The Drax Power (Generating Stations) Order

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

Environmental Statement
6 – Air Quality

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

Drax Power Limited

Drax Repower Project

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Author	Ioanna Gegision	
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6 AIR QUALITY

6.1 Introduction

6.1.1. This Chapter sets out the assessment of the impacts of the Proposed Scheme on air quality. The Proposed Scheme has the potential to affect local air quality during construction, operation and decommissioning due to:

- Dust and particulate matter emissions generated during construction and decommissioning activities, for example, site clearance, stockpiling, materials transport and trenching.
- Stack emissions from the operation of the Power Station Site.
- Cumulative effects on air quality from the Proposed Scheme with other projects, as set out in **Chapter 17** (Cumulative Effect).

6.1.2. For both human and ecological receptors, air quality effects can occur as a result of direct exposure to pollution in ambient air, but also as a result of the deposition of pollutants on the surface of the ground and vegetation. Furthermore, effects may arise from the Proposed Scheme alone and cumulatively with other developments in the vicinity.

6.1.3. This Chapter describes the assessment methodology, the baseline conditions at the Site and in the surrounding area, the embedded (primary and tertiary) mitigation adopted for the purposes of the assessment, and the impacts of the Proposed Scheme. It also provides a summary of the residual likely significant effects on human health taking into account national legislation. A summary of the likely significant effects on ecological receptors is provided in Chapter 9 (Biodiversity).

6.1.4. The Chapter (and its associated figures and appendices) is intended to be read as part of the wider ES, with particular reference to Chapter 5 (Transport), Chapter 9 (Biodiversity), Chapter 17 (Cumulative Effect) and Habitat Regulations Assessment (HRA) (Document Reference 6.6).

6.1.5. The Chapter's main focus is the assessment of stack emissions from the operation of the Power Station Site, both in isolation and in combination with stack emissions from neighbouring power stations. The proposed 4 new gas turbines have been assessed under scenarios designed to:

- Reflect the likely operational profile for the Power Station Site
- Consider potential abatement options and applicable emissions limits
- Ensure that no significant air quality effects arise on sensitive receptors including designated nature conservation sites.

6.2 Policy, Legislation and Guidance

Key Points Summary

- Action to manage and improve air quality in the UK is driven by a combination of European and national legislation which set limit values and objectives for the concentration of pollutants in ambient air.
- National and local planning policies require that the air quality impacts of the Proposed Scheme are acceptable in the context of these air quality limit values and objectives
- The control and regulation of emissions from the Proposed Scheme are considered under the UK's Environmental Permitting regime which should be assumed to be effective for the purpose of development control.
- The assessment of air quality impacts is undertaken in line with guidance published by UK Government, including Defra and Environment Agency, and the Institute for Air Quality Management

Policy

6.2.1. The applicable international, national and local planning policy is summarised as follows, full details are presented in Appendix 6.1:

- Department for Business, Energy and Industrial Strategy (BEIS) [published under the former Department of Energy and Climate Change (DECC)], National Policy Statements (NPS) for Energy (Ref. 6.1). DECC has published six NPS for Energy in 2011 (see Chapter 2). Whilst EN-4 and EN-5 are relevant to the Proposed Scheme, EN-1 and EN-2 are the most relevant in regards to air quality.
- Ministry of Housing, Communities and Local Government (HCLG) [published under the Department of Communities and Local Government (DCLG)], National Planning Policy Framework (NPPF) (Ref. 6.2). The Government's overall planning policies for England are described in the NPPF. One of the 12 core planning principles in the NPPF is that planning should *"contribute to conserving and enhancing the natural environment and reducing pollution."* The draft NPPF (Ref. 6.3) published in March 2018 includes some minor amendments to the existing air quality considerations. The draft NPPF states the need to consider air quality and potential mitigation at the plan making stage.
- Selby District Council (SDC), Local Plan 2013 (Ref. 6.4). SDC's Local Plan, Policy SP18 Protecting and Enhancing the Environment, states that: "*The main elements of the diverse range of assets that exist in the District (and which Policy SP18 seeks to protect and enhance) are: …. Air quality*". Saved policies from the 2005 Selby District Local Plan (Ref. 6.5) include Policy ENV2 Environmental pollution and Contaminated land that states: "*Proposals for development which would give rise to, or would be affected by, unacceptable levels of noise, nuisance, contamination or other environmental pollution including groundwater pollution will not be permitted unless satisfactory*

remedial or preventative measures are incorporated as an integral element in the scheme."

National Policy Statements

6.2.2. The NPS EN-1 details the approach the SoS should follow in determining whether a development is acceptable and in the public interest and highlights the role of the planning and pollution control systems. In regards to air quality and emissions, EN-1 stipulates that the SoS should:

- Focus on whether the development itself is acceptable in regards to its potential impacts on air quality;
- Assume that the regulator (i.e. Environment Agency) will properly enforce the relevant environmental regulatory regimes.
- Not refuse consent on the basis of pollution impacts unless there is reason why the EA would not grant an Environmental Permit for the Proposed Scheme.

6.2.3. NPS EN-1 supports the use of Combined Heat and Power (CHP) and the use of Carbon Capture and Storage (CCS). It stipulates that new combustion plants at or over 300 MW that fall under IED should demonstrate that the plant is "Carbon Capture Ready" (CCR) before consent may be given.

6.2.4. The NPS EN-2 states that developments should demonstrate good design and details policy requirements for assessing the potential impacts on air quality of energy infrastructure projects for fossil fuel generating stations.

Legislation

6.2.5. The applicable legislative framework is summarised as follows, full details are presented in Appendix 6.1:

- UK Air Quality Strategy (AQS) 2007 (Ref. 6.6)
- Air Quality (England) Regulations 2000 (Ref. 6.7).
- Air Quality (England) (Amendment) Regulations 2002 (Ref. 6.8).
- Air Quality Standards Regulations 2010 (Ref. 6.9).
- Environment Protection Act 1990 (Ref. 6.10).
- Environment Act 1995 (Ref. 6.11).
- IED (Ref. 6.12).

UK Air Quality Standards, Objectives and Limit Values

6.2.6. The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS) (Ref 6.6). The AQS sets standards for nine key air pollutants that reflect levels of pollution thought to avoid or minimise risks to health or ecosystems. The associated air quality objectives are policy targets, expressed as maximum permissible outdoor concentrations of pollutants that take account of economic efficiency, practicability, technical feasibility and timescales. The objectives for the key pollutants considered in this assessment are given in Table 6-1.

6.2.7. The European Union's Ambient Air Quality Directive also sets assessment levels for ambient air, known in the Directive as 'limit values'. In contrast to the objectives in the AQS, the limit values are legally binding on EU Member States. For the pollutants of interest to the Proposed Scheme, the EU limit values are numerically identical to the UK's objectives and enacted through the Air Quality Standards Regulations 2010 (Ref 6.9)

6.2.8. Table 6-1 also includes the relevant, non-statutory, target concentrations for protected conservation areas referenced in the Environment Agency online guidance (Ref. 6.13). A full list of all the relevant standards and objectives is presented in Appendix 6.1.

Table 6-1 - Air Quality Assessment Thresholds for Key Pollutants Relevant to the Air Quality Assessment of Impacts from the Proposed Scheme

Pollutant	Objective/ Limit Value[1] ($\mu g/m^3$)	Target Value[2] ($\mu g/m^3$)	Measured As	Set for the Protection of:
Nitrogen Dioxide (NO_2)	200	-	1 hour mean, not to be exceeded more than 18 times a year	Human Health
	40	-	Annual mean	
Particulate Matter (PM_{10})	40	-	Annual mean	
	50	-	24 hour mean, not to be exceeded more than 35 times a year	
Carbon Monoxide (CO)	10,000	-	8 hour mean	
Nitrogen Oxides (NO_x)	30	-	Annual mean	Ecosystems
	-	75	24 hour mean	
Ammonia (NH_3)	-	1	Annual mean, the lower value applies where lichen and bryophytes are present	
	-	3		

[1] Air Quality (England) Regulations 2000 (Ref 6.7); Air Quality Standards Regulations 2010 (Ref 6.9)
[2] Environment Agency Guidance (Ref 6.13)

6.2.9. The 'Air Quality Regulations' (Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002) (Refs 6.7, 6.8)) make clear that likely exceedances of the objectives should be assessed in relation to "*the quality of the air at locations which are situated outside of buildings or other natural or*

man-made structures, above or below ground", and where "*members of the public are regularly present*". Air quality assessments (in relation to human health) should, therefore, focus on those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. The assessment should not consider exceedances of the objectives at any location where relevant public exposure would not be realistic.

6.2.10. For the assessment of oxides of nitrogen and compliance with limit values set for the protection of vegetation, the EU Ambient Air Quality Directive requires that any monitoring location is representative of at least 1000 km^2. As such, it can be interpreted that compliance with such limit values (and corresponding objectives under the AQS) should not be assessed in the immediate vicinity of, for example, major roads or industrial installations. Indeed, the Directive (and corresponding Air Quality Standards Regulations, Ref 6.9) requires that the sampling locations be sited more than 5 km from industrial installations. Nevertheless, this assessment takes a conservative view and assesses the maximum impacts of the Power Station Site on ambient concentrations of nitrogen oxides (NOx), on sites designated for nature conservation, irrespective of the spatial scale over which this impact can be considered representative.

Guidance

6.2.11. A summary of the publications referred to in the preparation of this Chapter is provided below.

- *Local Air Quality Management Review and Assessment Technical Guidance* - The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their air quality review and assessment work (Ref. 6.14).
- *Land-use Planning & Development Control: Planning for Air Quality* - Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts (Ref. 6.15).
- *Guidance on the Assessment of Dust from Demolition and Construction* - This document published by the IAQM was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM_{10} impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified (Ref. 6.16).
- *Design Manual for Roads and Bridges* (DMRB) Volume 11 Section 3 Part 1, Air Quality (HA207/07) (Ref. 6.17).

- *Air Pollution Information Service website* (APIS) – This website provides background and indicative assessment levels for pollutant deposition, termed critical loads, and ammonia concentrations, termed critical levels, for use in air pollution impact assessments. The website is hosted by the Centre for Ecology and Hydrology and developed in partnership with the UK conservation agencies and regulatory agencies (Ref. 6.18).
- *Environment Agency: Risk assessments for specific activities*, *Environmental permits* - The air emissions section of this Environment Agency (EA) Guidance (online) has been referred to in determining the significance of impacts and the assessment methodology. (Ref. 6.13).
- *Selby Air Quality: Planning Guidance Note* – Selby District Council (SDC) has published an air quality planning guidance note to support developers when preparing air quality assessments. The guidance includes a checklist that enables applicants to check all relevant information have been included in detailed air quality impact assessment (Ref. 6.19).
- *UK Government's Planning Practice Guidance (PPG) – Air Quality* - This guidance provides a number of guiding principles on how the planning process can take into account the impact of new development on air quality, and explains how much detail air quality assessments need to include for proposed developments, and how impacts on air quality can be mitigated. (Ref. 6.20). The draft PPG (Ref. 6.21), published in March 2018, sets out the Government's approach to viability assessment for planning. The draft guidance will form part of the Government's online Planning Practice Guidance.

Consultation

6.2.12. Table 6-2 provides a summary of the consultation activities undertaken in support of the preparation of this Chapter.

Table 6-2 - Summary of Consultation Undertaken to Date (Air Quality)

Body / Organisation	Individual / Stat Body / Organisation	Meeting Dates and Other Forms of Consultation	Summary of Outcome of Discussions
Selby District Council	Environmental Health Officer.	Via Telephone and e-mail (February 2018)	SDC has agreed with the overall scope and methodology including: - Scoping out the assessment of construction and operational traffic. - The selected background and meteorological data - The identified sensitive receptors.

Body / Organisation	Individual / Stat Body / Organisation	Meeting Dates and Other Forms of Consultation	Summary of Outcome of Discussions
			The extent of the study area.
Environment Agency (EA) and Natural England (NE)	Lead Adviser, NE Air Quality Assessment Unit, EA Permitting Officer, EA	Meeting on 05/03/2018	- Overview of predicted emissions and scenarios. - Confirmation of designated sites for air quality assessment (site types and distances for air quality assessment). - Critical loads to be used - Approach to assessment for Project Process Contributions >1%. Approach to assessment for in-combination Process Contributions > 1%.

Scope of the Assessment

6.2.13. This section explains how the scope of the assessment has developed, and re-iterates the evidence base for insignificant effects (which have therefore been scoped out of the assessment), following further iterative assessment.

6.2.14. An EIA Scoping Report was submitted to the SoS in September 2017, as presented in Appendix 1.1.

6.2.1. A Scoping Opinion was received by the Applicant from the Planning Inspectorate (PINS) (on behalf of the SoS) on 23 October 2017, including formal responses from statutory consultees. The responses from the PINS/SoS in relation to air quality, and how those requirements should be addressed by the applicant, are set out in Table 6-3 below. Table 6-4 presents the statutory consultee comments received on the PEIR report in relation to air quality during the statutory consultation, and how those responses have been considered by the Applicant.

Table 6-3 - Scoping Opinion Summary Table (Air Quality)

Section	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of response
6.11	Effects on climate change	The Inspectorate does not agree that the impact of the project on climate during operation can be scoped out	The assessment of impact of the Proposed Scheme on climate is now included in Chapter 15 (Climate).
6.11	Carbon emissions against carbon budgets	The EIA Regulations do not specifically require an assessment of carbon emissions against carbon budgets. This approach to the assessment can be scoped out.	The assessment of impact of the Proposed Scheme on climate is now included in Chapter 15 (Climate). Comparisons to carbon budgets are included for context only.
6.11	Emissions	The terminology used within the Scoping Report [around "emissions intensity"] is vague. This should be clearly explained within the ES.	This topic is discussed further in Chapter 15 (Climate).
7.2.2	Emissions to air associated with operation of the gas pipeline	The Inspectorate agrees that the operation of the gas pipeline is not likely to result in any significant effects in terms of emissions to air and that this matter can be scoped out of consideration in the ES.	Noted.
7.2.2	Emissions to air resulting from operational traffic	Scoping out of operational traffic.	The evidence presented in the Chapter 5 (Transport) confirms that operational traffic has been scoped out.
7.2.3	Dust during operation	Section 7.2.3 of the Scoping Report notes that nuisance from dust will only be assessed during construction. No reference is made to the operational	Noted.

