected if the condition of habitats within the River Ouse or River Derwent was affected. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to water quality and this issue will be taken forwards for Appropriate Assessment.

G. The existing water cooling system used within the Existing Drax Power Station Complex will continue to be used for the Proposed Scheme, with the same intake and outflow volumes and temperature of water returning to the River Ouse. As there will be no change in the cooling water infrastructure and therefore any associated risk of fish entrainment, no LSE are predicted to arise (see Paragraph 3.2.17 of Chapter 3 of the ES).

H. No suitable habitat for Ramsar site fish species has been recorded within 50 m of the Proposed Scheme. The closest suitable watercourse for Ramsar fish species is the River Ouse, which is located approximately 85 m north of the Pipeline Area (see paragraph 9.5.56 of the ES Biodiversity Chapter). Given the absence of suitable habitat within or adjacent to the footprint of the Proposed Scheme, no displacement or mortality of Ramsar fish species is predicted to arise as a result of site clearance or construction activities. As such, no LSE are predicted to arise in relation to displacement or mortality of Ramsar fish species.

HRA Screening Matrix 7 Humber Estuary SAC

Name of European site and designation: Humber Estuary SPA												
EU Code: UK9006111												
Distance to NSIP: 6.5 km to the Power Station Site, 6.0 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
1130 Estuaries	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
1330 Atlantic salt meadows and a range of other sand dune types (H1110 Sandbanks which are slightly covered by sea water all the time; H1140 Mudflats and sandflats not covered by seawater at low tide; H1310 Salicornia and other annuals colonising mud and sand; and 1150 coastal	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)

lagoons)												
1140 Mudflats and sandflats not covered by seawater at low tide	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
1110 Sandbanks which are slightly covered by sea water all the time	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
1150 Coastal lagoons * Priority feature	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
1310 Salicornia and other annuals colonizing mud and sand	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
1330 Atlantic salt meadows *Glauco-Puccinellietalia maritimae*	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
2110 Embryonic shifting dunes	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
2120 "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)

2130 "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
2160 Dunes with *Hippopha rhamnoides*	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
1095 Sea lamprey *Petromyzon marinus*	✓ (e)	✓ (b)	✓ (e)	✗ (h)	✗ (h)	✗ (h)	✗ (h)	✗ (f)	✗ (h)	✗ (c)	✓ (d)	✗ (c)
1099 River lamprey *Lampetra fluviatilis*	✓ (e)	✓ (b)	✓ (e)	✗ (h)	✗ (h)	✗ (h)	✗ (h)	✗ (f)	✗ (h)	✗ (c)	✓ (d)	✗ (c)
1364 Grey seal *Halichoerus grypus*	✗ (a)	✓ (b)	✗ (a)	✗ (g)	✗ (g)	✗ (g)	✗ (g)	✗ (g)	✗ (g)	✗ (c)	✓ (d)	✗ (c)

Evidence supporting conclusions:

A. The designated feature is outside of the Proposed Scheme footprint with the SAC site in excess of 6 km from the Proposed Scheme. At this distance construction phase air quality impacts would have no perceptible effect (see Appendix 6.2 of the ES Air Quality chapter). The SAC is also sufficiently far downstream such that no perceptible effects on water quality are predicted to arise during any stage of the Proposed Scheme (see paragraph 12.6.82 of Chapter 12 of the ES). There would therefore be no resultant degradation of designated habitats supporting SAC species and no LSE are predicted to arise.

B. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Humber Estuary SAC. Air quality impacts on designated sites are usually assessed against ‘critical levels’ and ‘critical loads’. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a

designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forwards for Appropriate Assessment.

C. The potential for the effects of other Plans and Projects to combine with those of the Proposed Scheme has been considered in the Cumulative effects chapter of the ES (Chapter 17). No significant cumulative effects with other Plans and Projects have been identified during the construction and decommissioning phases of the Proposed Scheme (see the Biodiversity sections of Appendix 17.1 and 17.2 of Chapter 17 of the ES). As such no in-combination LSE would occur during the construction and decommissioning phases of the Proposed Scheme.

D. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on the Humber Estuary SAC as a result of the Proposed Scheme alone (see (b) above). There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE (and there is also the potential for in-combination air quality effects to lead to LSE), this issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

E. The SAC is located approximately 6km from the Proposed Scheme. The SAC is downstream of and hydrologically connected to the Proposed Scheme via the River Ouse, which flows into the Humber Estuary. Due to the intervening distance and associated dilution of any pollution or contamination accidentally released, the Proposed Scheme would not cause any perceptible water quality impacts within the SAC (see paragraph 12.6.82 of Chapter 12 of the ES). No suitable habitat for river or sea lamprey has been recorded within 50 m of the Site. During construction and decommissioning of the Proposed Scheme activities such as vegetation clearance, demolition of structures and earthworks could result in the incidental release of silt, fuels and other chemicals. Any contaminants released could however be transported into the River Ouse via surface water connections, with the River Ouse approximately 85 m from the Proposed Scheme at the closest point. The River Ouse is likely to be used by lamprey migrating between the Humber Estuary and upstream breeding sites. River and sea lamprey are also qualifying interests for The River Derwent SAC, upstream of the Proposed Scheme and also hydrologically connected to the River Ouse. As such, changes in water quality within the Ouse could potentially be transported upstream to the River Derwent. River and sea lamprey forming part of the Humber Estuary SAC populations could therefore be affected if the condition of habitats within the River Ouse or River Derwent was affected. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to water quality and this issue will be taken forwards for Appropriate Assessment.

F. The existing water cooling system used within the Existing Drax Power Station Complex will continue to be used for the Proposed Scheme, with the same intake and outflow volumes and temperature of water returning to the River Ouse. As there will be no change in the cooling water infrastructure and therefore any associated risk of fish entrainment, no LSE are predicted to arise (see Paragraph 3.2.17 of Chapter 3 of the ES).

G. Grey seal is a species associated primarily with coastal and marine habitats. Although subject to tidal influences, the River Ouse adjacent to the Proposed Scheme does not provide suitable habitat conditions for grey seal. The Proposed Scheme is located several kilometres upstream of the mouth of the estuary with the River Ouse in this location also observed to experience high velocity flows that would further discourage grey seals from travelling upstream from the estuary. As grey seals are highly unlikely to use habitats adjacent to the Proposed Scheme, no LSE are predicted to arise.

H. No suitable habitat for SAC fish species has been recorded within 50 m of the Proposed Scheme. The closest suitable watercourse for SAC fish species is the River Ouse, which is located approximately 85 m north of the Pipeline Area (see paragraph 9.5.56 of the ES Biodiversity Chapter). Given the absence of suitable habitat within or adjacent to the footprint of the Proposed Scheme, no displacement or mortality of SAC fish species is predicted to arise as a result of site clearance or construction activities. As such, no LSE are predicted to arise in relation to displacement or mortality of SAC fish species.

HRA Screening Matrix 8: Skipwith Common SAC

Name of European site and designation: Skipwith Common SAC												
EU Code: UK0030276												
Distance to NSIP: 8.5 km to the Power Station Site, 8.0 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
4010 Northern Atlantic wet heaths with *Erica tetralix*	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)
4030 European dry heaths	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)

Evidence supporting conclusions:

A. The SAC is located outside of the Proposed Scheme footprint (in excess of 8 km from the Proposed Scheme). At this distance construction phase air quality impacts would have no perceptible effect (see Appendix 6.2 of the ES Air Quality chapter). There are no surface water connections leading to the SAC from the catchment of the Proposed Scheme, or other impact pathways by which any construction and decommissioning phase impacts could affect the SAC. As such, no resultant LSE are predicted to arise.

B. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on Skipwith Common SAC. Air quality impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition

rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH_3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forwards for Appropriate Assessment.

C. The Proposed Scheme is predicted to have no effects whatsoever on the Skipwith Common SAC during the construction and decommissioning phases of the Proposed Scheme. As such, there are no pathways via which the Proposed Scheme could contribute to an in-combination effect with other plans and projects and no LSE are predicted to occur.

D. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the ES). This has identified the potential for air quality impacts on Skipwith Common SAC as a result of the Proposed Scheme alone (see (b) above). There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE (and there is also the potential for in-combination air quality effects to lead to LSE), this issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

HRA Screening Matrix 9: Thorne & Hatfield Moors SPA

Name of European site and designation: Thorne & Hatfield Moors SPA												
EU Code: UK9005171												
Distance to NSIP: 9.3 km to the Power Station Site, 7.6 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Supporting populations of the following Annex I species; Breeding Season: Nightjar *Caprimulgus eurpaeus*	× (a)	✓ (b)	× (a)	× (a)	× (a)	× (a)	× (a)	× (a)	× (a)	× (c)	✓ (d)	× (c)

Evidence supporting conclusions:

A. The Proposed Scheme is located in excess of 7 km from the SPA. No suitable habitat for nightjar has been recorded at or adjacent to the Proposed Scheme, with an absence of the species' preferred heathland or forestry habitats present (see Table 9-5 of the Biodiversity chapter of the ES). A review of Natural England Priority Habitat mapping and publicly available online aerial photography also suggests that such habitats are absent from areas that are hydrologically connected and downstream of the Proposed Scheme. As such, nightjar are highly unlikely to use any areas of habitat that could be affected by construction or decommissioning activities and as such experience any effects during these stages of the Proposed Scheme. No LSE are therefore predicted to occur.

B. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on Thorne and Hatfield Moors SPA. Air quality

impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law (Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forward for Appropriate Assessment.

C. The Proposed Scheme alone is predicted to have no effects whatsoever on Thorne and Hatfield Moors SPA during the construction and decommissioning phases. As such, there are no pathways via which the Proposed Scheme could contribute to an in-combination effect with other plans and projects and no LSE are predicted to occur.

D. Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified that there would be no significant air quality impacts on Thorne and Hatfield Moor SPA as a result of the Proposed Scheme alone. There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE (and there is also the potential for in-combination air quality effects to lead to LSE), this issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

HRA Screening Matrix 10: Thorne Moor SAC

Name of European site and designation: Thorne Moor SAC												
EU Code: UK0012915												
Distance to NSIP: 9.3 km to the Power Station Site, 7.6 km to the Pipeline Area												
European site features	**Likely effects of NSIP**											
Stage of Development	Habitat Degradation			Species Displacement			Direct Mortality			In Combination Effects		
	C	O	D	C	O	D	C	O	D	C	O	D
7120 Degraded raised bogs still capable of natural regeneration	✗ (a)	✓ (b)	✗ (a)							✗ (c)	✓ (d)	✗ (c)

Evidence supporting conclusions:

(a) The Proposed Scheme is located in excess of 7 km from the SAC. No raised bog or other habitats that could have a supporting role for habitats within the SAC are present on or adjacent to the Site (see Table 9-5 of the Biodiversity chapter of the ES). The SAC is located outside the drainage catchment of the Proposed Scheme, so could not be subject to any hydrological effects arising from the Proposed Scheme. No other impact pathways by which the SAC could be affected by the Proposed Scheme have been identified. No effects on SAC habitats are therefore expected to occur during construction and decommissioning. As such, no LSE predicted to occur.

(b) Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on Thorne Moor SAC. Air quality impacts on designated sites are usually assessed against 'critical levels' and 'critical loads'. Critical levels and critical loads are concentrations and deposition rates of pollutants, below which there is considered to be no potential for harm to a particular habitat type or qualifying feature of a designated site. In the absence of proposed mitigation measures (which cannot be taken into account at the screening stage on the basis of recent case law

(Ref 9.51)), emissions from the Proposed Scheme could potentially lead to exceedances of critical levels for NOx and NH3 and exceedances of critical loads for nitrogen deposition and acidification. There is therefore considered to be the potential for Likely Significant Effects (LSE) in relation to air quality and this issue will be taken forward for Appropriate Assessment.

(c) The Proposed Scheme alone is predicted to have no effects whatsoever on Thorne Moor SAC during the construction and decommissioning phases. As such, there are no pathways via which the Proposed Scheme could contribute to an in-combination effect with other plans and projects and no LSE are predicted to occur.

(d) Potential air quality impacts on designated sites have been assessed through dispersion modelling, including European Sites (see Chapter 6 (Air Quality) of the Environmental Statement (ES)). This has identified the potential for air quality impacts on Thorne Moor SAC as a result of the Proposed Scheme alone (see (b) above). There is the potential for emissions generated by the Proposed Scheme to combine with those from other emitting developments, leading to increased cumulative effects. Other relevant developments are identified in Appendices 17.1 and 17.2 of the Cumulative Effects chapter of the ES. Given that emissions from the Proposed Scheme alone could lead to LSE (and there is also the potential for in-combination air quality effects to lead to LSE), this issue will therefore be taken forwards for Stage 2 Appropriate Assessment.

The Drax Power (Generating Stations) Order

Land at, and in the vicinity of, Drax Power Station, near Selby, North Yorkshire

Habitat Regulations Assessment Report
Appendix 2 – HRA Integrity Matrices

The Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(g)

Drax Power Limited

Drax Repower Project

Applicant:	DRAX POWER LIMITED
Date:	May 2018
Document Ref:	6.6
PINS Ref:	EN010091

Planning Inspectorate

Advice Note 10

Habitats Regulations Assessment

Appendix 2: Drax Repower HRA Integrity Matrices

STAGE 2: EFFECTS ON INTEGRITY

Likely significant effects have been identified for the following sites:

- River Derwent SAC
- Lower Derwent Valley Ramsar
- Lower Derwent Valley SAC
- Lower Derwent Valley SPA
- Humber Estuary SAC
- Humber Estuary SPA
- Humber Estuary Ramsar
- Skipwith Common SAC
- Thorne and Hatfield Moors SPA
- Thorne Moors SAC

These sites have been subject to further assessment in order to establish if the NSIP could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below.

Matrix Key

✓ **=** Adverse effect on integrity **cannot** be excluded
× **=** Adverse effect on integrity **can** be excluded

C = construction
O = operation
D = decommissioning

HRA Integrity Matrix 1: River Derwent SAC

Name of European site and designation: River Derwent SAC															
EU Code: UK0030253															
Distance to NSIP 0.8 km to the Power Station Site, 1.1km to the Pipeline Area															
European site features	**Adverse effect on integrity**														
Effect	*Species Displacement*			*Habitat Degradation effects (hydrological)*			*Habitat degradation Effects (Air Quality)*			*Direct mortality*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation				**X(a)**	**X(a)**	**X(a)**		**X(d)**						**X(d)**	
1099 River lamprey *Lampetra fluviatilis*				**X(b)**	**X(b)**	**X(b)**		**X(d)**						**X(d)**	
1095 Sea lamprey *Petromyzon marinus*				**X(b)**	**X(b)**	**X(b)**		**X(d)**						**X(d)**	
1163 Bullhead *Cottus gobio*				**X(b)**	**X(b)**	**X(b)**		**X(d)**						**X(d)**	

1355 Otter *Lutra lutra*	**X(c)**		**X(c)**	**X(b)**	**X(b)**	**X(b)**		**X(d)**		**X(c)**		**X(c)**		**X(d)**	

Evidence supporting conclusions

a. No adverse effects on the integrity of the River Derwent SAC habitats are predicted as a result of construction or operational phase hydrological impacts. This is because there is limited potential for any upstream transport of silt or other pollutants from the Proposed Scheme reaching the River Derwent (paragraph 12.3.4 of the Water Resources, Quality and Hydrology ES chapter) and due to the presence of the Barmby Tidal barrage at the mouth of the River Derwent, which inhibits upstream flows into the Derwent from the Ouse.

b. As set out in paragraph (a), above, hydrological impacts would lead to no adverse effects on the integrity of the River Derwent SAC habitats and hence their suitability to support SAC fish species or otter. It is however also necessary to consider the potential implications of water quality changes in the River Ouse (downstream of the River Derwent), in relation to SAC fish species and otter. This is because migratory species (river lamprey and sea lamprey) could use the section of the Ouse between the Humber Estuary (downstream of the Proposed Scheme) and the River Derwent SAC (upstream of the Proposed Scheme). Otter have large home ranges and individuals associated with the River Derwent SAC are also likely to use the River Ouse and potentially parts of the Humber Estuary. The proposed CEMP will control potential hydrological impacts during construction and decommissioning, with no deterioration of the WFD status of the River Ouse (located upstream of the Humber Estuary SAC, SPA and Ramsar Site and downstream of the River Derwent SAC) predicted (paragraphs 12.6.13 of the Water Resources, Quality and Hydrology Chapter). During operation, existing and proposed drainage measures would ensure any impacts on water quality within suitable water features for migratory fish species and otters would be negligible (see paragraphs 12.6.50 – 12.6.53 of the ES Water Resources, Quality and Hydrology Chapter). No perceptible changes in the water quality of the Humber Estuary are predicted (paragraph 12.6.13 of the water quality resources chapter).