Section	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of response
		phase. However, having regard to the nature of the Proposed Development and activities of the operational phase, the Inspectorate does not consider there would be any likely significant effects and agrees that effects from dust during operation do not need to be assessed within the ES.	
n/a	Study area	Defining the Study Area after consultation with SDC and NE.	The ES defines the assessment area by referring to distance criteria referenced in relevant guidance, particularly IAQM/EPUK guidance for the construction phase and the EA criteria for the operation phase. Approach agreed with SDC and NE (refer to Table 6-2).
7.2.1	Sensitive receptors	Justify selected receptors and consult with SDC	The ES includes all relevant sensitive receptors based on comments received after consultation with SDC, NE and EA.
7.2.3	AQMA	Include impacts on AQMA as part of the Assessment	The ES includes an assessment of potential impacts on the AQMA.
7.2.4	Air dispersion modelling	Clearly define the relationship between the stack height and dispersion on the discharge of emissions. Justification of the	The assessment defines the worst case operational scenario and the selection of model inputs. It also includes a stack sensitivity

Section	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of response
		modelled parameters and the 'worst case' scenario assessed.	assessment that demonstrates that the selected stack height will ensure adequate dispersion of pollutants.
7.2.4	Baseline	Background data selection and consultation with SDC	The selection of background data has been agreed with SDC as part of the ES.
7.2.4	Deposition levels	The Scoping Report explains that impacts from nitrogen and acid deposition at ecological receptors will be assessed using background deposition levels taken from the Air Pollution Information System (APIS) website. The Inspectorate is content with this approach.	Noted.
7.2.1 and 7.2.4	Impacts in ecological sites resulting from nitrogen and acid deposition	Potential impacts on ecological receptors with regard to the cumulative assessment.	The cumulative assessment includes any relevant neighbouring projects that need to be considered and their potential impact on air quality, particularly on the sensitive receptors selected for this ES. This topic is discussed in this Chapter and also in Chapter 9 (Biodiversity) and Chapter 17 (Cumulative Effects)
n/a	Mitigation	Inclusion of mitigation	The ES provides a number of mitigation measures, particularly the implementation of a CEMP for the construction phase and

Section	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of response
			the potential application of SCR and NH_3 ceiling for the operational phase.
n/a	Air quality monitoring	The ES should set out long term air quality monitoring that would be undertaken as part of conditions in the environment permit.	The need for monitoring will be determined during Environmental Permit pre-application discussions with the EA.

Table 6-4 - Statutory Consultation Summary Table of the PEIR (Air Quality)

Body / Organisation	Comments	Response
SDC & NYCC	The method of assessment methodology and significance criteria and in particular the inclusion of a Construction Environment Management Plan (CEMP), to be submitted with the Environmental Statement (ES), during the construction phase and consideration of the Air Quality Management Area (AQMA) during the operational phase are agreed.	Noted
SDC & NYCC	It is noted and agreed that with the stack height set to 120 m, no exceedances of air quality objectives or limit values for the protection of human health are modelled. As such, no residual significant effects are expected on human health. The extent to which the proposal is 'future proofed' in the event that emission standards change and, it is assumed, become more strict should be set out. However, the comment that there are 'significant further reductions' with the 120 m stack height (compared to the 115 m current	A stack sensitivity assessment confirming the suitability of the 120 m stack is presented in Appendix 6.3. The emission concentrations considered in this assessment are in line with current IED limits. The assessment has considered the application of SCR abatement technology as well as an NH3 ceiling to ensure the Power Station Site can meet the 2017 BAT Reference document (BREF) conclusions on achievable emission limits for Large Combustion Plants.

Body / Organisation	Comments	Response
	cooling tower heights) needs quantifying.	
SDC & NYCC	It is noted that the air quality assessment will be completed in accordance with best practice guidance including: Institute of Air Quality Management (IAQM); Guidance on the Assessment of Dust from Demolition and Construction (June, 2016); Local Air Quality Management Review and Assessment Technical Guidance (LAQM.(TG))(2016); SDC: Air Quality Planning Guidance Note, April 2014; and EA online guidance: "Risk Assessments for specific activities: Environmental permits".	All listed guidance documents have been referenced in this Chapter where appropriate.

Insignificant Effects

6.2.2. The following effects have been considered insignificant and have therefore not been considered quantitatively within this Chapter, or have been assessed elsewhere within the ES:

- Dust and particulate matter emissions associated with activities during the construction phase (Stage 0, Stage 1 and Stage 2) - These would be controlled through the implementation of a CEMP, developed from the outline CEMP submitted in conjunction with this ES (the approval and implementation of the CEMP is secured by a requirement to Schedule 2 of the draft DCO (Document Ref. 3.1). This CEMP will be informed by the relevant IAQM guidance (Ref. 6.16) and will include prevention measures, such as screening stockpiles of material, deployment of windbreak netting and dampening exposed soils as appropriate, and set out requirements for ongoing monitoring and liaison with the local community and SDC. A qualitative construction dust risk assessment, following the IAQM 2014 guidance (Ref. 6.16), has been included in Appendix 6.2 to inform the measures required as part of CEMP. Effects from dust and particulate matter emissions, after mitigation is applied, are negligible and consequently are not assessed further in this Chapter. This is agreed with the SoS through the Scoping Opinion and with SDC.
- Exhaust emissions arising from construction plant equipment (applicable to Stage 0, Stage 1 and Stage 2) have the potential to impact local air quality. These emissions are NOx, NO_2 and particulate matter. Construction works for the Site Reconfiguration Works and for the Power Station Site would be

undertaken in the vicinity of the closest residential receptors (Drax Sports & Social Club, residential receptors along Main Road and New Road) for a limited period, with a staged approach to the construction of Unit X and Y. It is anticipated that construction of the first unit will be undertaken between late 2019 and 2022 and the second unit, if commissioned, will be constructed between 2021 and 2027. Similarly, the construction of the Gas Pipeline will be transitional with the closest receptors (residential receptors along Carr Lane, Main Road and Rushmore Lane) only affected for a limited period. As shown on the Figures 6.1 and 6.2 there will be a minimum distance of 100 m between the receptors and the edge of the Power Station Site and 50 m from the Pipeline Area, where the main construction activities would be undertaken. Any likely effects from construction plant emissions are expected to be controlled through the implementation of a CEMP. Therefore, the effects from NO_X, NO_2, PM_{10} and $PM_{2.5}$ emissions, after mitigation is applied, are negligible and consequently are not assessed further in this Chapter. This is agreed with the SoS through the Scoping Opinion and with SDC.

- NO_X / NO_2 and particulate matter exhaust emissions are likely to arise from construction (Stage 0, Stage 1 and Stage 2) and operational traffic generated by the Proposed Scheme. Operational traffic will be limited to staff vehicle trips and material deliveries. The number of trips generated during operation is not predicted to be above the criteria set out in DMRB for defining roads 'affected' by project-related traffic and requiring an air quality assessment (1,000 Annual Average Daily Traffic (AADT), or 200 AADT Heavy Duty Vehicles) (Ref. 6.17). Similarly, construction traffic levels are also expected to be below the DMRB criteria. It is therefore unlikely that operational and construction traffic will result in significant changes in ambient pollutant concentrations. As a result, construction and operational traffic have not been considered further in this Chapter. Further details on the expected traffic during the construction and operational phase are presented in Chapter 5 (Trans**port), i**ncluding, with regard to construction traffic, the outline Construction Traffic Management Plan and outline Construction Workers Travel Plan, both of which will be approved and implemented in accordance with requirements in Schedule 2 to the draft DCO (Document Ref. 3.1). This is agreed with the SoS through the Scoping Opinion and with SDC.

Potentially Significant Effects

Operation Phase

6.2.3. Emissions to air from the Power Station Site have the potential to significantly affect sensitive human and ecological receptors. A quantitative assessment of emissions of NO_X, NO_2, NH_3, CO, sulphur dioxide (SO_2), PM_{10} and hydrogen chloride (HCl) from the operation of the Power Station Site was undertaken. The assessment considered both OCGT and CCGT operation of the proposed new gas-fired units. Furthermore, with CCGT operation, operation without and with the use of exhaust gas treatment to reduce NOx emissions (for example, Selective Catalytic Reduction, SCR) was modelled.

6.2.4. A quantitative assessment of potential cumulative effects from emissions of NO_X and ammonia from the Eggborough Power Station and Thorpe Marsh Power Station was also undertaken. Detailed information on the scenarios considered, modelling inputs and results are presented in Appendix 6.3. Eggborough and Thorpe Marsh Power Stations are the only processes with significant potential for cumulative impacts on ecological receptors and key human receptors (refer to Chapter 17 (Cumulative Effect))[1].

6.2.5. The potentially significant effects from the operation of the Proposed Scheme relate to increased exposure to air pollutants and pollutant deposition for human and ecological receptors. The key pollutants for such effects are NOx, NO_2 and ammonia (and their deposition to the ground/vegetation). The contribution of the Proposed Scheme to ambient concentrations of other pollutants (particulate matter, SO_2, CO and HCl) is shown in Appendix 6.3 to be imperceptible and not significant.

Decommissioning Phase

6.2.6. Impacts during decommissioning are considered to mirror construction impacts with the study area defined as for the construction phase. No likely significant effects are anticipated with an appropriate decommissioning environmental management plan (DEMP) in place (and a requirement in Schedule 2 to the draft DCO (Document Ref. 3.1) secures the approval and implementation of a DEMP).

6.3 Assessment Methodology and Significance Criteria

Key Points Summary

- Baseline air quality is assessed using existing local and national data holdings. No scheme-specific monitoring was necessary.
- The potentially significant effects of the Proposed Scheme relate to emissions from combustion plant and these have been assessed using dispersion modelling
- Two core scenarios have been considered for the new gas turbines:
- Scenario A – Low NOx Emissions achieved without use of additional NOx abatement
- Scenario B – Low NOx Emissions achieved through NO_X abatement technology
- Cumulative impacts corresponding to these core scenarios are considered in Scenarios C and D
- Impacts are modelled for human and ecological receptors
- The significance of resulting effects is assessed, for human receptors, using guidance published by the Institute for Air Quality Management
- Impacts on ecological receptors are screened against Environment Agency insignificance criteria

[1] Whilst there are other power stations across the region, these stations are over 15km from the sensitive receptors and their impacts would, in reality, be imperceptibly small.

Scenarios Assessed

6.3.1. The emission limits applicable to the proposed new gas turbines (Units X and Y) will be set within the Environmental Permit for the facility. The permitting process will have regard to the limits set within the IED (Ref 6.12). Best Available Technology (BAT) reference documents (BREFs) are periodically updated and adopted under the IED. The "BAT conclusions" is a document containing the parts of a BREF laying down the conclusions on best available techniques. According to Article 14(3) of the IED, BAT conclusions shall be the reference for setting the permit conditions to installations covered by the Directive. The latest BAT conclusions for large combustion plant, and associated emission levels (AELs), were published in July 2017 (Ref 6.33).

6.3.2. The proposed gas turbines (Units X and Y) are intended to achieve greater efficiency than the top of the range set out in the latest BAT Conclusions (i.e. 60.5%). Such units were not considered during the development of the BAT conclusions due to there being insufficient data available. The high efficiency is achieved through higher temperatures within the turbine, with a consequential potential for higher thermal NOx emissions. The NOx emission guarantees being given by the manufacturer of the proposed units are, without the use of NOx abatement technology, outside of the BAT AEL range for NOx set for lower efficiency units. Optimum energy efficiency is highly desirable from an environmental perspective, due to lower emissions of greenhouse gases per KWh generated whilst the current technologies for NOx abatement through, for example, Selective Catalytic Reduction (SCR) have additional and potentially harmful emissions to air (ammonia slip) that may offset the benefits of any NOx reduction.

6.3.3. Taking into account the energy efficiency of the proposed gas turbines, we consider that they are beyond the scope of the latest BREF and associated BAT conclusions and, as such, have assessed the air quality impacts of the gas turbines with emissions at the levels guaranteed by the manufacturers without the use of NOx abatement technology. These emission levels meet the limits set out in the IED for gas turbines, namely 50mg/Nm^3, as an annual average.

6.3.4. In addition, we have considered the air quality impacts with emissions at the levels set in the BAT AELS (albeit for lower efficiency units), namely 30mg/Nm^3 NOx as an annual average and 40 mg/Nm^3 NOx as a daily average for CCGT plant or 50mg/Nm3 as a daily average of OCGT plant operating <1500 hrs/year. Based on currently available technology, this would require the use of NOx abatement such as SCR and, in this scenario, we consider the combined impacts of NOx and NH_3 emissions.

6.3.5. A summary of the core scenarios considered in the air quality assessment is presented in Table 6-5. These are based on the Proposed Scheme details described in Chapter 3 (Site and Project Description) and the emission limit discussion above. Appendix 6.3 includes a full list of the scenarios assessed.

6.3.6. Scenarios A1 and A2 model the impacts of the operation of Units X and Y with continuous operation in Combined Cycle and Open Cycle respectively, but without the use of NOx abatement technology.

6.3.7. Scenario B considers the operation of Units X and Y with exhaust gas treatment for NOx abatement. The assessment has been undertaken on the basis that, if SCR is used for the NOx abatement, the total emissions of ammonia will be no greater than 120 tonnes/annum (referred to in this chapter as 'the ammonia cap' to describe total emissions from Unit X and Unit Y). For the purpose of this assessment, this scenario has been modelled as Units X and Y operating for 1,500 hours in open cycle (without requirement for SCR) and the remainder of the year (~7,260 hours) in combined cycle (with SCR). This scenario represents a likely worst-case for the proposed ammonia cap in terms of air quality impacts since it maximises potential NOx emissions whilst meeting the ammonia cap. In practice, the ammonia cap may be achieved by other means, for example limiting operation to a single unit or by taking into account both emission rate and the number of operating hours in combined cycle mode for either or both Units, but impacts from these scenarios would be no worse than those modelled. The cap is necessary to limit the adverse environmental impacts of ammonia emissions with SCR.

6.3.8. Scenarios C and D represent the cumulative assessments corresponding to Scenarios A1 (CCGT, no NOx abatement) and B (NOx abatement in line with the ammonia cap). In Scenario C, it is assumed that the Proposed Scheme (Scenario A1) and Eggborough Power Station operate without exhaust gas treatment for NOx. In Scenario D, it is assumed that the Proposed Scheme (Scenario B) and Eggborough Power Station operate with SCR (including ammonia cap for the Proposed Scheme).

6.3.9. Scenarios A1 and C provide the worst realistic cases for the Proposed Scheme alone (A1) and cumulatively (C) in respect of NOx emissions and impacts on ambient concentrations of NOx and NO_2. It will be shown later in this chapter that operation in open cycle (Scenario A2) generates lower impacts than combined cycle operation.

6.3.10. NOx emissions (and impacts on ambient NOx and NO_2 concentrations) are reduced in Scenarios B and D (alone and cumulatively, with NOx abatement) in comparison to Scenarios A1 and C (alone and cumulatively, without NOx abatement). However, Scenarios B and D model the worst realistic impacts (alone and cumulatively) for ecological receptors due to their impacts on ambient concentrations of ammonia and total nitrogen and acid deposition.