Bullhead are not expected to be present within the River Ouse downstream or immediately upstream of the Proposed Scheme. This is because bullhead is a freshwater species that does not inhabit tidal waters. The EA identify saline intrusion as a potential water quality issue for groundwater at the Site (paragraph 12.5.15 of the Water Resources, Quality and Hydrology Chapter). Tidal influences also raise the level of the River Ouse by approximately 4.2 m (paragraph 12.5.12 of

the Water Resources, Quality and Hydrology Chapter), further confirming tidal influences in the stretch of the Ouse adjacent to and downstream of the Site.

c. Evidence of otter has been recorded along the River Ouse and on some of the smaller watercourses along the route of the Gas Pipeline (paragraphs 9.5.28 – 9.5.32 of the ES Biodiversity Chapter). Installation of the Gas Pipeline will result in temporary disturbance of habitats within the Pipeline Area. No watercourses are expected to be directly physically impacted, where the pipeline is installed under watercourses using trenchless techniques (see paragraph 3.3.19 of the ES Site and Project Description Chapter). However, where open-cut techniques are used, there may be temporary impacts to otter commuting, foraging and resting habitat. Mitigation will be implemented to negate any potential impacts on commuting or foraging otter. Specifically, the maintenance of adequate channel and bankside habitat during the works to ensure commuting can continue unimpeded (with directional fencing used where necessary); the avoidance of night-time working and lighting; and construction best-practice to ensure otters do not come into contact with open trenches and other areas where otters may be trapped and injured or killed. Current survey data demonstrates that no potential resting sites will be impacted upon. Updated survey data prior to construction will determine whether this situation remains. If resting sites are found during updated survey to be impacted, mitigation will be implemented (comprising replacement habitat) to ensure no net loss and maintenance of the species Favourable Conservation Status. This, in turn will ensure no adverse effects on integrity. Construction of the Gas Pipeline would take up to a year including construction of the Gas Receiving Facility and Above Ground Installation. Installation of the Gas Pipeline only is expected to take approximately four months (see Paragraph 3.3.27 of the ES Site and Project Description Chapter). The Project CEMP would also include measures to limit indirect effects on watercourses (see paragraph 12.6.13 of the ES Water Resources, Quality and Hydrology Chapter) and measures to prevent the incidental mortality of otters (see paragraph 9.6.74 of the ES Biodiversity Chapter) during installation of the pipeline. Given the above measures, any displacement of otters that occurs during construction, operation or decommissioning of the Proposed Scheme would be minor and short term, with no perceptible effect on the SAC population. This would not compromise the favourable conservation status of populations associated with the River Derwent SAC and hence there would be no adverse effect on the integrity of the SAC (see Paragraphs 9.6.80, 9.6.87 and 9.6.90 of the ES Biodiversity Chapter).

d. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Table 6.16, 6.17, 6.21 and 6.23 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a detailed description of the modelling assumptions). This includes the predicted impact of the Proposed

Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 and 6.23. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) and the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of Chapter 6 of the ES).

The air quality modelling shows that the Proposed Scheme will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The River Derwent (and the hydrologically connected downstream River Ouse) is not considered to be sensitive to the effects of nitrogen deposition and associated acidification, due to the River's water quality. Environment Agency (EA) monitoring data indicates that the River Derwent is strongly phosphate limited. In phosphate limited systems, additional inputs of nitrogen have limited effects on plant productivity, as phosphate is the primary limiting nutrient. As such, additional inputs from the Proposed Scheme, both alone or in-combination with other Plans or Projects, would be unlikely to lead to any perceptible eutrophication effects on freshwater habitats within the SAC.

It should also be noted that the current condition of the SSSI is favourable, despite the large inputs of nitrogen from existing diffuse agricultural sources. The constituent SSSI Units of the River Derwent SAC (River Derwent SSSI and Newton Mask SSSI) within 15 km of the Project Site, were all assessed as being in 'favourable', 'unfavourable recovering' or 'unfavourable no change' condition when last assessed. A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 5.53% of the River Derwent SSSI was reported as being in 'favourable' condition, 93.69% recorded as being in 'unfavourable – recovering' condition, with the remaining 0.78% classed as 'unfavourable no change'. Unit 21 of this SSSI was classed as 'unfavourable no change' due to ponds having been filled in and scrub management being required. For the Newton Mask SSSI, 100% of the SSSI units are reported to be in 'favourable' condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments of the Site.

In light of the information presented above, no adverse effects to the integrity of the SAC are predicted.

HRA Integrity Matrix 2: Lower Derwent Valley SAC

Name of European site and designation: Lower Derwent SAC												
EU Code: UK0012844												
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area												
European site features	**Adverse effect on integrity**											
Effect	*Habitat degradation*			*Species Displacement*			*Direct mortality*			*In combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
6510 Lowland hay meadows *Alopecurus pratensis*, *Sanguisorba officinalis*		**X(a)**									**X(a)**	
91E0 Alluvial forests with Alder *Alnus glutinosa* and Ash *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)		**X(a)**									**X(a)**	
1355 Otter *Lutra lutra*	**X(b)**	**X(a, b)**	**X(b)**	**X(c)**	**X(c)**	**X(c)**	**X(c)**	**X(c)**	**X(c)**		**X(a)**	

a. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH_3) will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto the Lower Derwent Valley SAC. There is a maximum modelled process contribution of 0.8% and 0.2% for nitrogen and acid deposition respectively (see Table 6.19 and 6.20 of the ES Air Quality Chapter, respectively). The process contribution from the Proposed Scheme also reduces with increasing distance from the stacks. For example, the maximum process contribution for nitrogen deposition onto the Breighton Meadows SSSI component of the SAC (the closest part of the site), is predicted to be 0.8%. The maximum process contribution for nitrogen deposition onto the Derwent Ings SSSI component of the SAC (approximately 2 km further north than Breighton Meadows SSSI), is predicted to be 0.5%. As the impacts of the Proposed Scheme alone lead to no exceedances of critical levels or process contributions in excess of 1% of critical loads, no adverse effects on the integrity of the SAC are predicted to arise.

Information on the Air Pollution Information Service (APIS) website (Ref 9.54) identifies that the 91E0 Alluvial forests habitat type is not susceptible to the effects of eutrophication or acidification. As such, nitrogen deposition and acidification from the Proposed Scheme is not predicted to have any perceptible effects on this habitat. The SSSI citations for the underpinning SSSI components of the SAC are also identified as being comprised of lowland meadow habitats, with the 91E0 habitat type associated with sections of the SAC in excess of 15 km from the Proposed Scheme. In light of the above, the Proposed Scheme is predicted to have no perceptible air quality impacts on this habitat type.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.6% for nitrogen deposition and 0.3% for acidification (see Tables 6.25 and 6.26 of the ES Air Quality Chapter). The cumulative acid deposition impact is predicted

to lead to a *de minimus* in-combination effect, which will lead to no perceptible vegetative change of SAC habitats. The cumulative nitrogen deposition impact reduces with increasing distance from site. Whilst a maximum impact of 1.6% of critical load is predicted over the Breighton Meadows SSSI component of the SAC, the maximum impact over the more distant Derwent Ings SSSI component is 1.4%, declining further with increasing distance from the Proposed Scheme. The Breighton Meadows SSSI has an area of 38.79 ha, representing approximately 4.2% by area of the SAC.