Table 6-5 - Air Quality Assessment Scenarios

Scenario	Existing Power Station	Gas Generating Stations Unit X & Y	Gas Receiving Facility	Eggborough Power Station	Thorpe Marsh Power Station

Scenario	Existing Power Station	Gas Generating Stations Unit X & Y	Gas Receiving Facility	Eggborough Power Station	Thorpe Marsh Power Station
Do Nothing (Future baseline)	2 Coal units + 4 Biomass units	-	-	-	-
With Proposed Scheme					
Scenario A1	4 Biomass units	4 Gas Turbines in CCGT mode without NOx abatement	12 boilers	-	-
Scenario A2	4 Biomass units	4 Gas Turbines in OCGT mode	12 boilers	-	-
Scenario B	4 Biomass units	4 Gas Turbines, 1,500 hours in OCGT mode, up to7,260 hours in CCGT mode with NOx abatement and ammonia cap	12 boilers	-	-
Cumulative Effects					
Scenario C	4 Biomass units	4 Gas Turbines in CCGT mode (Scenario A1)	12 boilers	Without SCR	Without SCR
Scenario D	4 Biomass units	4 Gas Turbines, 1,500 hours in OCGT mode,~7,260 hours in CCGT mode with NOx abatement and ammonia cap (Scenario B)	12 boilers	With SCR	Without SCR

6.3.11. The scenario in which Unit X is operating during the construction of Unit Y will have lower impacts than the future scenarios considered here (with both Unit X and Unit Y in operation) and as such Stage 2 (operation of Unit X, construction of Unit Y) has not been explicitly modelled. The assessment of Stage 2 is therefore conservative, given it is based on a scenario in which both units are operational rather than one.

6.3.12. Existing air quality monitoring and national modelling (see Section 6.4 – Baseline Air Quality) implicitly include a contribution from the current operations at the Power Station and, therefore, the current baseline does not require modelling.

Since the assessment makes no allowance, quantitatively, for future improvements in air quality, the current baseline is also representative of the near future. However, by the time of operation of Unit X, emissions from the existing units will be required to meet the emission levels set out in the IED / BAT conclusions for solid fuel combustion. The Future Baseline / Do Nothing scenario explicitly modelled therefore considers the existing plant meeting future emission levels (Appendix 6.3).

6.3.13. The existing biomass boilers (4No) do not form part of the Proposed Scheme but contribute to air quality impacts in the vicinity of the plant. Moreover, the contribution of the Proposed Scheme to local pollution levels should take account of the repowering of the 2 coal units. As such, the 4 biomass units (without coal) are included in the modelling of the 'With Propsed Scheme' scenarios. Due to the height of the main stack (through which the biomass and coal units currently discharge), this has limited impact on the modelled impacts but is included for completeness.

6.3.14. The electrical connection options for Unit Y have no impact on modelled pollutant concentrations and do not, therefore, affect the modelled scenarios.

Primary Mitigation

6.3.15. The Proposed Scheme allows for primary mitigation of impacts during operation through setting an appropriate stack height (Appendix 6.3) and control of NOx emissions. As set out in the previous section, two scenarios have been considered for the control of NOx emissions:

- Without additional NOx Abatement – Low NOx emissions (<50 mg/Nm^3 in the exhaust gases, IED compliant) can be achieved via optimisation of the combustion process in Units X and Y. This reduces the maximum efficiency of the units slightly but does not require exhaust gas treatment. Low NOx emissions, as a result of combustion control, are assumed for the purposes of the assessment of the A1 scenario (CCGT mode) (and therefore the cumulative assessment in Scenario C) and A2 scenario (OCGT mode).

- Exhaust Gas Treatment – The use of exhaust gas treatment such as SCR can further reduce NOx emissions (<30 mg/Nm^3 in CCGT mode, BAT-AEL compliant) 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 cap of 120 tonnes of ammonia. This exhaust gas treatment, operating at the ammonia cap, is assumed in relation to CCGT mode in Scenario B (and therefore the cumulative assessment in Scenario D)[2].

[2] SCR is not required for the plant operating in OCGT since operation in OCGT mode will be limited to <1500 hours / year and in such circumstances, the annual mean BAT-AEL of 35mg/Nm^3 does not apply whilst 50mg/Nm^3 as a daily mean can be met without requirement for abatement.

Embedded Mitigation

6.3.16. The implementation of dust control measures described in the Outline CEMP (Document Reference 6.5) has been considered as tertiary mitigation and as such any potential impacts during construction activities have been considered insignificant after the implementation of CEMP. The Outline CEMP has been submitted as part of this application and its approval and implementation are secured by a requirement in Schedule 2 to the draft DCO (Document Ref. 3.1).

Extent of the Study Area

6.3.17. In relation to operational impacts, the study area extends 15 km in all directions from the Power Station Site (refer to Figure 6.3). This distance conforms to the EA guidance (Ref 6.11).

Receptors

6.3.18. The assessment of operational impacts considered impacts on sensitive human and ecological receptors. In terms of ecological receptors, the receptors were identified based on the following EA guidance (Ref. 6.13):

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites (protected wetlands) within 15 km of the Power Station Site.
- Sites of Special Scientific Interest (SSSIs) and local nature sites within 2 km of the Power Station Site.

6.3.19. Summaries of the identified human and ecological receptors are presented in Table 6-6 and Table 6-7 respectively and their location is shown in Figure 6.4. Note that ecological receptors are represented in the assessment as a series of discrete receptors covering the area of the designation within the study area.

Table 6-6 - Human Receptors Considered in the Air Quality Assessment

Receptor ID	Receptor	X (m)	Y(m)
R1	Foreman's Cottage	466848	428488
R2	East Yorkshire Caravan	466681	426392
R3	Drax Sports & Social Club	466440	426327
R4	Wren Hall	467290	427162
R5	3 Pear Tree Avenue	467759	428000
R6	Crange Cottages	465346	426160
R7	Drax Abbey Farm	467077	428276

Table 6-7 - Ecological Receptors Considered in the Air Quality Assessment

Receptor	APIS Classification
River Derwent SAC, SSSI	Rivers and streams
Thorne Moor SAC, SSSI	Degraded raised bog
Lower Derwent SAC, SPA, Ramsar	Low and medium altitude hay meadows (neutral/calcareous)
Breighton Meadows SSSI (Lower Derwent)	Low and medium altitude hay meadows (neutral/calcareous)
Derwent Ings SSSI (Lower Derwent)	Low and medium altitude hay meadows (neutral/calcareous)
Humber Estuary SPA, SAC, Ramsar, SSSI	Mudflats and sandflats not covered by seawater at low tide Pioneer, low-mid, mid-upper saltmarshes
Skipwith Common SAC, SSSI, National Nature Reserve (NNR)	Northern wet heath European dry heath
Eskamhorn Meadows SSSI	Low and medium altitude hay meadows (neutral)
Brockholes Sites of Importance for Nature Conservation (SINC)	Fen, Marsh and Swamp
Meadow East of Orchard Farm SINC	Neutral grassland

Method of Baseline Data Collation

6.3.20. A desktop study was undertaken to collate baseline information and included the following:

- Consultation with Environmental Health Officer (EHO) at SDC to agree the scope of the assessment and the methodology to be applied, and to obtain the baseline data to be used in the assessment.
- Review of Selby District Council (SDC) latest Review and Assessment reports (Ref. 6.22) and air quality data for the area surrounding the Site, including data from Defra (Ref. 6.23) and the EA (Ref. 6.24).
- Review of monitoring data collated by the Existing Drax Power Station Complex and historic data collected the Aire Valley Power Stations Joint Environment Programme (JEP) (Ref. 6.25).

Assessment Methodology

6.3.21. To assess potential impacts from emissions from the new stacks associated with the Power Station Site atmospheric dispersion modelling was performed using the Cambridge Environmental Research Consultants (CERC) Air Dispersion Modelling Software (ADMS 5.2.1). This model uses detailed information regarding the

pollutant releases, local building effects and local meteorological conditions to predict pollution concentrations at specific locations selected by the user.

6.3.22. Operation of the Proposed Scheme was considered in both open (OCGT) and combined cycle (CCGT) operations. To ensure a realistic worst case scenario, the generating units are assumed to run at full load continuously. Combined cycle is the more likely operating scenario and the results presented in the main chapter for operation without exhaust gas treatment (Scenario A1 and Scenario C) assume operation at all times in this mode. For operation with exhaust gas treatment, to meet the ammonia emissions cap, 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.

6.3.23. A stack sensitivity assessment (Appendix 6.3) was undertaken to identify the stack height that ensures adequate dispersion of air pollutants, minimising environmental impacts (including visual impacts) whilst ensuring that no significant effects result from emissions to air. The approach is in line with the EPUK and EA guidance.

6.3.24. The air quality assessment for the operational phase followed the EA online guidance (Ref. 6.13). The conversion of NO_X to NO_2 adopted the approach outlined in the AQMAU Guidance Note 'Conversion Ratios for NO_X and NO_2' (2006) (Ref 6.24).

6.3.25. A detailed description of the air dispersion modelling inputs, scenarios and assumption are presented in Appendix 6.3.

6.3.26. The modelled contributions of the Proposed Scheme and cumulative processes to long-term and short-term ambient pollutant concentrations (Process Contribution, PC) are compared with the appropriate assessment levels alone and in combination with background concentrations (PEC, i.e. PC plus background levels). The relevant assessment standards are set out in Table 6-1.

6.3.27. For impacts on ecological receptors, the assessment standards for the concentration of pollutants in air set out in Table 6-1 are termed 'critical levels'. For NOx, the critical levels are independent of the habitat type; for NH_3, the critical level is 3µg/m^3 but this decreases to 1µg/m^3 if lower order plants are present. Critical levels are set at the concentrations above which direct effects on receptors *may* occur according to present knowledge.

6.3.28. For deposition, no comparable regulated standards exist and the impacts are assessed against critical loads. Critical loads are set for effects due to eutrophication (nitrogen deposition) and acidification (combined action of sulphur and nitrogen deposition). Critical loads are set at levels below which, according to current knowledge, significant harmful effects do not occur.

6.3.29. Critical loads are assigned to habitat classes of the European Nature Information System (EUNIS) to enable consistency of habitat terminology and understanding

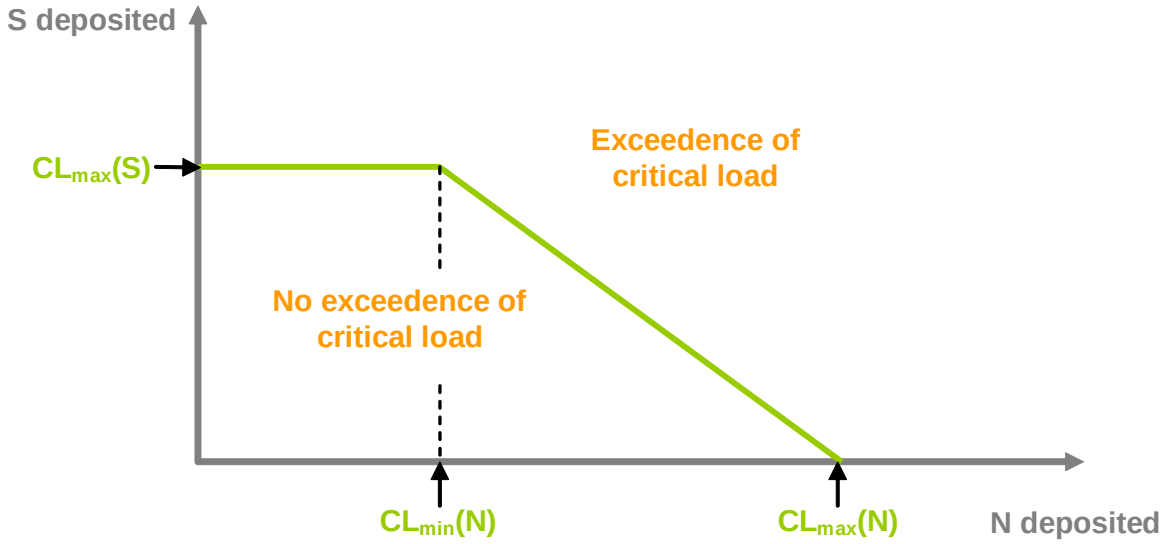
across Europe. They are given as ranges (e.g. 10-20 kgN/ha/yr) which reflect variations in ecosystem response and soil types across Europe. In the assessment, a conservative approach is adopted and impacts are compared to the lower limit of the specified range.

6.3.30. For acidification, the 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. In the CLF, sulphur deposition is plotted against nitrogen deposition (shown below), and the risk of acidification impacts is characterised by the following three quantities:

- CLmax(S) – Maximum critical load for sulphur
- CLmin(N) – Minimum critical load for nitrogen
- CLmax(N) – Maximum critical load for nitrogen

6.3.31. This is shown in Diagram 6-1.

Diagram 6-1 - Schematic of Critical Load Function for acidification



6.3.32. The critical loads for the assessment were agreed with the Proposed Scheme's ecologist with reference to the levels set out on the APIS website. For sites designated at international or national level, the APIS facility to extract 'site-specific relevant critical loads' was used (Ref. 6.18). For local designated sites, critical loads were extracted using the APIS 'search by location tool' and the designated feature for the site. These data are set out in Table 6-8 and Table 6-9.

6.3.33. An assessment of the increased deposition of both nutrient nitrogen and acid due to nitrogen is carried out in accordance with the methodologies described in the Environment Agency AQMAU 'AQTAG06 Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air' (Ref. 6.27).

Table 6-8 - Critical Loads (CL) for internationally designated sites (and constituent SSSI units). Data are taken from the APIS website

Site	Habitat	Range	Nitrogen (kgN/ha/yr)	Acid Deposition		
				$CL_{min}N$	$CL_{max}N$	$CL_{max}S$
River Derwent	Rivers and streams	Min	No critical loads set			
		Max				
Lower Derwent / Breighton Meadows /Derwent Ings	Low and medium altitude hay meadows (neutral/ calcareous)	Min	20	0.856	4.856	4.000
		Max	30	1.710	5.710	4.000
Thorne Moor	Degraded raised bog	Min	5	0.321	0.462	0.141
		Max	10	0.321	0.467	0.146
Humber Estuary	Pioneer, low-mid, mid-upper saltmarsh	Min	20	Not Sensitive		
		Max	30			

Table 6-9 - Critical Loads (CL) for nationally designated sites. Data are taken from the APIS website

Site	Habitat	Range	Nitrogen (kgN/ha/yr)	Acid Deposition		
				$CL_{min}N$	$CL_{max}N$	$CL_{max}S$
Eskamhorn Meadows	Neutral grassland	Min	20	0.438	1.998	1.560
		Max	30			
Brockholes	Fen, marsh and swamp	Min	10	Not sensitive		
		Max	15			
Meadow East of Orchard Farm	Northern wet heath / European dry heath	Min	10	1.071	5.071	4.000
		Max	20			

6.3.34. The results of the detailed dispersion modelling are also presented as isopleths in Figures 6.5 to 6.12.

Significance Criteria

6.3.35. The assessment of potential effects as a result of the Proposed Scheme has taken into account the operational phase. The approach provided in the EPUK/IAQM (Ref. 6.15) guidance has been used within this assessment to assist in describing the air quality effects of emissions by the Proposed Scheme once operational. This is in line with best practice.

Human Receptors

6.3.36. For long term (annual mean) pollutant concentrations, the EPUK/IAQM guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion. This is summarised in Table 6-10.