The constituent SSSI Units of the Lower Derwent SAC (Breighton Meadows SSSI and Derwent Ings SSSI) within 15 km of the Site, were all assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed despite the large inputs of nitrogen from existing sources (which exceed the lower band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 92.86% of the Breighton Meadows SSSI was reported as being in 'favourable' condition, with the remaining 7.14% recorded as being in 'unfavourable – recovering' condition. For the Derwent Ings SSSI, 59.7% of the SSSI units are reported to be in 'favourable' condition, with the remaining 40.3% of the SSSI units in 'unfavourable – recovering' condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments of the Site.

The contribution of the Proposed Scheme, whether assessed alone (see below) or in combination with other industrial processes, is largely insignificant and a relatively small proportion of the total deposition. The risk of exceedance of critical loads and the level of exceedance of the critical loads is a function of the rates of background deposition rather than the result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of critical loads and levels for the European Sites within 15km of the Proposed Scheme.

- Taking into account the conservatism built into the air quality assessment including:
- Continuous full load operation for the year;
- 70% conversion of NOx to NO2;
- Assessment of maximum impacts anywhere in a designated site, irrespective of area represented by the maximum and the presence of particular habitats;
- Assessment against the lower threshold of recommended critical loads;

- Assessment of maximum impacts across 5 modelled years; and
- Emissions continually at the limit set in the IED / Bref Conclusions and or recommended emissions ceiling

The impacts of the Proposed Scheme both alone and in combination with other relevant development proposals will be small overall and likely imperceptible.

Given the conservatism of the air quality modelling and the low magnitude of the cumulative air quality impacts, no adverse effects to the integrity of the Lower Derwent Valley SAC are predicted to arise.

b. As set out in paragraph (a), above, no adverse effects on the integrity of the River Derwent SAC habitats and hence their suitability to support otter are predicted as a result of hydrological impacts. It is also necessary to consider the potential implications of water quality changes in the River Ouse (downstream of the River Derwent), in relation to otter. This is because otter have large home ranges (see paragraph 9.6.77 – 9.6.78 of the Biodiversity Chapter of the ES) and individuals associated with the River Derwent SAC are also likely to use the River Ouse and potentially parts of the Humber Estuary. The proposed CEMP will control potential hydrological impacts during construction and decommissioning, with no deterioration of the WFD status of the River Ouse (located upstream of the Humber Estuary SAC, SPA and Ramsar Site and downstream of the River Derwent SAC) predicted (paragraphs 12.6.13 of the Water Resources, Quality and Hydrology Chapter). During operation, existing and proposed drainage measures would ensure any impacts on water quality within suitable water features for otters would be negligible (see paragraphs 12.6.50 – 12.6.53 of the ES Water Resources, Quality and Hydrology Chapter). As such, no adverse effects on the otter population associated with the Lower Derwent Valley SAC are predicted to arise.

c. Evidence of otter has been recorded along the River Ouse and on some of the smaller watercourses along the route of the Gas Pipeline (paragraphs 9.5.28 – 9.5.32 of the ES Biodiversity Chapter). Installation of the Gas Pipeline will result in temporary disturbance of habitats within the Pipeline Area. No watercourses are expected to be directly physically impacted, where the pipeline is installed under watercourses using trenchless techniques (see paragraph 3.3.19 of the ES Site and Project Description Chapter). However, where open-cut techniques are used, there may be temporary impacts to otter commuting, foraging and resting habitat. Mitigation will be implemented to negate any potential impacts on commuting or foraging otter. Specifically, the maintenance of adequate channel and bankside habitat during the works to ensure commuting can continue unimpeded (with directional fencing used where necessary); the avoidance of night-time working and lighting; and construction best-practice to ensure otters do not come into contact with open trenches and

other areas where otters may be trapped and injured or killed. Current survey data demonstrates that no potential resting sites will be impacted upon. Updated survey data prior to construction will determine whether this situation remains. If resting sites are found during updated survey to be impacted, mitigation will be implemented (comprising replacement habitat) to ensure no net loss and maintenance of the species Favourable Conservation Status. This, in turn will ensure no adverse effects on integrity. Construction of the Gas Pipeline would take up to a year including construction of the Gas Receiving Facility and Above Ground Installation. Installation of the Gas Pipeline only is expected to take approximately four months (see Paragraph 3.3.27 of the ES Site and Project Description Chapter). The Project CEMP would also include measures to limit indirect effects on watercourses (see paragraph 12.6.13 of the ES Water Resources, Quality and Hydrology Chapter). Measures to prevent the incidental mortality of otters and allow their continued movement along watercourses within the Pipeline Area during construction (see paragraph 9.6.74 of the ES Biodiversity Chapter) would also be included. Given the above, any displacement of otters that occurs during construction, operation or decommissioning of the Proposed Scheme would be minor and short term, with negligible effects on the SAC population. This would not compromise the favourable conservation status of populations associated with the Lower Derwent Valley SAC and hence there would be no adverse effect on the integrity of the SAC (see Paragraphs 9.6.80, 9.6.87 and 9.6.90 of the ES Biodiversity Chapter).

HRA Integrity Matrix 3: Lower Derwent Valley SPA

Name of European site and designation: Lower Derwent Valley SPA						
EU Code: UK9006092						
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat Degradation (air quality)*			*In combination effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
Supporting populations of the following Annex I species; Breeding Season: Corncrake Crex *crex,* Spotted Crake *Porzana porzana;* Over winter*:* Bewick's Swan Cygnus *columbianus bewickii,* Bittern *Botaurus stellaris,* Golden Plover *Pluvialis apricaria,* Ruff *Philomachus pugnax*		**X(a)**			**X(a)**	

Supporting populations of following migratory species; Over winter: Teal *Anas crecca*		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH_3) will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto the Lower Derwent Valley SPA. There is a maximum modelled process contribution of 0.8% and 0.2% for nitrogen and acid deposition respectively (see Table 6.19 and 6.20 of the ES Air Quality Chapter, respectively). The process contribution from the Proposed Scheme also reduces with increasing distance from the stacks. For example, the maximum process contribution for nitrogen deposition onto the Breighton Meadows SSSI component of the SPA (the closest part of the site), is predicted to be 0.8%. The maximum process contribution for nitrogen deposition onto the Derwent Ings SSSI component of the SPA (approximately 2 km further north than Breighton Meadows SSSI), is predicted to be 0.5%. As the impacts of the Proposed Scheme alone lead to no exceedances of critical levels or process contributions in excess of 1% of critical loads, no adverse effects on the integrity of the SAC are predicted to arise.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.6% for nitrogen deposition and 0.3% for acidification (see Tables 6.24 and 6.25 of the ES Air Quality Chapter) for the neutral grassland habitats assessed. The cumulative acid deposition impact is predicted to lead to a *de minimus* in-combination effect, which would lead to no perceptible vegetative change of SPA habitats and hence their role supporting SPA bird species. The cumulative nitrogen deposition impact also reduces with increasing distance from site. Whilst a maximum impact of 1.6% of critical load (Process Contribution from the Proposed Scheme up to 0.6%) is predicted over the Breighton Meadows SSSI component of the SPA, the maximum impact over the more distant Derwent Ings SSSI component is 1.4% (Process Contribution from the Proposed Scheme up to 0.4%), with the Process Contribution from the Proposed Scheme declining further with increasing distance from the Proposed Scheme. The Breighton Meadows SSSI has an area of 38.79 ha, representing approximately 4.2% by area of the SPA.

The constituent SSSI Units of the Lower Derwent SPA (Breighton Meadows SSSI and Derwent Ings SSSI) within 15 km of the Project Site, were all assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed despite the large inputs of nitrogen from existing sources (which exceed the upper band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 92.86% of the Breighton Meadows SSSI was reported as being in 'favourable' condition, with the remaining 7.14% recorded as being in 'unfavourable – recovering' condition. For the Derwent Ings SSSI, 59.7% of the SSSI units are reported to be in 'favourable' condition, with the remaining 40.3% of the SSSI units in 'unfavourable – recovering' condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments.

The Site relevant critical loads page for the Lower Derwent Valley SPA (reference 9.54 of the ES Biodiversity Chapter) includes advice on the application of critical loads and levels to several of the bird species for which the SPA is designated (golden plover, tundra swan, ruff and Eurasian teal). The advice on critical loads identifies that '*no expected negative impact on species due to impacts on the species' broad habitat'* for Eurasian teal and Ruff. For tundra swan a potential negative impact is identified for standing water habitats, dependent on whether waterbodies are nitrogen or phosphate-limited. Environment Agency (EA) monitoring data indicates that the River Derwent is strongly phosphate limited. In phosphate limited systems, additional inputs of nitrogen have limited effects on plant productivity, as phosphate is the primary limiting nutrient. As such, additional inputs would be unlikely to lead to any perceptible eutrophication effects on standing water habitats within the SPA. For golden plover APIS identifies the Critical Load for neutral grassland habitats as being appropriate, due to the species' use of this habitat type.

Given the above no adverse effects to the integrity of the Lower Derwent Valley SPA are predicted to arise.

HRA Integrity Matrix 4: Lower Derwent Valley Ramsar

Name of European site and designation: Lower Derwent Valley Ramsar						
EU Code: N/A						
Distance to NSIP: 5.1 km to the Power Station Site, 5.7 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat Degradation (air quality)*			*In combination effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
Rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates as well as a leafhopper, *Cicadula ornate* for which Lower Derwent Valley is the only known site in Great Britain.		**X(a)**			**X(a)**	
Staging post for passage birds in spring. Of particular note are the nationally important numbers of Ruff, *Philomachus pugnax* and Whimbrel, *Numenius*		**X(a)**			**X(a)**	

phaeopus.						
Regularly supports 20,000 or more waterbirds		**X(a)**			**X(a)**	
Regularly supports 1% of the individuals in a population of the following species or subspecies of waterbird: Eurasian wigeon , *Anas Penelope* and Eurasian teal , *Anas crecca*		**X(a)**				

a. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH_3) will not lead to any exceedances of AQ standards for NOx or NH_3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto the Lower Derwent Valley Ramsar Site. There is a maximum modelled process contribution of 0.8% and 0.2% for nitrogen and acid deposition respectively (see Table 6.19 and 6.20 of the ES Air Quality Chapter, respectively). The process contribution from the Proposed Scheme also reduces with increasing distance from the Proposed Scheme stacks. For example, the maximum process contribution for nitrogen deposition onto the Breighton Meadows SSSI component of the Ramsar Site (the closest part of the site), is predicted to be 0.8%. The maximum process contribution for nitrogen deposition onto the Derwent Ings SSSI component of the Ramsar Site (approximately 2 km further north than Breighton Meadows SSSI), is predicted to be 0.5%. As the impacts of the Proposed Scheme alone lead to no exceedances of critical levels or process contributions in excess of 1% of critical loads, no adverse effects on the integrity of the SAC are predicted to arise.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.6% for nitrogen deposition and 0.3% for acidification (see Tables 6.24 and 6.25 of the ES Air Quality Chapter) for the neutral grassland habitats assessed. The cumulative acid deposition impact is predicted to lead to a *de minimus* in-combination effect, which will lead to no perceptible vegetative change of Ramsar Site habitats. The cumulative nitrogen deposition impact also reduces with increasing distance from the Proposed Scheme. Whilst a maximum impact of 1.6% of critical load (Process Contribution from the Proposed Scheme up to 0.6%) is predicted over the Breighton Meadows SSSI component of the Ramsar Site, the maximum impact over the more distant Derwent Ings SSSI component is 1.4% (Process Contribution from the Proposed Scheme up to 0.4%), with the Process Contribution from the Proposed Scheme declining further with increasing distance from the Proposed Scheme. The Breighton Meadows SSSI has an area of 38.79 ha, representing approximately 4.2% by area of the Ramsar Site.

The constituent SSSI Units of the Lower Derwent SPA (Breighton Meadows SSSI and Derwent Ings SSSI) within 15 km of the Project Site, were all assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed despite current inputs of nitrogen from existing sources (which exceed the site relevant critical load in the equivalent area of SPA). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 92.86% of the Breighton Meadows SSSI was reported as being in 'favourable' condition, with the remaining 7.14% recorded as being in 'unfavourable – recovering' condition. For the Derwent Ings SSSI, 59.7% of the SSSI units are reported to be in 'favourable' condition, with the remaining 40.3% of the SSSI units in 'unfavourable – recovering' condition. The SSSI condition assessment reports identify that the botanical diversity of the SSSI appears to remain similar to that observed during previous botanical surveys and assessments of the Site.

The Site relevant critical loads page for the Lower Derwent Valley SPA (reference 9.54 of the ES Biodiversity Chapter) includes advice on the application of critical loads and levels to several of the bird species for which the SPA is designated (golden plover, tundra swan, ruff and Eurasian teal). Ruff and Eurasian teal are also listed in the citation for the Lower Derwent Valley Ramsar Site. The advice on APIS on critical loads identifies that '*no expected negative impact on species due to impacts on the species' broad habitat'* for Ruff. Environment Agency (EA) monitoring data also indicates that the River Derwent is strongly phosphate limited. In phosphate limited systems, additional inputs of nitrogen have limited effects on plant productivity, as phosphate is the primary limiting nutrient. As such, additional inputs would be unlikely to lead to any perceptible eutrophication effects on standing water habitats within the Ramsar Site.

Given the above and the conservatism of the air quality modelling (see paragraphs 6.5.19 and 6.10.2 of Chapter 6 of the ES), no adverse effects to the integrity of the Lower Derwent Valley SPA are predicted to arise.

HRA Integrity Matrix 5: Humber Estuary SAC

Name of European site and designation: Humber Estuary SAC									
EU Code: UK9006111									
Distance to NSIP: 6.0 km to the Power Station Site, 6.0 km to the Pipeline Area									
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat Degradation (hydrology)*			*Habitat Degradation (air quality)*			*In-combination effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
1130 Estuaries					**X(b)**			**X(b)**	
1330 Atlantic salt meadows and a range of other sand dune types (H1110 Sandbanks which are slightly covered by sea water all the time; H1140 Mudflats and sandflats not covered by seawater at low tide; H1310 Salicornia and other annuals colonising mud and sand; and 1150 coastal lagoons)					**X(b)**			**X(b)**	
1140 Mudflats and sandflats not covered by seawater at low tide					**X(b)**			**X(b)**	
1110 Sandbanks which are slightly covered by sea water all the time					**X(b)**			**X(b)**	
1150 Coastal lagoons * Priority					**X(b)**			**X(b)**	

feature									
1310 Salicornia and other annuals colonizing mud and sand					**X(b)**			**X(b)**	
1330 Atlantic salt meadows *Glauco-Puccinellietalia maritimae*					**X(b)**			**X(b)**	
2110 Embryonic shifting dunes					**X(b)**			**X(b)**	
2120 "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")					**X(b)**			**X(b)**	
2130 "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature					**X(b)**			**X(b)**	
2160 Dunes with *Hippopha rhamnoides*					**X(b)**			**X(b)**	
1095 Sea lamprey *Petromyzon marinus*	**X(a)**	**X(a / b)**	**X(a)**		**X(b)**			**X(b)**	
1099 River lamprey *Lampetra fluviatilis*	**X(a)**	**X(a / b)**	**X(a)**		**X(b)**			**X(b)**	
1364 Grey seal *Halichoerus grypus*					**X(b)**			**X(b)**	

a. No perceptible changes in the water quality of the Humber Estuary are predicted (paragraph 12.6.13 of the water quality resources chapter). It is however necessary to consider the potential implications of water quality changes in the River Ouse upstream of the estuary in relation to SAC fish species. This is because river lamprey and sea lamprey could use the section of the Ouse between the Humber Estuary SAC (downstream of the Proposed Scheme) and the River Derwent SAC (upstream of the Proposed Scheme). There are likely to be population linkages between lamprey using habitats within the Humber Estuary SAC, River Ouse, and upstream River Derwent SAC.

The proposed CEMP will control potential hydrological impacts during construction and decommissioning, with no deterioration of the WFD status of the River Ouse (located upstream of the Humber Estuary SAC, SPA and Ramsar Site

and downstream of the River Derwent SAC) predicted (paragraphs 12.6.13 of the Water Resources, Quality and Hydrology Chapter). During operation, existing and proposed drainage measures would ensure any impacts on water quality within suitable water features for migratory fish species would be negligible (see paragraphs 12.6.50 – 12.6.53 of the ES Water Resources, Quality and Hydrology Chapter).

b. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH3) will not lead to any exceedances of AQ standards for NOx or NH3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen deposition onto the Humber Estuary SAC. There is a maximum modelled process contribution of 0.3% for nitrogen deposition (see Table 6.19 and 6.20 of the ES Air Quality Chapter). Humber Estuary habitats occurring within 15 km of the Proposed Scheme are not considered to be sensitive to acidification.