Table 6-10 - Impact Descriptors for Individual Receptors

Long term average concentration at receptors in assessment year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% AQAL	Negligible	Slight	Moderate	Moderate
95 – 102 of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109 %	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Notes
AQAL = Air Quality Assessment Level, which for this assessment related to the UK Air Quality Strategy objectives.
Where the %change in concentrations is <0.5%, the change is described as 'Negligible' regardless of the concentration.
When defining the concentration as a percentage of the AQAL, 'without scheme' concentration should be used where there is a decrease in pollutant concentration and the 'with scheme;' concentration where there is an increase.
Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.

6.3.37. For short term (hourly and 8-hourly averages) pollutant concentrations from sources such as the Proposed Scheme ('point' sources), the EPUK/IAQM guidance recommends that the impact is described with reference to the magnitude of the impact from the process without consideration of the background concentrations. This is based on an assumption that the background concentrations will be smaller than the peak concentrations caused by a

substantial plume. Where the impact is ≤10% of a standard, it is negligible; impacts in the range 11-20% are slight, 21-50% are moderate and those ≥51% are substantial.

Ecological Receptors

6.3.38. 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) 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).

6.3.39. In terms of NO_X concentrations, the assessment references the EA guidance (Ref. 6.13), where total Predicted Environmental Concentrations ((PEC) PC plus background concentrations) do not exceed 70% of the long term standard, or 20% of the headroom between short term standard and short term background concentrations, the impact is likely to be acceptable, with no significant effects. In the event that impacts exceed the criteria set out above, this information along with changes in nutrient nitrogen deposition and NO_X concentrations were provided to the Project ecologist to determine the significance of effects based on their professional judgment. Refer to Chapter 9 (Biodiversity) for further information.

Effect Significance

6.3.40. The following terms have been used to define the significance of the effects identified:

- Major effect: where the Proposed Scheme could be expected to have a very significant effect (either positive or negative) on receptors. For human receptors it is defined as when predicted impacts are classed as substantial, based on the IAQM criteria. For ecological receptors this is defined by the Project ecologist and it is specific for each designated site.
- Moderate effect: where the Proposed Scheme could be expected to have a noticeable effect (either positive or negative) on receptors. For human receptors it is defined as when predicted impacts are classed as moderate, based on the IAQM criteria. For ecological receptors this is defined by the Project ecologist and it is specific for each designated site.
- Minor effect: where the Proposed Scheme could be expected to result in a small, barely noticeable effect (either positive or negative) on receptors. For human receptors it is defined as when predicted impacts are classed as slight,

based on the IAQM criteria. For ecological receptors this is defined by the Project ecologist and it is specific for each designated site.

- Negligible: where no discernible effect is expected as a result of the Proposed Scheme on receptors. For human receptors it is defined as when predicted impacts are classed as negligible, based on the IAQM criteria. For ecological receptors a negligible effect is based on EA guidance and is describe on paragraph 6.3.38 and 6.3.39.

6.3.41. These definitions of significance are conservative in that they directly relate impacts at individual receptors to significance. EPUK/IAQM guidance indicates that their descriptors are applicable to individual receptors only and that overall significance of effects should take account of such factors as the existing and future air quality in the absence of the development, the extent of current and future population exposure to the impacts and the influence/validity of assumptions adopted for the assessment.

6.4 Baseline Conditions

Key Points Summary

- **Ambient pollutant concentrations are well within the statutory air quality objectives and limit values for the protection of human health in the immediate vicinity of the Power Station**
- **There is a single Air Quality Management Area within the study area, in the centre of Selby Town. It is 6km from the Power Station and associated with vehicle emissions.**
- **NOx concentrations are well within their critical level over all sites designated for nature conservation in the study area**
- **NH_3 concentrations exceed the critical level where lower order plants are present but are within the critical level for other vegetation**
- **Nitrogen and acid deposition exceed the critical loads and critical load functions for the most sensitive habitats across all over sites designated for nature conservation with the exception of Eskamhorn SSSI and Lower Derwent SAC**

Current Baseline

6.4.1. The Proposed Scheme is located in an area where air quality is influenced by emissions from the Existing Drax Power Station Complex and by traffic emissions from vehicles using the local road network, including the M62 motorway. There are a number of industrial pollution sources in the surrounding area that influence air quality, including the Eggborough Power Station.

6.4.2. According to the latest Air Quality Annual Status Report (Ref. 6.22) from SDC, the air quality objectives are met throughout the District, apart from exceedances of the annual mean NO_2 objective in Selby Town. As a result of these exceedances SDC designated an AQMA in 2016. The Proposed Scheme lies approximately 6 km to the southeast of the AQMA. SDC is currently preparing a draft Air Quality Action Plan (AQAP) to address air quality issues within its area of jurisdiction.

6.4.3. SDC does not monitor air quality in the vicinity of the Proposed Scheme. There is, however, historic monitoring available, with the survey undertaken as part of the Aire Valley Power Stations Joint Environment Programme (JEP). In addition, on site monitoring has been undertaken as part of permitting requirements for the Existing Drax Power Station Complex to demonstrate compliance with the air quality objectives. No exceedances were reported between 2005 and 2015 and the monitoring requirements ceased when tighter emission limits were introduced as part of the IED in 2016.

6.4.4. Background pollutant concentrations are available from the national maps provided on the Department for Environment, Food & Rural Affairs (Defra) website (Ref. 6.23), where background concentrations of those pollutants included within the Air Quality Strategy (AQS) have been mapped at a grid resolution of 1x1 km for the whole of the UK. Projected concentrations are available for all years between 2016 and 2030.

6.4.5. Table 6-11 presents a summary of the monitoring and mapped background concentrations. The available local air quality data are considered appropriate for use in this assessment and no site specific air quality monitoring was undertaken. The concentrations take into account the contribution of existing industrial processes in the vicinity of the Proposed Scheme, including the Drax Power Station itself. The data are, therefore, conservative for use as background concentrations for the assessment of impacts on human health.

Table 6-11- Monitored Backgorund Pollutant concentrations (µg/m3)

Source	NO_x	NO_2	SO_2	PM_{10}	$PM_{2.5}$
Defra background maps 2018[1]	11.2-14.7	8.5-10.9	n/a	11.8-14.1	7.9-9.0
JEP – Carr Lane[2]	n/a	n/a	2.6	n/a	n/a
JEP - Downes Ground Farm[2]	n/a	15.2	2.1	n/a	n/a
JEP - Hemingbrough Landing[2]	n/a	14.2	2.3	n/a	n/a
JEP – West Bank[2]	n/a	15.1	2.5	n/a	n/a

[1]The range covers concentrations at grid squares within 2 km from the Site, concentrations at individual receptors are presented in Appendix 6.3**.**
[2] Average concentrations 2009 – 2015 calculated from the Drax Power Limited Annual Reports (Ref. 6.25)

6.4.6. Background levels of acid and nitrogen (N) deposition, NH_3, NOx and SO_2 concentrations at ecological receptors were taken from the APIS website. A summary of the background concentrations and deposition levels at the identified ecological receptors are presented in Table 6-12.

Table 6-12 - Background Pollutant Concentrations and Deposition Levels at Ecological Receptors

Site	NO_x ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NH_3 ($\mu g/m^3$)	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (Keq/ha/yr)	
					(N)	(S)
River Derwent SAC, SSSI	13.1 – 16.3	0.62 – 0.95	2.23 – 2.76	14.7 – 19.18	1.05 – 1.37	0.25 - 0.29
Thorne Moor SAC, SSSI	15.1 – 18.6	0.51 – 0.62	1.43 – 2.39	14.7 – 18.9	1.05 – 1.35	0.25 - 0.26
Lower Derwent SAC, SPA	13.1 – 15.3	0.64 – 0.94	2.42 – 2.81	19.2 – 21.0	1.37 – 1.50	0.28 – 0.30
Breighton Meadows SSSI	14.8 – 15.3	0.76 – 0.91	2.14 – 2.81	17.9 – 21.0	1.28 - 1.5	0.26 – 0.30
Derwent Ings SSSI	13.1 – 15.3	0.64 – 0.94	2.42 – 2.76	19.2 – 20.9	1.37 – 1.49	0.28 – 0.30
Humber Estuary SPA, SAC, SSSI	15.0 – 23.2	0.62 – 0.92	2.09 – 2.92	17.8 – 20.7	1.27 – 1.48	0.28 – 0.29
Skipwith Common SAC, SSSI	13.8 – 14.8	0.68 – 0.79	2.34 – 2.42	19.2	1.37	0.28 – 0.29
Eskamhorn Meadows SSSI	16.0 – 16.5	0.60 – 0.62	2.14	17.9	1.28	0.26
Brockholes[1] SINC	17.8	2.40	2.23	18.5	1.32	0.26
Orchard Farm[1] SINC	17.9	2.88	2.24	19.2	1.37	0.31

[1] No maximum and minimum values available

6.4.7. The review of existing pollutant concentrations and deposition rates over the identified designated sites has shown that NO_X and SO_2 concentrations are within the relevant critical levels (30 $\mu g/m^3$ and 20 $\mu g/m^3$ respectively). NH_3 concentrations are likely to exceed the critical levels where lower plants are present (ammonia critical levels/targets are1$\mu g/m^3$ for lower plants; 3$\mu g/m^3$ for higher plants), specifically over the Thorne Moor and Skipwith Common sites (Appendix 6.1). Note that according to APIS, NO_X concentrations over the Humber Estuary exceed the critical level in places (Immingham) but these areas are well outside the study area for the Power Station Site impacts. Nitrogen deposition exceeds the lower range of the relevant critical loads for all identified designated sites with the exception Eskamhorn Meadows SSSI and Lower Derwent SAC (the

latter for acid deposition only). Deposition exceeds the higher range of the critical level for Thorne Moor SAC and the Humber Estuary.

Future Baseline

6.4.8. It is expected that, should the Proposed Scheme not proceed, the baseline conditions on-site in relation to local air quality will likely remain unchanged or that concentrations will slightly reduce. The reduction is due to the expected reduction in vehicle emissions as older, more polluting vehicles are replaced by cleaner vehicles and, in addition, the decrease in emissions from the Power Station itself due to the aforementioned requirements for the existing units to meet BAT-AELs.

6.4.9. Table 6-13 presents future pollutant concentrations in 2026 and demonstrates a reduction in pollutant concentrations compared to concentrations in 2018, as mapped by Defra (**Error! Reference source not found.**). The reductions in pollutant concentrations have not been assumed within the assessment. This ensures a conservative assessment but has limited material impact on the outcome of the assessment since current and future pollutant concentrations are well within the air quality standards whether or not the improvement is taken into account.

Table 6-13- Future Pollutant Concentrations (µg/m$_3$)

Source	NO_x	NO_2	SO_2	PM_{10}	$PM_{2.5}$
Defra background maps 2026	8.2-11.2	6.3-8.5	n/a	11.5-13.7	7.6-8.7

6.5 Assessment of Likely Significant Impacts and Effects

Key Points Summary

- No likely significant effects will arise during construction works, whether as result of emissions of dust and particulate matter from earthworks or emissions from construction plant and vehicle exhausts.
- The stacks for the proposed gas turbines should be 120m tall to minimise impacts on local air quality.
- The operation of the new gas turbines will not result in exceedances of statutory objectives and limit values for the concentration of pollutants in ambient air, whether operated as a single unit or two units together,
- No significant effects on human health are likely as a result of the operation of the Proposed Scheme, either alone or in combination with other power stations. This applies whether or not additional NOx abatement is assumed.
- Over ecological receptors, no direct effects due to exposure to NOx are likely since the daily and annual mean critical levels are not exceeded with the operation of the gas turbines. This applies whether or not additional NOx abatement is used.
- Total ammonia concentrations and deposition levels exceed the critical levels and loads over some sites and habitats. However, this is primarily due to high background deposition and pollutant concentrations. The operation of the

Proposed Scheme contributes a relatively small amount to the total pollution levels.

- The impacts of the operation of the Proposed Scheme alone on ammonia concentrations and nitrogen/acid deposition are, using Environment Agency criteria, insignificant if an annual cap of 120 tonnes is applied on ammonia emissions.
- The impacts of the Proposed Scheme in combination with other proposed power stations exceeds 1% of the critical level for ammonia and nitrogen and acid deposition critical loads over some sites. The significance of this impact is considered in Chapter 9 (Biodiversity).

Stage 0 – Site Reconfiguration Works

6.5.1. The main impacts during the Site Reconfiguration Works relate to dust generated during demolition and earthwork activities and exhaust emissions from construction plant equipment and construction traffic. A Construction Dust Assessment was undertaken and considered potential impacts from dust generating activities during Stage 0 (see Appendix 6.2). As noted in paragraph 6.2.2, potential impacts from exhaust emissions from construction plant equipment and construction traffic are insignificant.

6.5.2. The Construction Dust Assessment concluded that, with the implementation of CEMP (considered embedded mitigation), secured by requirements in Schedule 2 to the draft DCO (Document Ref. 3.1), potential impacts in Stage 0 would be negligible.

Stage 1 – Construction of Unit X

6.5.3. The main impacts during Stage 1 relate to dust generated during construction and exhaust emissions from construction plant equipment and construction traffic. A Construction Dust Assessment was undertaken and considered potential impacts from dust generating activities during Stage 1 (see Appendix 6.2). As noted in paragraph 6.2.2 potential impacts from exhaust emissions from construction plant equipment and construction traffic are insignificant.

6.5.4. The Construction Dust Assessment concluded that with the implementation of CEMP (considered embedded mitigation) and the Construction Traffic Management Plan potential impacts in Stage 1 would be negligible.

Stage 2 – Operation of Unit X and Construction of Unit Y

6.5.5. The main impacts during the construction of Unit Y in Stage 2 relate to dust generated during construction and exhaust emissions from construction plant equipment and construction traffic. A Construction Dust Assessment was undertaken and considered potential impacts from dust generating activities during Stage 2 (see Appendix 6.2). As noted in paragraph 6.2.2 potential impacts from exhaust emissions from construction plant equipment and construction traffic are insignificant.

6.5.6. The Construction Dust Assessment concluded that with the implementation of CEMP (considered embedded mitigation) and the Construction Traffic Management Plan potential impacts during construction of Unit Y in Stage 2 are considered negligible.

6.5.7. The operation of Unit X is associated with emissions to air from the new stacks as well emissions from operational traffic. As noted in paragraph 6.3.3 potential impacts from exhaust emissions from operational traffic are insignificant.

6.5.8. With negligible impacts from construction activities and operational traffic, the combined effects of Unit Y construction with Unit X operation will be.no worse than the operation of Unit X alone.

6.5.9. Potential impacts from operational emissions from Unit X have not been considered in isolation and have been assessed as part of Stage 3. The Stage 3 assessment will demonstrate that without the use of NOx abatement, the effects of the combined operation of both Unit X and Unit Y on local air quality are not significant. The impacts of the operation of one Unit alone will be approximately one half of the modelled impacts and similarly not significant. As set out in the methodology, the operation of a single unit is one possible way to meet the ammonia cap for Scenario B (with NOx abatement). The Stage 3 assessment for operation with NOx abatement therefore covers the worst case impacts at Stage 2, albeit with conservative assumptions regarding the potential emissions of NOx (which would be lower with just a single unit operating).