The maximum predicted cumulative deposition impact of the Proposed Scheme would be 0.9% for nitrogen deposition. As stated above, Humber Estuary habitats are not considered to be sensitive to acidification and there would be no exceedances of any critical levels.

Given the conservatism of the air quality modelling (see paragraphs 6.5.19 and 6.10.2 of Chapter 6 of the ES) and the low magnitude of the cumulative air quality impacts, no adverse effects to the integrity of the Humber Estuary SAC are predicted to arise.

HRA Integrity Matrix 6: Humber Estuary Ramsar Site

Name of European site and designation: Humber Estuary Ramsar Site						
EU Code: UK11031						
Distance to NSIP: 6.5 km to the Power Station Site, 6.0 km to the Pipeline Area						
European site features	**Likely effects of NSIP**					
Stage of Development	Habitat Degradation			In Combination Effects		
	C	O	D	C	O	D
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.		**x (b)**			**x (b)**	
Ramsar criterion 3 The Humber Estuary Ramsar site supports a		**x (b)**			**x (b)**	

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.*						
Ramsar criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season		**x (b)**			**x (b)**	
Ramsar criterion 6 – species/populations occurring at		**x (b)**			**x (b)**	

levels of international importance: Eurasian golden plover, *Pluvialis apricaria* Altifrons; Red knot, *Calidris canutus*; Dunlin, *Calidris alpina* Alpine; Black-tailed godwit, *Limosa limosa* Islandica; Common redshank, *Tringa totanus* Brittanica; Common shelduck, *Tadorna tadorna*; Bar-tailed godwit , *Limosa lapponica Lapponica*;						
Ramsar criterion 8 The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatili*s and sea lamprey *Petromyzon marinus* between coastal waters and	**x (a)**	**x (a/b)**	**x (a)**		**x (b)**	

their spawning areas.						

a. No perceptible changes in the water quality of the Humber Estuary are predicted (paragraph 12.6.13 of the water quality resources chapter). It is however necessary to consider the potential implications of water quality changes in the River Ouse upstream of the estuary in relation to SAC fish species. This is because river lamprey and sea lamprey could use the section of the Ouse between the Humber Estuary SAC (downstream of the Proposed Scheme) and the River Derwent SAC (upstream of the Proposed Scheme). There are likely to be population linkages between lamprey using habitats within the Humber Estuary SAC, River Ouse, and upstream River Derwent SAC.

The proposed CEMP will control potential hydrological impacts during construction and decommissioning, with no deterioration of the WFD status of the River Ouse (located upstream of the Humber Estuary SAC, SPA and Ramsar Site and downstream of the River Derwent SAC) predicted (paragraphs 12.6.13 of the Water Resources, Quality and Hydrology Chapter). During operation, existing and proposed drainage measures would ensure any impacts on water quality within suitable water features for migratory fish species would be negligible (see paragraphs 12.6.50 – 12.6.53 of the ES Water Resources, Quality and Hydrology Chapter).

b. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH3) will not lead to any exceedances of AQ standards for NOx or NH3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen deposition onto the Humber Estuary Ramsar site. There is a maximum modelled process contribution of 0.3% for nitrogen deposition (see Table 6.19

and 6.20 of the ES Air Quality Chapter). Humber Estuary habitats occurring within 15 km of the Proposed Scheme are not considered to be sensitive to acidification.

The maximum predicted cumulative deposition impact of the Proposed Scheme would be 0.9% for nitrogen deposition. As stated above, Humber Estuary habitats are not considered to be sensitive to acidification and there would be no exceedances of any critical levels.

Given the conservatism of the air quality modelling (see paragraphs 6.5.19 and 6.10.2 of Chapter 6 of the ES) and the low magnitude of the cumulative air quality impacts, no adverse effects to the integrity of the Humber Estuary Ramsar site are predicted to arise.

HRA Integrity Matrix 7: Humber Estuary SPA

Name of European site and designation: Humber Estuary SPA						
EU Code: UK9006111						
Distance to NSIP: 6 km to the Power Station Site, 6.0 km to the Pipeline Area						
European site features	**Likely effects of NSIP**					
Stage of Development	Habitat Degradation			In Combination Effects		
	C	O	D	C	O	D
Used regularly by 1% or more of the Great Britain populations of the following Annex I species: Avocet *Recurvirostra avosetta* (breeding and wintering), Bittern *Botaurus stellaris*, Hen harrier *Circus cyaneus,* Golden plover *Pluvialis apricaria*, Bar-tailed godwit *Limosa lapponica*, Ruff *Philomachus*		**x (a)**			**× (a)**	

pugnax, Bittern *Botaurus stellaris*, Marsh harrier *Circus aeruginosus*, Little tern *Sterna albifrons*						
Used regularly by 1% or more of the biogeographical populations of the following migratory species: Shelduck *Tadorna tadorna,* Knot *Calidris canutus,* Dunlin *Calidris alpine* (passage and wintering), Black-tailed godwit *Limosa limosa,* Redshank *Tringa tetanus* (passage and wintering), Black-tailed godwit *Limosa limosa.*		**x (a)**			**× (a)**	

a. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.16 to 6.20 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH3), nitrogen deposition and acidification. Predicted cumulative

impacts with other projects for these gas species are also presented in Tables 6.21 to 6.25. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme (taking into account embedded mitigation measures to minimise operational emissions of NOx and NH3) will not lead to any exceedances of AQ standards for NOx or NH3 concentrations, either alone or in-combination with other plans or projects (see tables 6.16 and 6.17 and tables 6.21 and 6.23 in Chapter 6 of the ES). The Proposed Scheme alone will not lead to significant nitrogen deposition onto the Humber Estuary SPA. There is a maximum modelled process contribution of 0.3% for nitrogen deposition (see Table 6.19 and 6.20 of the ES Air Quality Chapter). Humber Estuary habitats (and their supporting role for SPA bird species) occurring within 15 km of the Proposed Scheme are not considered to be sensitive to acidification.

The maximum predicted cumulative deposition impact of the Proposed Scheme would be 0.9% for nitrogen deposition. As stated above, Humber Estuary habitats are not considered to be sensitive to acidification and there would be no exceedances of any critical levels.

Given the conservatism of the air quality modelling (see paragraphs 6.5.19 and 6.10.2 of Chapter 6 of the ES) and the low magnitude of the cumulative air quality impacts, no adverse effects to the integrity of the Humber Estuary Ramsar site are predicted to arise.

HRA Integrity Matrix 8: Skipwith Common SAC

Name of European site and designation: Skipwith Common SAC						
EU Code: UK0030276						
Distance to NSIP: 8.0 km to the Power Station Site, 8.0 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat Degradation (air quality)*			*In-combination Effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
4010 Northern Atlantic wet heaths with *Erica tetralix*		**X(a)**			**X(a)**	
4030 European dry heaths		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.18 to 6.22 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.23 to 6.27. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations, both alone and in-combination with other plans or projects (see tables 6.18 and 6.23 in Chapter 6 of the ES). The Proposed Scheme would generate a maximum Process Contribution of 0.4% of the critical level for NH3. This is in the context of an existing exceedance of 242% of critical level, with the Proposed Scheme equivalent to up to 0.17% of background levels. There are no exceedances of critical levels for NOx, either alone or in-combination with other plans or projects (see tables 6.19 and 6.20, and 6.24 and 6.25 of the ES Air Quality Chapter). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto Skipwith Common SAC. There is a maximum modelled process contribution of 0.4% and 0.3% for nitrogen and acid deposition respectively (see Table 6.21 and 6.22 of the ES Air Quality Chapter, respectively). The process contribution also reduces with increasing distance from the Proposed Scheme. As such, air quality impacts of the Proposed Scheme alone are not predicted to lead to adverse effects to the integrity of the European Site.