Stage 3 – Operation of Units X and Y

Stack Height Sensitivity Testing

6.5.10. Stack height sensitivity testing was undertaken to determine an appropriate stack height for the new Units. The assessment is presented in full in Appendix 6.3 and concluded that a stack height of 120 m provides adequate dispersion to reduce the impacts of the operation of the Units to negligible or slight adverse levels.

6.5.11. Stack heights from 70m to 140m were tested. Significant benefits, in terms of reduced ground level impacts, were seen as the stack height increased from 70m to 120m. This was due to the reduced impacts of building downwash from the existing cooling towers on site. However, beyond this height, whilst benefits are still seen with increasing stack height, the rate of reduction in impacts decreased markedly, particularly for annual mean concentrations.

Potential Impacts on Human Health

6.5.12. In this section, the contributions of the Power Station Site to air pollution are presented as maximum ground level concentrations at the identified human receptors. The model results are presented as the contribution of the Power Station Site on its own, termed the Process Contribution (PC), and in combination with background concentrations, termed the Predicted Environment Concentration (PEC). As set out in the assessment of baseline pollutant concentrations, the

background concentrations take into account other existing industrial processes in the vicinity of the site.

6.5.13. The PC of the Power Station Site is represented as the change in concentrations between the Do Nothing scenario and each of Scenario A1 (Unit X and Unit Y- CCGT, no SCR) and Scenario B (Unit X and Unit Y- CCGT with SCR and ammonia cap plus 1500hrs in OCGT mode). Similarly, the cumulative PC is provided by the change between the Do Nothing scenario and each of Scenarios C and D. The results for all other scenarios are presented and discussed in Appendix 6.3.

6.5.14. Table 6-14 and Table 6-15 show the maximum modelled impacts for NO_2, at the sensitive human receptors. The data presented are the maximum impacts over the 5 meteorological years tested (2012 to 2016), with the Power Station Site stacks at a height of 120 m. The data shown are the maximum total ambient pollutant concentration (PEC = PC plus background concentrations) and the PC alone. The impacts are compared to the relevant AQS objectives.

6.5.15. The modelled NO_2 concentrations for Scenario A1 (low NOx without abatement) and B (low NOx with SCR abatement) are well within the UK's air quality objectives for the protection of human health for all years and averaging periods. In the worst realistic case (Scenario A1 – combined cycle operation with low NOx emissions through combustion control), the maximum process contribution from the Proposed Scheme to annual mean NO_2 concentrations is 1.6 µg/m3 (3 Pear Tree Avenue, 3.9% of the annual mean objective, Table 6-14) and 22.5 µg/m3 as an hourly mean (11.3% of the objective, Drax Sports and Social Club Table 6-15). Total pollutant concentrations at these receptors are 25% and 22% of the annual mean and hourly mean objectives respectively.

6.5.16. Potential impacts from emissions of CO, SO_2, NH_3, PM_{10} and HCl are all negligible and presented in Appendix 6.3.

6.5.17. Using the EPUK/IAQM impact descriptors (Table 6-10, and subsequent paragraphs), impacts are negligible at all receptors for annual mean concentrations and negligible to slight adverse for hourly mean concentrations.

6.5.18. With very low risk of exceedance of the air quality standards, whether long term or short term, no significant health effects are anticipated as a result of the Proposed Scheme. This applies whether emissions are limited by combustion control (Scenario A1) or using SCR abatement (Scenario B).

Table 6-14 - Maximum Operational Impact at Human Receptors – Annual Mean NO_2

Receptor	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.	Impact Descriptor
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m^3)						
Foreman's	8.5	1.2	2.9%	9.7	24.2%	Negligible

Receptor	Back-ground ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of Obj.	PEC ($\mu g/m^3$)	PEC as % of Obj.	Impact Descriptor
Cottage						
East Yorkshire Caravan	10.9	0.2	0.5%	11.1	27.8%	Negligible
Drax Sports Club	10.9	0.5	1.2%	11.4	28.4%	Negligible
Wren Hall	8.8	0.2	0.4%	9.0	22.4%	Negligible
3 Pear Tree Avenue	8.5	1.6	3.9%	10.1	25.2%	Negligible
Crange Cottages	9.4	0.5	1.1%	9.9	24.6%	Negligible
Drax Abbey Farm	8.5	1.2	2.9%	9.7	24.2%	Negligible
Read School	9.2	0.2	0.6%	9.4	23.6%	Negligible
Scenario B – Combined cycle operation with SCR (NOx emissions at $30mg/Nm^3$)						
Foreman's Cottage	8.5	0.6	1.5%	9.1	22.7%	Negligible
East Yorkshire Caravan	10.9	0.1	0.3%	11.0	27.5%	Negligible
Drax Sports Club	10.9	0.2	0.6%	11.1	27.8%	Negligible
Wren Hall	8.8	0.1	0.3%	8.9	22.3%	Negligible
3 Pear Tree Avenue	8.5	0.8	2.0%	9.3	23.2%	Negligible
Crange Cottages	9.4	0.2	0.6%	9.6	24.1%	Negligible
Drax Abbey Farm	8.5	0.6	1.5%	9.1	22.7%	Negligible
Read School	9.2	0.1	0.3%	9.3	23.3%	Negligible

Notes
Obj. = Objective / Limit Value = $40\mu g/m^3$
For the assessment of the EPUK/IAQM impact descriptor, the 'PC expressed as a % of the objective' and, for long term impacts, the 'PEC expressed as a % of the objective' are input to the impact descriptor matrix (**Error! Reference source not found.** and subsequent paragraphs)
Concentrations and percentages are rounded to 1 decimal place

Table 6-15 - Maximum Operational Impact at Human Receptors – Hourly Mean (99.79th percentile) NO_2

Receptor	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.	Impact Descriptor
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m^3)						
Foreman's Cottage	17.0	21.3	10.7%	38.3	19.2%	Slight Adv.
East Yorkshire Caravan	21.8	14.2	7.1%	36.0	18.0%	Negligible
Drax Sports Club	21.8	22.5	11.3%	44.3	22.2%	Slight Adv.
Wren Hall	17.6	5.2	2.6%	22.8	11.4%	Negligible
3 Pear Tree Avenue	17.0	20.4	10.2%	37.4	18.7%	Negligible
Crange Cottages	18.8	14.0	7.0%	32.8	16.4%	Negligible
Drax Abbey Farm	17.0	21.0	10.5%	38.0	19.0%	Negligible
Read School	18.4	9.3	4.7%	27.7	13.9%	Negligible
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
Foreman's Cottage	17.0	17.1	8.5%	34.1	17.0%	Negligible
East Yorkshire Caravan	21.8	11.3	5.7%	33.1	16.6%	Negligible
Drax Sports Club	21.8	18.0	9.0%	39.8	19.9%	Negligible
Wren Hall	17.6	4.2	2.1%	21.8	10.9%	Negligible
3 Pear Tree Avenue	17.0	16.3	8.2%	33.3	16.7%	Negligible
Crange Cottages	18.8	11.2	5.6%	30.0	15.0%	Negligible
Drax Abbey	17.0	16.8	8.4%	33.8	16.9%	Negligible

Receptor	Back-ground ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of Obj.	PEC ($\mu g/m^3$)	PEC as % of Obj.	Impact Descriptor
Farm						
Read School	18.4	7.5	3.7%	25.9	12.9%	Negligible

Notes
Obj. = Objective / Limit Value = 40µg/m^3
Obj. = Objective / Limit Value = 200µg/m^3;
Concentrations and percentages are rounded to 1 decimal place

6.5.19. Contour plots of the Process Contribution to annual and hourly NO_2 and are provided in Figures 6.5 to 6.8, modelled using meteorological data from 2015.

6.5.20. Across all years, the point of maximum offsite impact of the plume occurs between 800 – 1800 m to the east/northeast of the stacks for annual mean concentrations and within 400 – 500 m of the stacks for hourly mean concentrations. Annual mean impacts are concentrated to the north-east of the stacks reflecting the prevailing south-westerly winds and the influence of building downwash (cooling towers) on the plumes from Units X and Y. The impacts from the boilers used at the Gas Receiving Facility are negligible and only discernible in the immediate vicinity of the boilers.

6.5.21. Hourly mean impacts are more evenly distributed, reflecting the observation that poor dispersion conditions can occur under winds from any direction, but are also maximised to the north-east of the stack.

6.5.22. The maximum impacts of the Power Station Site occur more than 2.5 km northeast of the major road through the study area (A645). Nevertheless, given the scale of the impact of the Power Station Site in comparison to background concentrations, the maximum total predicted environmental concentrations occur at the roadside rather than at the point of maximum impact of the plume. The analysis of baseline air quality determined that roadside annual mean NO_2 concentrations are likely to be <30 µg/m^3 (concentrations taken from monitoring toward south of Selby, at A19 roadside, outside of AQMA). Taking a conservative approach, even if the maximum process contribution (1.7 µg/m^3) is added to this roadside background pollutant concentration, total pollutant concentrations will remain well below the air quality objective. Hourly mean concentrations will also remain well below the air quality objective. Impacts at the Selby AQMA will imperceptible in magnitude.

6.5.23. Table 6-16 and Table 6-17 provide the maximum modelled cumulative impacts for annual mean and hourly mean NO_2 respectively. In both tables, impacts are provided with and without the use of SCR NOx abatement. The modelled cumulative impacts are, as is to be expected, higher than for the contribution of the Proposed Scheme alone. However, the risk of exceedance of the air quality objectives remains very low and the impacts on annual mean concentrations are negligible and on hourly mean concentrations negligible to slight adverse.

6.5.24. Overall, therefore, whilst the sensitivity of human receptors to air quality effects is high, with very low risk of exceedance of air quality standards set for the protection of human health, the effects of the operation of the Proposed Scheme will be negligible. This applies whether the Proposed Scheme is considered alone or in-combination with other planned projects in the region (explicitly Eggborough and Thorpe Marsh Power Stations), and, importantly, whether or not NOx emissions abatement technology is used.

Table 6-16 - Maximum cumulative operational impact at human receptors – annual mean NO_2

Receptor	Back-ground ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of Obj.	PEC ($\mu g/m^3$)	PEC as % of Obj.	Impact Descriptor
Scenario C – Combined cycle operation with low NOx emissions (50mg/m3)						
Foreman's Cottage	8.5	1.6	4.0%	10.1	25.2%	Negligible
East Yorkshire Caravan	10.9	0.6	1.5%	11.5	28.7%	Negligible
Drax Sports Club	10.9	0.8	2.1%	11.7	29.4%	Negligible
Wren Hall	8.8	0.6	1.5%	9.4	23.5%	Negligible
3 Pear Tree Avenue	8.5	2.0	5.0%	10.5	26.3%	Negligible
Crange Cottages	9.4	0.8	2.1%	10.2	25.6%	Negligible
Drax Abbey Farm	8.5	1.6	4.1%	10.1	25.4%	Negligible
Read School	9.2	0.6	1.6%	9.8	24.6%	Negligible
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm3)						
Foreman's Cottage	8.5	0.9	2.3%	9.4	23.5%	Negligible
East Yorkshire Caravan	10.9	0.4	1.0%	11.3	28.2%	Negligible
Drax Sports Club	10.9	0.5	1.3%	11.4	28.5%	Negligible
Wren Hall	8.8	0.4	1.1%	9.2	23.1%	Negligible
3 Pear Tree	8.5	1.1	2.8%	9.6	24.0%	Negligible

Receptor	Back-ground ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of Obj.	PEC ($\mu g/m^3$)	PEC as % of Obj.	Impact Descriptor
Avenue						
Crange Cottages	9.4	0.5	1.3%	9.9	24.8%	Negligible
Drax Abbey Farm	8.5	0.9	2.3%	9.4	23.6%	Negligible
Read School	9.2	0.4	1.1%	9.6	24.1%	Negligible

Obj. = Objective / Limit Value = 40µg/m^3
Concentrations and percentages are rounded to 1 decimal place

Table 6-17 - Maximum Cumulative Operational Impact at Human Receptors – Hourly Mean (99.79th percentile) NO_2

Receptor	Back-ground ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of Obj.	PEC ($\mu g/m^3$)	PEC as % of Obj.	Impact Descriptor
Scenario C – Combined cycle operation with low NOx emissions (50mg/m_3)						
Foreman's Cottage	17.0	21.7	10.9%	38.7	19.4%	Slight Adv.
East Yorkshire Caravan	21.8	14.2	7.1%	36.0	18.0%	Negligible
Drax Sports Club	21.8	22.5	11.3%	44.3	22.2%	Slight Adv.
Wren Hall	17.6	6.5	3.3%	24.1	12.1%	Negligible
3 Pear Tree Avenue	17.0	22.2	11.1%	39.2	19.6%	Slight Adv.
Crange Cottages	18.8	14.0	7.0%	32.8	16.4%	Negligible
Drax Abbey Farm	17.0	21.1	10.5%	38.1	19.0%	Slight Adv.
Read School	18.4	9.3	4.7%	27.7	13.9%	Negligible
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm_3)						
Foreman's Cottage	17.0	17.4	8.7%	34.4	17.2%	Negligible
East Yorkshire	21.8	11.3	5.7%	33.1	16.6%	Negligible

Receptor	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.	Impact Descriptor
Caravan						
Drax Sports Club	21.8	18.0	9.0%	39.8	19.9%	Negligible
Wren Hall	17.6	4.5	2.3%	22.1	11.1%	Negligible
3 Pear Tree Avenue	17.0	17.6	8.8%	34.6	17.3%	Negligible
Crange Cottages	18.8	11.2	5.6%	30.0	15.0%	Negligible
Drax Abbey Farm	17.0	16.9	8.4%	33.9	16.9%	Negligible
Read School	18.4	7.5	3.7%	25.9	12.9%	Negligible

Obj. = Objective / Limit Value = 200µg/m^3
Concentrations and percentages are rounded to 1 decimal place

Potential Impacts on Ecological Receptors

6.5.25. In this section, the contributions of the Power Station Site to air pollution are presented as maximum ground level concentrations and deposition levels at the identified designated sites. As for human health, the PC of the Proposed Scheme represents the change in concentration/ deposition between the Do Nothing scenario and either Scenario A1 (Unit X and Unit Y- CCGT) and Scenario B (Unit X and Unit Y- CCGT with SCR and ammonia cap plus 1500 hours of OCGT operation). Similar tables are provided for the cumulative scenarios, Scenarios C and D. The results for Scenario A2 are presented for completeness in Appendix 6.3, but are lower than Scenario A1 at all receptors.

6.5.26. The spatial distributions of impacts on ground level concentrations of NH_3 and NO_X, modelled using 2015 meteorological data with SCR (Scenario B), are shown in Figures 6.7 and 6.8. The River Derwent SAC lies close to the areas of maximum impacts from the Power Station Site.

Ammonia

6.5.27. Using Environment Agency criteria, the impacts of the operation of Units X and Y on ammonia concentrations are insignificant (≤1% of the critical level). With NOx abatement (Scenario B), the cap on emissions is required to achieve insignificant impacts.

6.5.28. Table 6-18 presents the maximum total ambient pollutant concentration of NH_3 (with typical background concentrations). In Scenario A1 (combined cycle

operation with combustion control) there is an imperceptible decrease in concentrations with the Proposed Scheme due to the reduction in emissions from the main (existing) stack (6 units burning coal or biomass, reducing to 4 biomass units) and the absence of ammonia emissions from the gas generating stations.

6.5.29. With Scenario B (SCR and ammonia emissions cap), the impact of the Proposed Scheme is greatest over River Derwent, where the maximum increase in ammonia concentration is 0.03 µg/m^3 (1% of the critical level) but total ammonia concentrations remain within the critical level.

6.5.30. Total ammonia concentrations with or without the Proposed Scheme are within the critical level for all sites except Thorne Moor and Skipwith Common, where the critical level is set to 1 µg/m^3 for the protection of lower order plants. Over these sites, the maximum impacts of the Proposed Scheme are 0.5% and 0.4% of the critical level respectively and insignificant.

Nitrogen Oxides

6.5.31. No direct effects from increased exposure to nitrogen oxides are likely since total ambient concentrations of annual mean and daily mean NOx with the Proposed Scheme are within their respective critical levels over all sites. Concentrations are highest in Scenario A1 without the additional NOx abatement provided by the use of SCR in Scenario B (Table 6-19, Table 6-20).

6.5.32. The maximum likely impact of the Proposed Scheme (Scenario A1) exceeds 1% of the annual mean critical level over the River Derwent SAC (6%), the Lower Derwent SAC (4%, including associated SSSI Units) and Humber Estuary (2%). However, as stated earlier, total concentrations remain within the critical level.

6.5.33. The maximum contribution of the Proposed Scheme to daily mean NOx concentrations is 49% of the critical level over River Derwent SAC and 22% of the critical level over Lower Derwent SAC. The total concentrations over these sites are within the critical level, at 92% and 63% respectively. The maximum impact of the Proposed Scheme is greater than 10% of the critical level over all sites except Skipwith Common SAC.

6.5.34. These impacts are based on the highest daily average concentration over the 5 meteorological years modelled. The actual number of days on which concentrations approach this level will be limited. Moreover, it has been assumed that the daily mean background concentration is twice the annual mean background concentration and that this elevated background concentration coincides with the maximum impact from the Proposed Scheme. Therefore, the projected impacts on daily mean pollutant concentrations are likely to be highly conservative. Overall, the absence of modelled exceedances of the critical levels for NOx is indicative of a low risk due to direct impacts of exposure to ambient concentrations of NOx over the designated sites whether NOx emissions are controlled via combustion control (Scenario A1) or with the use of abatement such as SCR (Scenario B).

Table 6-18- Maximum Operational Impact at Ecological Receptors – Annual Mean NH_3

Receptor	Critical Level	Back-ground ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of Obj.	PEC ($\mu g/m^3$)	PEC as % of Obj.
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m_3)						
River Derwent SAC/SSSI	3	2.76	0.00	0.0%	2.76	92%
Lower Derwent SAC	3	2.81	0.00	0.0%	2.81	94%
Breighton Meadows SSSI	3	2.81	0.00	0.0%	2.81	94%
Derwent Ings SSSI	3	2.76	0.00	0.0%	2.76	92%
Thorne Moor SAC/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	3	2.92	0.00	0.0%	2.92	97%
Eskamhorn SSSI	3	2.14	0.00	0.0%	2.14	71%
Brockholes SINC	3	2.23	0.00	0.0%	2.23	74%
Orchard Farm SINC	3	2.24	0.00	0.0%	2.24	75%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	3	2.76	0.03	1.1%	2.79	93%
Lower Derwent SAC	3	2.81	0.02	0.6%	2.83	94%
Breighton Meadows SSSI	3	2.81	0.02	0.6%	2.83	94%
Derwent Ings SSSI	3	2.76	0.01	0.3%	2.77	92%
Thorne Moor SAC/SPA	1	2.39	0.00	0.5%	2.39	239%

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Skipwith Common SAC	1	2.42	0.00	0.4%	2.42	242%
Humber Est. SAC/SPA	3	2.92	0.01	0.3%	2.93	98%
Eskamhorn SSSI	3	2.14	0.01	0.2%	2.15	72%
Brockholes SINC	3	2.23	0.01	0.2%	2.24	75%
Orchard Farm SINC	3	2.24	0.01	0.2%	2.25	75%

Table 6-19 - Maximum Operational Impact at Ecological Receptors – Annual Mean NOx

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m$_3$)						
River Derwent SAC/SSSI	30	16.26	2.15	7.18%	18.41	61%
Lower Derwent SAC	30	15.32	1.25	4.15%	16.57	55%
Breighton Meadows SSSI	30	15.28	1.25	4.15%	16.53	55%
Derwent Ings SSSI	30	15.32	0.77	2.57%	16.09	54%
Thorne Moor SAC/SPA	30	18.56	0.32	1.06%	18.88	63%
Skipwith Common SAC	30	14.75	0.30	1.00%	15.05	50%
Humber Est. SAC/SPA	30	23.19	0.54	1.81%	23.73	79%
Eskamhorn SSSI	30	16.49	0.37	1.25%	16.86	56%
Brockholes SINC	30	17.8	0.35	1.17%	18.15	61%

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Orchard Farm SINC	30	17.9	0.34	1.12%	18.24	61%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	30	16.26	1.11	3.7%	17.37	58%
Lower Derwent SAC	30	15.32	0.65	2.2%	15.97	53%
Breighton Meadows SSSI	30	15.28	0.65	2.2%	15.93	53%
Derwent Ings SSSI	30	15.32	0.40	1.3%	15.72	52%
Thorne Moor SAC/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	30	23.19	0.28	0.9%	23.47	78%
Eskamhorn SSSI	30	16.49	0.19	0.6%	16.68	56%
Brockholes SINC	30	17.8	0.18	0.6%	17.98	60%
Orchard Farm SINC	30	17.9	0.17	0.6%	18.07	60%

Table 6-20 - Maximum Operational Impact at Ecological Receptors – Daily Mean NOx

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Scenario A1 – Combined cycle operation with low NOx emissions (50mg/m$_3$)						
River Derwent SAC/SSSI	75	32.52	36.8	49.1%	69.3	92%
Lower Derwent SAC	75	30.64	16.7	22.2%	47.3	63%

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Breighton Meadows SSSI	75	30.56	16.7	22.2%	47.2	63%
Derwent Ings SSSI	75	30.64	9.5	12.7%	40.2	54%
Thorne Moor SAC/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	75	46.38	9.1	12.2%	55.5	74%
Eskamhorn SSSI	75	32.98	15.8	21.1%	48.8	65%
Brockholes SINC	75	35.6	19.3	25.7%	54.9	73%
Orchard Farm SINC	75	35.8	11.8	15.8%	47.6	64%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	75	32.5	22.4	29.9%	54.9	73%
Lower Derwent SAC	75	30.6	12.6	16.8%	43.3	58%
Breighton Meadows SSSI	75	30.6	12.6	16.8%	43.2	58%
Derwent Ings SSSI	75	30.6	6.3	8.4%	37.0	49%
Thorne Moor SAC/SPA	75	37.1	5.7	7.6%	42.8	57%
Skipwith Common SAC	75	29.5	4.8	6.4%	34.3	46%
Humber Est. SAC/SPA	75	46.4	6.3	8.4%	52.7	70%
Eskamhorn SSSI	75	33.0	9.7	12.9%	42.6	57%
Brockholes SINC	75	35.6	11.6	15.5%	47.2	63%

Receptor	Critical Level	Back-ground ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of Obj.	PEC ($\mu g/m^3$)	PEC as % of Obj.
Orchard Farm SINC	75	35.8	7.1	9.5%	42.9	57%

Nitrogen and Acid Deposition

6.5.35. Using Environment Agency criteria, the impacts of the operation of Units X and Y on nitrogen and acid deposition are insignificant (≤1% of the critical level). With NOx abatement (Scenario B), the cap on emissions is required to achieve insignificant impacts.

6.5.36. Table 6-21 and Table 6-22 show the maximum process contribution to nitrogen and acid (N) deposition resulting from the Power Station Site emissions over the nationally/internationally designated and locally designated sites. As in Table 6-12, existing deposition levels exceed the lower estimates of the critical loads for the most sensitive habitats for nitrogen and acid deposition across all sites, with the exception of habitats within Eskamhorn SSSI and Lower Derwent SAC (acid only).

6.5.37. In Scenario A1 (without NOx abatement), the contribution of the Proposed Scheme to total nitrogen and acid deposition is ≤1% of the relevant critical load for all habitats and designated sites. Maximum impacts of the Proposed Scheme occur at Thorne Moor (0.6% and 0.5% of the critical loads for nitrogen and acid respectively, Table 6-21 and Table 6-22). Based on EA guidance this level of impact on nitrogen and acid deposition is insignificant.

6.5.38. With Scenario B (with NOx abatement), the impact of ammonia emissions from the abatement technology results in an overall increase in deposition that is only partially offset by the decrease in nitrogen deposition from nitrogen dioxide. Notwithstanding this, the impacts of the Proposed Scheme on deposition remain ≤1% (insignificant, Table 6-21 and Table 6-22) for nitrogen and acid deposition over all habitats.

6.5.39. For both acid and nitrogen deposition, the deposition of nitrogen resulting from the Proposed Scheme is a small proportion of the existing deposition. That is to say that the risk of exceedance of critical loads or the level of exceedance of the critical load, is wholly dependent on the existing deposition levels and would not be affected by the Proposed Scheme.

Cumulative Impacts

6.5.40. Table 6-23 to Table 6-27 show the cumulative impacts of the Proposed Scheme and other developments within the study area (Scenarios C and D) on the designated sites.

6.5.41. For the concentration of pollutants in air, concentrations of nitrogen oxides (Table 6-24 and 6-25) and ammonia (Table 6-23) remain below the critical levels over all

sites in both Scenarios C and D, with, as in the baseline, the exception of ammonia concentrations over Thorne Moor and Skipwith Common SACs.

6.5.42. Without NOx abatement (Scenario C), the cumulative impacts on ammonia concentrations are negligible (<1%). With NOx abatement (Scenario D), the cumulative impacts of the Proposed Scheme on ammonia concentrations are 0.01 µg/m^3 (1% of the critical level) and 0.03 µg/m^3 (3% of the critical level) over Thorne Moor and Skipwith Common respectively. However, as noted previously, the contribution of the Proposed Scheme alone is less than 0.5% of the critical level at these sites with the ammonia cap (Scenario B, Table 6.18).

6.5.43. Modelled total concentrations of annual mean NOx are less than 70% of the critical level / air quality objective over all sites and in all scenarios with the exception of Humber Estuary SAC/SPA where the maximum total concentration is 24.1 µg/m^3 (within the critical level but up to 81% of the critical level, Table 6-24).

6.5.44. In Scenario C, the cumulative contribution to nitrogen deposition is ≤1% of the critical load for all sites except Thorne Moor, where the cumulative PC is 0.09 kgN/ha/yr (2% of the critical load). In Scenario D (with NOx abatement), cumulative impacts are generally ≤1% of the critical loads but amount to 2% (nitrogen deposition) (Table 6-26) and ≤1% (acid deposition) (Table 6-27) of the critical loads for habitats within Lower Derwent SAC, and 3% (nitrogen deposition) and 2% (acid deposition) of the critical loads for habitats within Thorne Moor SAC.

6.5.45. Overall, the assessment of cumulative impacts has broadly similar conclusions to those for the impact of the Proposed Scheme alone. NOx and ammonia concentrations will be within the air quality objectives with the operation of the Proposed Scheme, with the exception of ammonia concentrations over lower plants in Thorne Moor and Skipwith Common SACs.

6.5.46. Both nitrogen and, to a lesser extent, acid deposition exceed their critical loads across most designated sites/habitats. 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 a result of the operation of the Proposed Scheme. In other words, the Proposed Scheme would make no difference to the exceedance of the critical loads.

6.5.47. Actions at the national and European level, including the setting of national emissions ceilings, should reduce emissions of both NOx and ammonia and subsequently nitrogen deposition over the medium to long term. For example, the National Emission Ceilings Regulations 2018 commit the UK to reducing ammonia emissions by 8% between 2020 and 2029 and 16% from 2030 onwards. Emissions of NOx are required to reduce by 55%.

6.5.48. Total nitrogen deposition with the use of NOx abatement technology such as SCR, is higher than when NOx emissions are combustion controlled over all sites. That is to say, the impacts of the deposition of reduced nitrogen (from ammonia) more

than offsets any gain resulting from the reduction in the deposition of oxidised nitrogen (from NO_2).

6.5.49. Further discussion and analysis of the impacts of the operation of the Proposed Scheme on ecological receptors is set out in Chapter 9 (Biodiversity).

Table 6-21 - 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/SSSI	No critical load set					
Lower Derwent SAC	20	21.0	0.12	0.6%	21.1	106%
Breighton Meadows SSSI	20	21.0	0.12	0.6%	21.1	106%
Derwent Ings SSSI	20	20.9	0.07	0.4%	20.9	105%
Thorne Moor SAC/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	20	20.7	0.05	0.3%	20.8	104%
Eskhamhorn SSSI	20	17.9	0.04	0.2%	18.0	90%
Brockholes SINC	10	18.5	0.04	0.4%	18.5	185%
Orchard Farm SINC	10	19.2	0.03	0.3%	19.2	192%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	No critical load set					
Lower Derwent SAC	20	21.0	0.16	0.8%	21.2	106%
Breighton Meadows SSSI	20	21.0	0.16	0.8%	21.2	106%

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
Derwent Ings SSSI	20	20.9	0.09	0.5%	21.0	105%
Thorne Moor SAC/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	20	20.7	0.07	0.3%	20.8	104%
Eskhamhorn SSSI	20	17.9	0.05	0.2%	18.0	90%
Brockholes SINC	10	18.5	0.05	0.5%	18.5	185%
Orchard Farm SINC	10	19.2	0.05	0.5%	19.2	192%

Table 6-22 - 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)						
River Derwent SAC/SSSI	No critical load set					
Lower Derwent SAC	4.856	1.5	0.008	0.2%	1.51	31%
Breighton Meadows SSSI	4.856	1.5	0.008	0.2%	1.51	31%
Derwent Ings SSSI	4.856	1.49	0.005	0.1%	1.50	31%
Thorne Moor SAC/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.	Not sensitive					

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
SAC/SPA						
Eskhamhorn SSSI	1.998	1.28	0.003	0.1%	1.28	64%
Brockholes SINC	Not sensitive					
Orchard Farm SINC	5.071	1.37	0.002	0.0%	1.37	27%
Scenario B – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	No critical load set					
Lower Derwent SAC	0.453	1.50	0.011	0.2%	1.51	31%
Breighton Meadows SSSI	0.453	1.50	0.011	0.2%	1.51	31%
Derwent Ings SSSI	0.453	1.49	0.007	0.1%	1.50	31%
Thorne Moor SAC/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	Not sensitive					
Eskamhorn SSSI	1.998	1.28	0.004	0.2%	1.28	64%
Brockholes SINC	Not sensitive					
Orchard Farm SINC	5.071	1.37	0.003	0.1%	1.37	27%