The maximum predicted cumulative impact of the Proposed Scheme would be 2.7% of the critical level for NH3, with the Proposed Scheme contributing up to 0.4% of this. There would be a cumulative impact of up to 1.9% of critical load for nitrogen deposition and up to 1.6% for acidification, with the Proposed Scheme contributing 0.4% and 0.3% respectively. The cumulative impacts on NH_3 concentrations and nitrogen and acid deposition therefore exceed 1% of critical load / critical levels (see paragraphs 6.6.35 to 6.6.39 of the ES Air Quality Chapter).

To support this assessment, published research into the effects of nitrogen deposition on heathland habitats was reviewed. This included a review of existing scientific knowledge covering several studies (Caporn *et al.,* 2016 (reference 9.52)) and a study of how ecosystem functions could be used as indicators for heathland response to nitrogen deposition (Bahring *et al.,* 2017 (Ref. 9.55)). These studies suggest that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because where nitrogen is already in excess the plants present within the habitats have limited capacity to respond. In the Natural England study (Caporn *et al*., (2016)), with background deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Skipwith common SAC of 19.2 kgN/ha/yr), adding a further 1 kg N/ha/yr was shown to decrease species richness by between 1.4% and 1.9%. Graminoid (grass) cover was found to increase by between 0.8% and 1.1%. The maximum species richness recorded across the studies examined in Caporn *et al.,* (2016) varied between 16 and 32.

Taking a worst-case species richness from the above of 16, an impact equivalent to 3.26 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum

predicted cumulative impact of the Proposed Scheme with other plans and projects is 0.19 kgN/ha/yr, equivalent to approximately 6% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls well within the bounds of natural between-years variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case cumulative impact of acid deposition is marginally above 1% (1.6%), with the contribution from the Proposed Scheme decreasing with increasing distance from stacks. No perceptible vegetative change of SAC habitats is predicted to arise from this level of deposition.

In addition, the constituent SSSI Units of the Skipwith Common SAC within 15 km of the Proposed Scheme were also assessed as being in 'favourable' or 'unfavourable recovering' condition when last assessed in 2014 despite current levels of nitrogen input from other sources (which exceed the lower band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 47.96% of the constituent SSSI units were reported as being in 'favourable' condition, the remaining value of 52.04% was recorded as being in 'unfavourable – recovering' condition, suggesting the condition of these areas in relation to their target condition is being achieved or improving.

As well as the ecological factors considered above, future national emissions ceilings are likely to reduce emissions of both NOx and ammonia levels and subsequently deposition in the medium to long term. For example, The National Emissions Ceilings Regulations (2018) commit the UK to reducing ammonia emissions by 8% between 2020 and 2029 and by 16% from 2018 onwards (see paragraph 6.6.40 of the ES Air Quality Chapter). Government policy and socioeconomic factors are also promoting the uptake of ultra-low and zero emission vehicles. Current government policy is for all new car and van sales from 2040 onwards to be of ultra-low and zero-emission vehicles, with new conventional diesel and petrol-fuelled vehicles banned from sale (see paragraph 9.6.9 of the ES Biodiversity Chapter). Data on APIS (Ref. 9.56) indicates that approximately 8.6% of nitrogen deposition onto Skipwith Common SAC arises from road transport. Future reductions in emissions from the UK vehicle fleet would therefore reduce and likely eventually eliminate these inputs. For comparison, the source attribution data on APIS identifies the Existing Drax Power Station Complex as contributing approximately 1.5% of total nitrogen deposition.

Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme, either alone or in combination with other Plans and Projects.

HRA Integrity Matrix 9: Thorne Moor SAC

Name of European site and designation: Thorne Moor SAC						
EU Code: UK9005171						
Distance to NSIP: 9.3 km to the Power Station Site, 7.6 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat degradation (air quality)*			*In-combination Effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
7120 Degraded raised bogs still capable of natural regeneration		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.18 to 6.22 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.23 to 6.27. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations, both alone and in-combination with other plans or projects (see tables 6.18 and 6.23 in Chapter 6 of the ES). The Proposed Scheme would generate a maximum Process Contribution of

0.5% of the critical level for NH3. This is in the context of an existing exceedance of 239% of critical level, with the process contribution from the Proposed Scheme equivalent to approximately 0.2% of background levels. There are no exceedances of critical levels for NOx, either alone or in-combination with other plans or projects (see tables 6.19 and 6.20, and 6.24 and 6.25 of the ES Air Quality Chapter). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto Thorne Moor SAC. There is a maximum modelled process contribution of 0.8% and 0.6% for nitrogen and acid deposition respectively (see Table 6.21 and 6.22 of the ES Air Quality Chapter, respectively). The process contribution also reduces with increasing distance from the Proposed Scheme. As such, air quality impacts of the Proposed Scheme alone are not predicted to lead to adverse effects to the integrity of the European Site.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.3% of the critical level for NH_3, with the Proposed Scheme contributing up to 0.5% of this. The contribution from the Proposed Scheme to cumulative NH_3 also decreases with increasing distance from the stacks. Given the cumulative exceedance is only marginally above 1% of critical level at the point of greatest predicted impact, no perceptible effects on SAC vegetation are predicted to arise. There would be a cumulative impact of up to 2.7% of critical load for nitrogen deposition and up to 2.1% for acidification, with the Proposed Scheme contributing 0.8% and 0.6% respectively. The cumulative impacts on nitrogen and acid deposition therefore exceed 1% of critical load (see paragraphs 6.6.35 to 6.6.39 of the ES Air Quality Chapter).

To support this assessment, published research into the effects of nitrogen deposition on bog habitats was reviewed. This included a review of existing scientific knowledge covering several studies (Caporn *et al.,* 2016 (reference 9.52)) and a study of how ecosystem functions could be used as indicators for heathland response to nitrogen deposition (Bahring *et al.,* 2017 (Ref. 9.55)). These studies suggest that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because nitrogen is already in excess, with the plants present having limited capacity to respond. In the Natural England study (Caporn *et al*., (2016)), with background deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Thorne Moor SAC of 19.2 kgN/ha/yr), adding a further 1 kg N/ha/yr was shown to decrease species richness by circa 0.7%. Graminoid (grass) cover was found to increase by 1.5%. The maximum species richness recorded across the studies examined in Caporn *et al.,* (2016) was 32.

Taking a species richness from the above of 32, an impact equivalent to 3.3 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted cumulative impact of the Proposed Scheme with other plans and projects is 0.13 kgN/ha/yr, equivalent to approximately 3.9% of the amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls within

the bounds of natural variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case cumulative impact of acid deposition is marginally above 1% (2.1%), with the contribution from the Proposed Scheme decreasing with increasing distance from stacks. Again, no perceptible vegetative change of SAC habitats are predicted to arise from this level of deposition, in the context of the baseline deposition levels. There is also evidence from a study completed by the Centre for Ecology and Hydrology (2015, Ref. 9.57) that suggests levels of acid deposition across Thorne Moor are reducing, with evidence of a downward trend between 2012 and 2014.

The constituent SSSI Units of the Thorne Moor SAC within 15 km of the Project Site, were assessed as being in 'favourable', 'unfavourable recovering', 'unfavourable no change' and 'unfavourable declining' condition when last assessed despite current inputs of nitrogen from other sources (which exceed the upper band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 3.85% of the Thorne Crowle and Gool Moors SSSI was reported as being in 'favourable' condition, with 91.97% recorded as being in 'unfavourable – recovering' condition. 2.94% was assessed as 'unfavourable no change' with 1.24% 'unfavourable declining'. The majority of the SAC is considered to be in 'unfavourable – recovering' condition by NE. NE identify initiatives to control scrub and manage water balance as the main factors leading to improvements (see Appendix 3).