***Table** 6-23 - **Maximum** Cumulative Operational Impact at Ecological Receptors – **Annual** Mean NH_3*

Receptor	Critical Level	Back-ground ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC as % of Obj.	PEC ($\mu g/m^3$)	PEC as % of Obj.
Scenario C – Combined cycle operation with low NOx emissions (50mg/m^3)						
River Derwent SAC/SSSI	3	2.76	0.00	0.0%	2.76	92%
Lower Derwent SAC	3	2.81	0.00	0.0%	2.81	94%
Breighton Meadows SSSI	3	2.81	0.00	0.0%	2.81	94%
Derwent Ings SSSI	3	2.76	0.00	0.0%	2.76	92%
Thorne Moor SAC/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	3	2.92	0.00	0.0%	2.92	97%
Eskhamhorn SSSI	3	2.14	0.00	0.0%	2.14	71%
Brockholes SINC	3	2.23	0.00	0.0%	2.23	74%
Orchard Farm SINC	3	2.24	0.00	0.0%	2.24	75%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	3	2.76	0.06	2.1%	2.82	94%
Lower Derwent SAC	3	2.81	0.04	1.4%	2.85	95%
Breighton Meadows SSSI	3	2.81	0.04	1.4%	2.85	95%
Derwent Ings SSSI	3	2.76	0.04	1.2%	2.80	93%
Thorne Moor SAC/SPA	1	2.39	0.01	1.3%	2.40	240%

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Skipwith Common SAC	1	2.42	0.03	2.7%	2.45	245%
Humber Est. SAC/SPA	3	2.92	0.02	0.7%	2.94	98%
Eskhamhorn SSSI	3	2.14	0.02	0.8%	2.16	72%
Brockholes SINC	3	2.23	0.02	0.8%	2.25	75%
Orchard Farm SINC	3	2.24	0.05	1.6%	2.29	76%

Table 6-24 - Maximum Cumulative Operational Impact at Ecological Receptors – Annual Mean NOX

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Scenario C – Combined cycle operation with low NOx emissions (50mg/m^3)						
River Derwent SAC/SSSI	30	16.26	2.79	9.3%	19.05	64%
Lower Derwent SAC	30	15.32	1.82	6.1%	17.14	57%
Breighton Meadows SSSI	30	15.28	1.82	6.1%	17.10	57%
Derwent Ings SSSI	30	15.32	1.34	4.5%	16.66	56%
Thorne Moor SAC/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	30	23.19	1.02	3.4%	24.21	81%
Eskhamhorn SSSI	30	16.49	0.83	2.8%	17.32	58%
Brockholes SINC	30	17.8	0.81	2.7%	18.61	62%

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Orchard Farm SINC	30	17.9	1.24	4.1%	19.14	64%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	30	16.26	1.57	5.2%	17.83	59%
Lower Derwent SAC	30	15.32	1.06	3.5%	16.38	55%
Breighton Meadows SSSI	30	15.28	1.06	3.5%	16.34	54%
Derwent Ings SSSI	30	15.32	0.81	2.7%	16.13	54%
Thorne Moor SAC/SPA	30	18.56	0.66	2.2%	19.22	64%
Skipwith Common SAC	30	14.75	0.50	1.7%	15.25	51%
Humber Est. SAC/SPA	30	23.19	0.68	2.3%	23.87	80%
Eskhamhorn SSSI	30	16.49	0.55	1.8%	17.04	57%
Brockholes SINC	30	17.8	0.53	1.8%	18.33	61%
Orchard Farm SINC	30	17.9	0.80	2.7%	18.70	62%

Table 6-25 - Maximum Cumulative Operational Impact at Ecological Receptors – Daily Mean NO_x

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Scenario C – Combined cycle operation with low NOx emissions (50mg/m^3)						
River Derwent SAC/SSSI	75	32.5	36.8	49.1%	69.3	92%
Lower Derwent SAC	75	30.6	16.7	22.3%	47.4	63%
Breighton	75	30.6	16.7	22.3%	47.3	63%

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Meadows SSSI						
Derwent Ings SSSI	75	30.6	10.0	13.3%	40.6	54%
Thorne Moor SAC/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	75	46.4	10.1	13.4%	56.4	75%
Eskhamhorn SSSI	75	33.0	15.8	21.1%	48.8	65%
Brockholes SINC	75	35.6	19.3	25.7%	54.9	73%
Orchard Farm SINC	75	35.8	11.9	15.8%	47.7	64%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	75	32.5	22.4	29.9%	54.9	73%
Lower Derwent SAC	75	30.6	12.6	16.9%	43.3	58%
Breighton Meadows SSSI	75	30.6	12.6	16.9%	43.2	58%
Derwent Ings SSSI	75	30.6	6.8	9.1%	37.5	50%
Thorne Moor SAC/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	75	46.4	6.9	9.3%	53.3	71%
Eskhamhorn SSSI	75	33.0	9.7	12.9%	42.6	57%
Brockholes SINC	75	35.6	11.6	15.5%	47.2	63%

Receptor	Critical Level	Back-ground (µg/m^3)	PC (µg/m^3)	PC as % of Obj.	PEC (µg/m^3)	PEC as % of Obj.
Orchard Farm SINC	75	35.8	7.2	9.5%	43.0	57%

Table 6-26 - 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)						
River Derwent SAC/SSSI	No critical load set					
Lower Derwent SAC	20	21.0	0.17	0.9%	21.2	106%
Breighton Meadows SSSI	20	21.0	0.17	0.9%	21.2	106%
Derwent Ings SSSI	20	20.9	0.13	0.6%	21.0	105%
Thorne Moor SAC/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	20	20.7	0.10	0.5%	20.8	104%
Eskamhorn SSSI	20	17.9	0.08	0.4%	18.0	90%
Brockholes SINC	10	18.5	0.08	0.8%	18.6	186%
Orchard Farm SINC	10	19.2	0.13	1.3%	19.3	193%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	No critical load set					

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
Lower Derwent SAC	20	21.0	0.32	1.6%	21.3	107%
Breighton Meadows SSSI	20	21.0	0.32	1.6%	21.3	107%
Derwent Ings SSSI	20	20.9	0.27	1.4%	21.1	106%
Thorne Moor SAC/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	20	20.7	0.17	0.9%	20.9	104%
Eskamhorn SSSI	20	17.9	0.18	0.9%	18.1	90%
Brockholes SINC	10	18.5	0.18	1.8%	18.7	187%
Orchard Farm SINC	10	19.2	0.33	3.3%	19.5	195%

Table 6-27 - 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/SSSI	No critical load set					
Lower Derwent SAC	4.856	1.5	0.012	0.3%	1.51	31%
Breighton Meadows SSSI	4.856	1.5	0.012	0.3%	1.51	31%
Derwent Ings	4.856	1.49	0.009	0.2%	1.50	31%

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
SSSI						
Thorne Moor SAC/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%
Humber Est. SAC/SPA	Not sensitive					
Eskamhorn SSSI	1.998	1.28	0.006	0.3%	1.29	64%
Brockholes SINC	Not sensitive					
Orchard Farm SINC	5.071	1.37	0.009	0.2%	1.38	27%
Scenario D – Combined cycle operation with SCR (NOx emissions at 30mg/Nm^3)						
River Derwent SAC/SSSI	No critical load set					
Lower Derwent SAC	4.856	1.50	0.023	0.5%	1.52	31%
Breighton Meadows SSSI	4.856	1.50	0.023	0.5%	1.52	31%
Derwent Ings SSSI	4.856	1.49	0.020	0.4%	1.51	31%
Thorne Moor SAC/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	Not sensitive					
Eskamhorn SSSI	1.998	1.28	0.013	0.6%	1.29	65%
Brockholes SINC	Not sensitive					

Receptor	Critical Load	Back-ground (kgN/ha/yr)	PC (kgN/ha/yr)	PC as % of CL	PEC (kgN/ha/yr)	PEC as % of CL
Orchard Farm SINC	5.071	1.37	0.024	0.5%	1.39	27%

Decommissioning

6.5.50. The main impacts during decommissioning relate to dust generated during construction and exhaust emissions from construction plant equipment and construction traffic. A Construction Dust Assessment was undertaken and considered potential impacts from dust generating activities during Stage 1 (see Appendix 6.2). Effects from Stage 1 are considered to be comparable to those during decommissioning, and therefore, as noted in paragraph 6.2.2 potential impacts from exhaust emissions from construction plant equipment and construction traffic are insignificant. Similarly to Stage 1 (where the CEMP will be implemented) a DEMP will be approved and implemented during decommissioning (as secured by a requirement to Schedule 2 of the draft DCO (Document Ref. 3.1)) in order to manage construction effects.

6.6 Mitigation and Enhancement Measures

6.6.1. No further direct mitigation of air emissions is proposed for the Proposed Scheme beyond the embedded mitigation of setting an appropriate stack height and the inclusion of NOx and ammonia emissions control either by combustion control or the use of SCR with an ammonia emissions ceiling.

6.7 Residual Effects

6.7.1. This section considers residual effects on human health only. Effects on ecological receptors are considered in Chapter 9 (Biodiversity).

Stage 0 – Reconfiguration Works

6.7.2. No significant residual effects are expected.

Stage 1 – Construction of Unit X

6.7.3. No significant residual effects are expected.

Stage 2 – Operation of Unit X and Construction of Unit Y

6.7.4. No significant residual effects are expected.

Stage 3 – Operation of Units X and Y

6.7.5. No significant residual effects are expected.

Stage 4 - Decommissioning

6.7.6. No significant residual effects are expected.

6.8 Limitations and Assumptions

6.8.1. The specific construction methodology has not yet been finalised. As such, the risk assessment is based on professional judgement and previous experience of major construction works. This is not considered to place a significant constraint on the assessment since appropriate dust and air emissions mitigation measures will be included within the CEMP for the works. Moreover, no site-specific reasons have been identified that would render standard dust mitigation measures ineffective.

6.8.2. Dispersion modelling is an inherently uncertain process. As such, the assessment is based on modelling with 5 years of meteorological data and the conclusions drawn on the basis of the worst year of the five tested, or the worst hour/day within these years. Furthermore, the emissions from the plant are assumed to be continuously at their emission limits and that the plant operates continuously. These assumptions, amongst others, are designed to ensure that the assessment of impacts is both robust and conservative.

6.8.3. The design of the boilers required for the Gas Receiving Facility has not yet been finalised. The modelling is based on the operation of 6.6 MW (thermal input) boilers, with NOx emissions at 31 mg/kWh. Uncertainties in the design are, however, unlikely to have a significant impact on the assessment outcome since the boilers represent a very minor impact in comparison to the total emissions from the Proposed Scheme.

6.9 Summary

Construction and Decommissioning

6.9.1. There will be no permanent residual effects associated with the construction or decomissioning of the Proposed Scheme. The risk of impacts relating to construction works can be mitigated with the implementation of standard mitigation measures and are, in any case, all temporary.

Operation

Human Health

6.9.2. Maximum modelled impacts are negligible to slight adverse in all operating Scenarios (with/without NOx abatement; with/without cumulative processes) and there are no modelled exceedances of air quality objectives or limit values.

6.9.3. As such, no significant adverse residual effects on human health anticipated from the operation of the Proposed Scheme. With the stack height set at 120 m, and NOx emissions controlled either by combustion control or the use of abatement technology, the effects of the Proposed Scheme on ambient air quality are negligible in significance.

6.9.4. In particular, for ambient pollutant concentrations, total predicted environmental concentrations with the operation of the Proposed Scheme are well within the air quality objectives set in UK regulations for the protection of health. These levels

are set to be protective and, as such, where concentrations are within the objectives no adverse effects will occur.

6.9.5. Background concentrations of NOx in the vicinity of the Power Station are low which contributes to the negligible effects. However, the impact of the Proposed Scheme on pollutant concentrations in the nearest Air Quality Management Area (Selby), where background pollutant concentrations are higher, is less than 0.5% of the objective for annual mean NO_2 (the measure for which the AQMA was declared) and is, therefore, also negligible.

Operation

Ecological Receptors

6.9.6. No direct effects due to exposure to NOx are likely with the operation of the Proposed Scheme. This applies to all Scenarios including whether or not NOx abatement is used. Impacts are slightly higher in magnitude without the use of NOx abatement (Scenarios A1 and C show higher concentrations than Scenarios B and D respectively) but this has no material impact on the outcome of the assessment since total NOx concentrations remain within the air quality objectives and limit values for the protection of ecosystems.

6.9.7. For nitrogen and acid deposition, and ammonia concentrations, existing deposition/pollution levels widely exceed the critical loads/ critical levels set for the most sensitive habitats within designated sites in the vicinity of the Power Station Site. The worst-case impacts of the Proposed Scheme are a small proportion of the background deposition and pollution levels and largely insignificant. That is to say, the risks of exceedance of critical loads and levels are a result of existing / background deposition and pollution levels and are highly unlikely to be affected by emissions from the Proposed Scheme. Further information on ecological effects can be found in Chapter 9 (Biodiversity).

6.9.8. The impacts of the Proposed Scheme alone on ammonia concentrations and pollutant deposition (Scenarios A and B) are insignificant (≤1% of the critical level). In the case of deposition, whilst both NOx and NH_3 contribute to total deposition, NH_3 deposits more readily than NOx. As a result the reduction in deposition from NOx in Scenario B (with NOx abatement) in comparison to Scenario A (without NOx abatement) is more than offset by the impact of increased deposition from NH_3 even with the imposition of an ammonia cap.

Overall Conclusions

6.9.9. Taking into account the conservatism built into the 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 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

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

Table 6-28 - Summary of Effects Table for Air Quality

Description of Effects	Receptor	Significance and Nature of Effects Prior to Mitigation / Enhancement	Summary of Mitigation / Enhancement	Significance and Nature of Effects Following Mitigation / Enhancement (Residual)
Stage 0 – Site Reconfiguration Works				
Dust deposition and change in pollutant concentrations due to construction works, plant and vehicles	Residential receptors Ecological Receptors	Negligible (T / D)	Application of CEMP	Negligible on all receptors
Stage 1 – Construction of Unit X				
Dust deposition and change in pollutant concentrations due to construction works, plant and vehicles	Residential receptors Ecological Receptors	Negligible (T / D)	Application of CEMP and CTMP	Negligible on all receptors
Stage 2 – Operation of Unit X and Construction of Unit Y				
Change in pollutant concentrations	Residential receptors (R1- R9)	Negligible (T – construction, P – operation, D – direct, - adverse) on Residential Properties	• Procurement of suitable plant equipment. • Adoption of considerate	Negligible on Residential Properties

Description of Effects	Receptor	Significance and Nature of Effects Prior to Mitigation / Enhancement	Summary of Mitigation / Enhancement	Significance and Nature of Effects Following Mitigation / Enhancement (Residual)
from emissions of NO_X, NO_2 and NH_3 arising from Unit X	Ecological Receptors	[For ecological receptors, see Chapter 9 Biodiversity]	layout and design and stack height. • Plant to be designed and operated to achieve defined NOx / NO2 emission concentration and, if relevant, a ceiling on ammonia emissions.	
Stage 3 – Operation of Units X and Y				
Change in pollutant concentrations from emissions of NO_X, NO_2 and NH_3 arising from the Unit X and Y	Residential receptors (R1- R9) Ecological Receptors	Negligible (T – construction, P – operation, D – direct, - adverse)on Residential Properties [For ecological receptors, see Chapter 9 Biodiversity]	• Procurement of suitable plant equipment; • Adoption of considerate layout and design and stack height; • Plant to be designed to achieve defined NOx / NO2 emission concentration and, if relevant, a ceiling on ammonia emissions	- Negligible on Residential Properties
Decommissioning				
Dust deposition and change in	Residential receptors	Negligible (T / D)	Application of mitigation measures akin to CEMP and	Negligible on all receptors

Description of Effects	Receptor	Significance and Nature of Effects Prior to Mitigation / Enhancement	Summary of Mitigation / Enhancement	Significance and Nature of Effects Following Mitigation / Enhancement (Residual)
pollutant concentrations due to demolition works, plant and vehicles	Ecological Receptors		CTMP	

NB: Aspects of the proposed scheme considered as part of the pre-mitigation scenario are summarised above in Section 1.6, and within Chapter X: Summary of Environmental Statement.