As well as the ecological factors considered above, future national emissions ceilings are also likely to reduce emissions of both NOx and ammonia levels and subsequently deposition in the medium to long term. For example, The National Emissions Ceilings Regulations (2018), commit the UK to reducing ammonia emissions by 8% between 2020 and 2029 and by 16% from 2018 onwards (see paragraph 6.6.40 of the ES Air Quality Chapter). Government policy and socioeconomic factors are also promoting the uptake of ultra-low and zero emission vehicles. Current government policy is for all new car and van sales from 2040 onwards to be of ultra-low and zero-emission vehicles, with new conventional diesel and petrol-fuelled vehicles banned from sale (see paragraph 9.6.9 of the ES Biodiversity Chapter). Data on APIS (Ref. 9.58) indicates that approximately 10.3% of nitrogen deposition onto Thorne Moor SAC arises from road transport. Future reductions in emissions from the UK vehicle fleet would therefore reduce and eventually eliminate these inputs. For comparison, the source attribution data on APIS identifies the existing Drax Power Station complex as contributing approximately 1.9% of total nitrogen deposition.

Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme, either alone or in combination with other Plans and Projects.

HRA Integrity Matrix 10: Thorne and Hatfield Moor SPA

Name of European site and designation: Thorne and Hatfield Moor SPA						
EU Code: UK0012915						
Distance to NSIP: 9.3 km to the Power Station Site, 7.6 km to the Pipeline Area						
European site features	**Adverse effect on integrity**			**Adverse effect on integrity**		
Effect	*Habitat degradation (air quality)*			*In-combination Effects (air quality)*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*
Supporting populations of the following Annex I species; Breeding Season: Nightjar *Caprimulgus eurpaeus*		**X(a)**			**X(a)**	

a. Chapter 6 of the ES (Air Quality) sets out the methodology and results of air quality dispersion modelling of the Proposed Scheme. This includes quantification of potential air quality impacts on designated ecological sites, including Natura 2000 Sites. Tables 6.18 to 6.22 of the ES Air Quality chapter sets out the predicted numerical air quality impacts of the Proposed Scheme, based on a realistic worst-case scenario for operation (see paragraph 6.4.13 of the ES Air Quality Chapter for a description of the modelling assumptions). This includes the predicted impact of the Proposed Scheme alone on levels of Nitrous Oxides (NOx), ammonia (NH_3), nitrogen deposition and acidification. Predicted cumulative impacts with other projects for these gas species are also presented in Tables 6.23 to 6.27. The worst-case scenario assessed in the air quality chapter is considered in this SIAA, i.e operation of both units with Selective Catalytic Reduction (SCR) with the annualised ammonia budget (see paragraph 6.4.13 to 6.4.15 of the ES Air Quality Chapter).

The air quality modelling shows that the Proposed Scheme would make a minor contribution to an existing exceedance of the critical level for annual mean NH_3 concentrations, both alone and in-combination with other plans or projects (see tables 6.18 and 6.23 in Chapter 6 of the ES). The Proposed Scheme would generate a maximum Process Contribution of

0.5% of the critical level for NH3. This is in the context of an existing exceedance of 239% of critical level, with the process contribution from the Proposed Scheme equivalent to approximately 0.2% of background levels. There are no exceedances of critical levels for NOx, either alone or in-combination with other plans or projects (see tables 6.19 and 6.20, and 6.24 and 6.25 of the ES Air Quality Chapter). The Proposed Scheme alone will not lead to significant nitrogen or acid deposition onto Thorne Moor SPA. There is a maximum modelled process contribution of 0.8% and 0.6% for nitrogen and acid deposition respectively (see Table 6.21 and 6.22 of the ES Air Quality Chapter, respectively). The process contribution also reduces with increasing distance from the Proposed Scheme. As such, air quality impacts of the Proposed Scheme alone are not predicted to lead to adverse effects to the integrity of the European Site.

The maximum predicted cumulative impact of the Proposed Scheme would be 1.3% of the critical level for NH_3, with the Proposed Scheme contributing up to 0.5% of this. The contribution from the Proposed Scheme to cumulative NH_3 also decreases with increasing distance from the stacks. Given the cumulative exceedance is only marginally above 1% of critical level at the point of greatest predicted impact, no perceptible effects on SAC vegetation are predicted to arise. As such, the suitability of the habitats present to support nightjar is not expected to be subject to perceptible change. There would be a cumulative impact of up to 2.7% of critical load for nitrogen deposition and up to 2.1% for acidification, with the Proposed Scheme contributing 0.8% and 0.6% respectively. The cumulative impacts on nitrogen and acid deposition therefore exceed 1% of critical load (see paragraphs 6.6.35 to 6.6.39 of the ES Air Quality Chapter).

To support this assessment, published research into the effects of nitrogen deposition on bog habitats was reviewed. This included a review of existing scientific knowledge covering several studies (Caporn *et al.,* 2016 (reference 9.52)) and a study of how ecosystem functions could be used as indicators for heathland response to nitrogen deposition (Bahring *et al.,* 2017 (Ref. 9.55)). These studies suggest that the effects of additional nitrogen where background deposition rates are already high are much reduced relative to where background deposition rates are low. This is because nitrogen is already in excess, with the plants present having limited capacity to respond. In the Natural England study (Caporn *et al*., (2016)), with background deposition rates of 20 kg N/ha/yr (comparable to estimated baseline deposition rates at Thorne Moor SAC of 19.2 kgN/ha/yr), adding a further 1 kg N/ha/yr was shown to decrease species richness by between 0.7%. Graminoid (grass) cover was found to increase by 1.5%. The maximum species richness recorded across the studies examined in Caporn *et al.,* (2016) was 32.

Taking a species richness from the above of 32, an impact equivalent to 3.3 kgN/ha/yr would theoretically be required to reduce species richness across the SAC by an average of one species (per quadrat). The maximum predicted cumulative impact of the Proposed Scheme with other plans and projects is 0.13 kgN/ha/yr, equivalent to approximately 3.9% of the

amount required to reduce species richness by an average of one species per quadrat. This level of deposition falls within the bounds of natural variation and is predicted to lead to negligible (and imperceptible) vegetative change across the SAC. The worst-case cumulative impact of acid deposition is marginally above 1% (2.1%), with the contribution from the Proposed Scheme decreasing with increasing distance from stacks. Again, no perceptible vegetative change of SAC habitats are predicted to arise from this level of deposition. There is also evidence from a study completed by the Centre for Ecology and Hydrology (2015, Ref. 9.57) that suggests levels of acid deposition across Thorne Moor are reducing, with evidence of a downward trend between 2012 and 2014.

The constituent SSSI Units of the Thorne Moor SAC within 15 km of the Project Site, were assessed as being in 'favourable', 'unfavourable recovering', 'unfavourable no change' and 'unfavourable declining' condition when last assessed despite current inputs of nitrogen from other sources (which exceed the upper band of the site relevant critical load). A copy of the last SSSI unit condition assessment is provided in Appendix 3 of this SIAA. 3.85% of the Thorne, Crowle and Gool Moor SSSI was reported as being in 'favourable' condition, with 91.97% recorded as being in 'unfavourable – recovering' condition. 2.94% was assessed as 'unfavourable no change' with 1.24% 'unfavourable declining'. The majority of the SAC is considered to be in 'unfavourable – recovering' condition by NE. NE identify initiatives to control scrub and manage water balance as the main factors leading to improvements in habitat condition (see Appendix 3).

As well as the ecological factors considered above, future national emissions ceilings are also likely to reduce emissions of both NOx and ammonia levels and subsequently deposition in the medium to long term. For example, The National Emissions Ceilings Regulations (2018), commit the UK to reducing ammonia emissions by 8% between 2020 and 2029 and by 16% from 2018 onwards (see paragraph 6.6.40 of the ES Air Quality Chapter). Government policy and socioeconomic factors are also promoting the uptake of ultra-low and zero emission vehicles. Current government policy is for all new car and van sales from 2040 onwards to be of ultra-low and zero-emission vehicles, with new conventional diesel and petrol-fuelled vehicles banned from sale (see paragraph 9.6.9 of the ES Biodiversity Chapter). Data on APIS (Ref. 9.58) indicates that approximately 10% of nitrogen deposition onto Thorne Moor SPA arises from road transport. Future reductions in emissions from the UK vehicle fleet would therefore reduce and eventually eliminate these inputs. For comparison, the source attribution data on APIS identifies the existing Drax Power Station complex as contributing approximately 1.7% of total nitrogen deposition.

Given the factors set out above, the air quality impacts of the Proposed Scheme are not predicted to lead to adverse effects on the integrity of the Proposed Scheme, either alone or in combination with other Plans and Projects.