Key to table: + / - = Positive or Negative P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term N/A = Not Applicable

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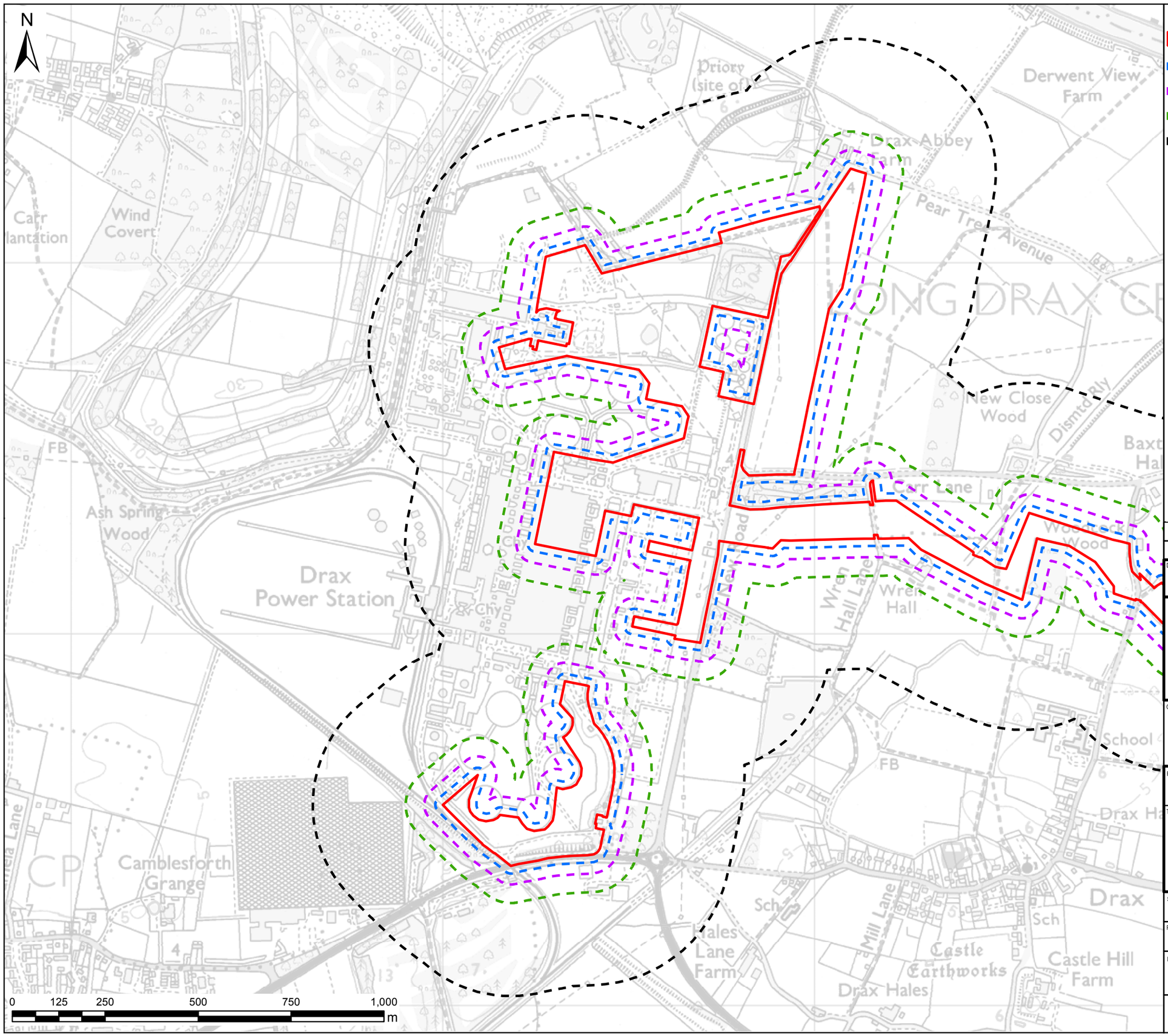

Key

- Site Boundary
- 20m Buffer
- 50m Buffer
- 100m Buffer
- 350m Buffer

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Figure 6.1
Construction Phase Impacts - Power Station Site, Laydown Area and GRF

SCALE @ A3:	CHECKED:	APPROVED:
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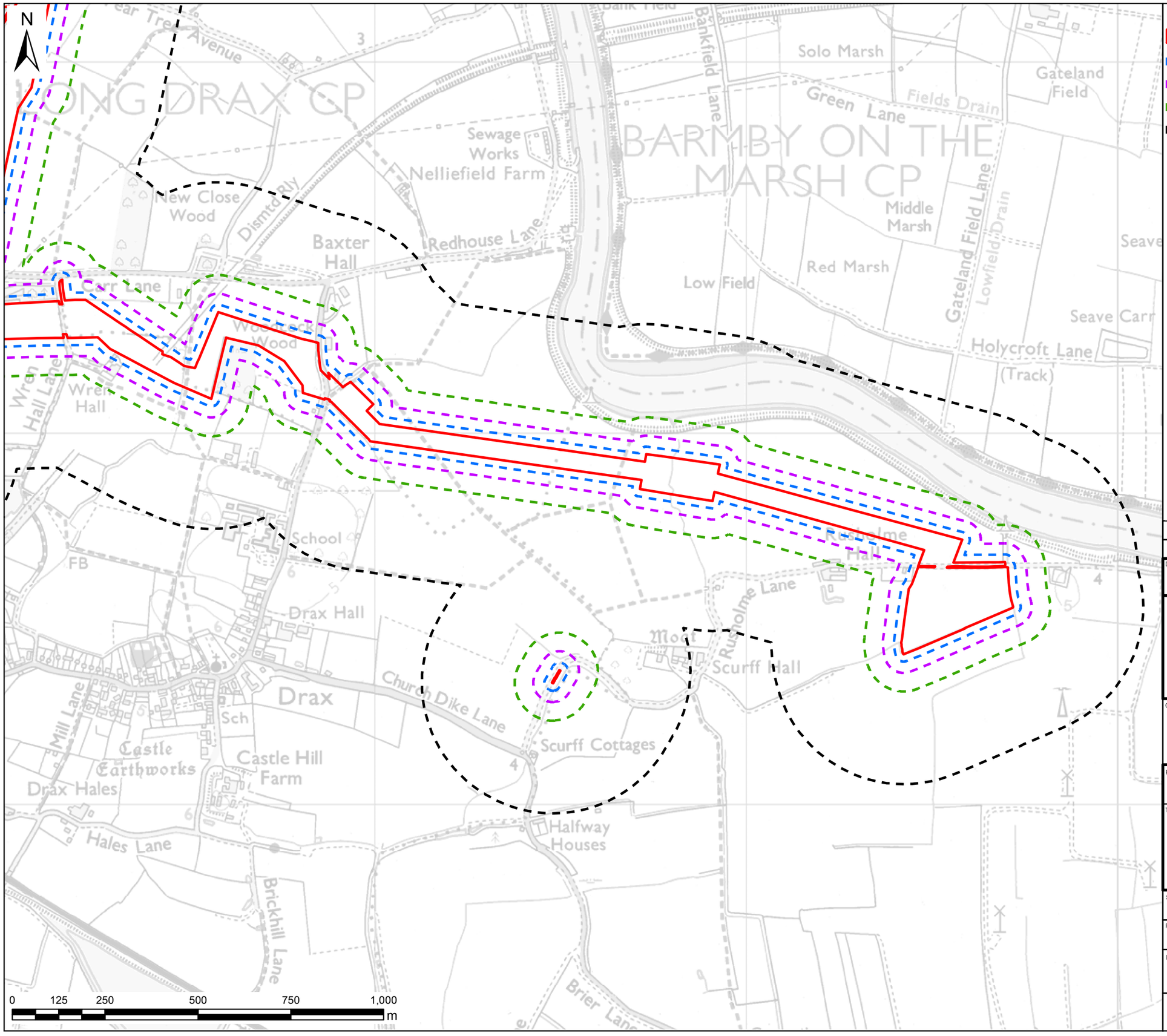

Key

- Site Boundary
- 20m Buffer
- 50m Buffer
- 100m Buffer
- 350m Buffer

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TITLE: Figure 6.2
Construction Phase Impacts -
Pipeline Study Area

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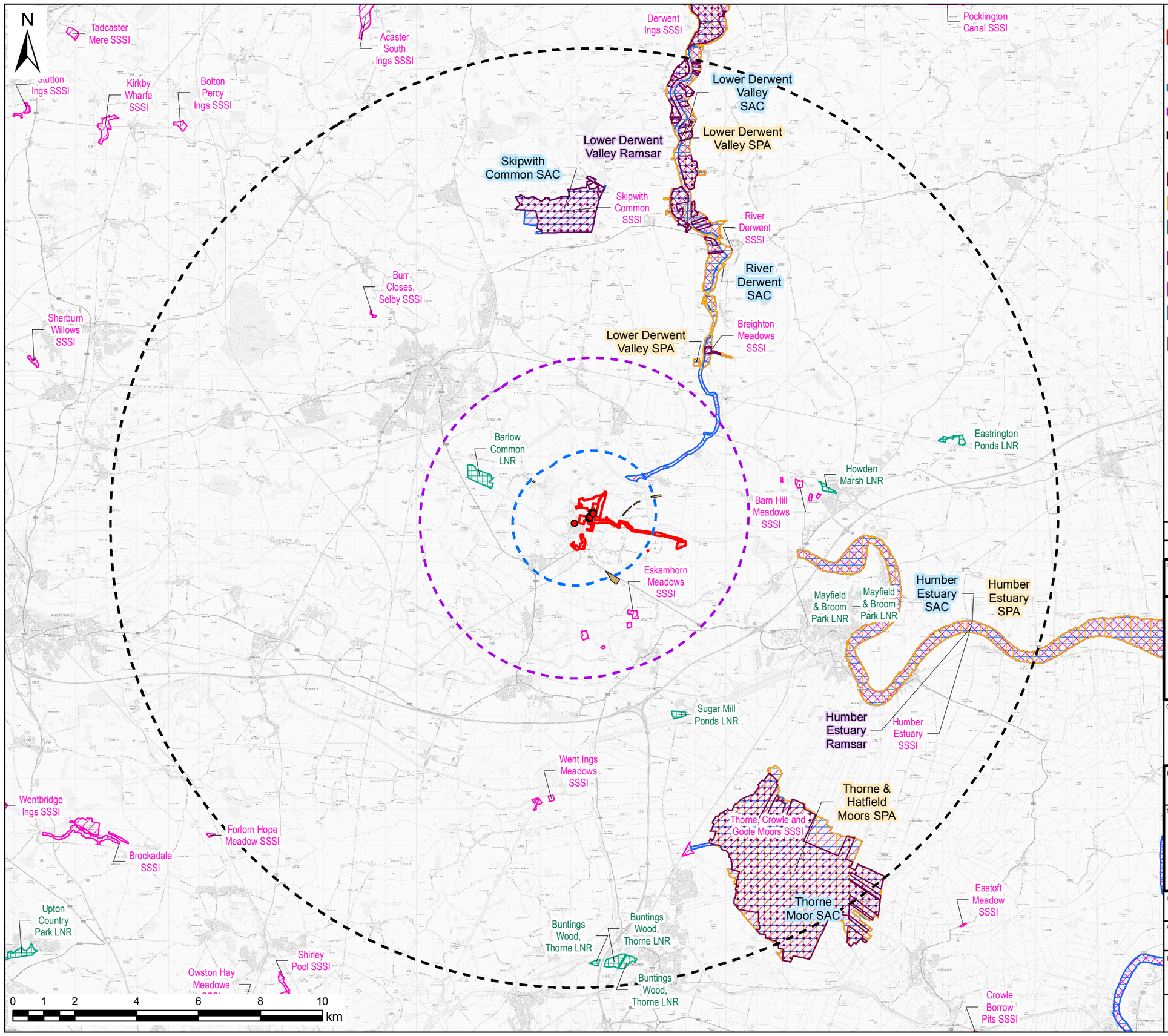

Key

- Site Boundary
- Stack Locations
- 2km Buffer around Stack Locations
- 5km Buffer around Stack Locations
- 15km Buffer around Stack Locations

Ecological Designations

- National Nature Reserve (NNR)
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Ramsar Site - Wetland of International Importance
- Site of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Sites of Importance for Nature Conservation (SINC) within 500m

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TITLE: Figure 6.3 Operational Phase - Air Quality Study Area

SCALE @ A3:	CHECKED:		APPROVED:
120,000 @ A3	IG		CT
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N

River View
Brown Cow Road
Marsh Lane
Ashleigh Farm
Barlow
Park Road
Mill La
Mark La
Wind Covert
Station Cottages
Garr Dyke
Low Farm
Camela Lane
Camela House
Camblesforth
Brigg La
A1041
Station Bungalow
Hook's Fields
Foreman's Cottage
R1
Drax Abbey Farm
R7
R9
Lodge
R5
Long Drax or Langrick
Hawst House
Hemingbrough Grange
Barmby Pasture
High Street
Barmby on the Marsh
Nelliefield Farm
Oakbank Farm
The Lodge
Redhouse Lane
The Hayloft
R4
Wren Hall
Woodlands
Wren Hall La
R8
Station Cottage
R2
R3
A645
Drax
Main Road
Church Dike Lane
Scurff Cottages
Scurff Hall
Rusholme Lane
Willow Row Drain
Hales Lane Farm
Hales La
Castle Hill La
Landray House
Brier Lane
Brock Holes
Field
Newland

0 250 500 1,000 1,500 2,000 m

Key

- Site Boundary
- 2km Buffer around Stack Locations
- Stack Locations
- Human Receptors

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TITLE: Figure 6.4 Operational Phase - Human Receptors

SCALE @ A3:	CHECKED:		APPROVED:
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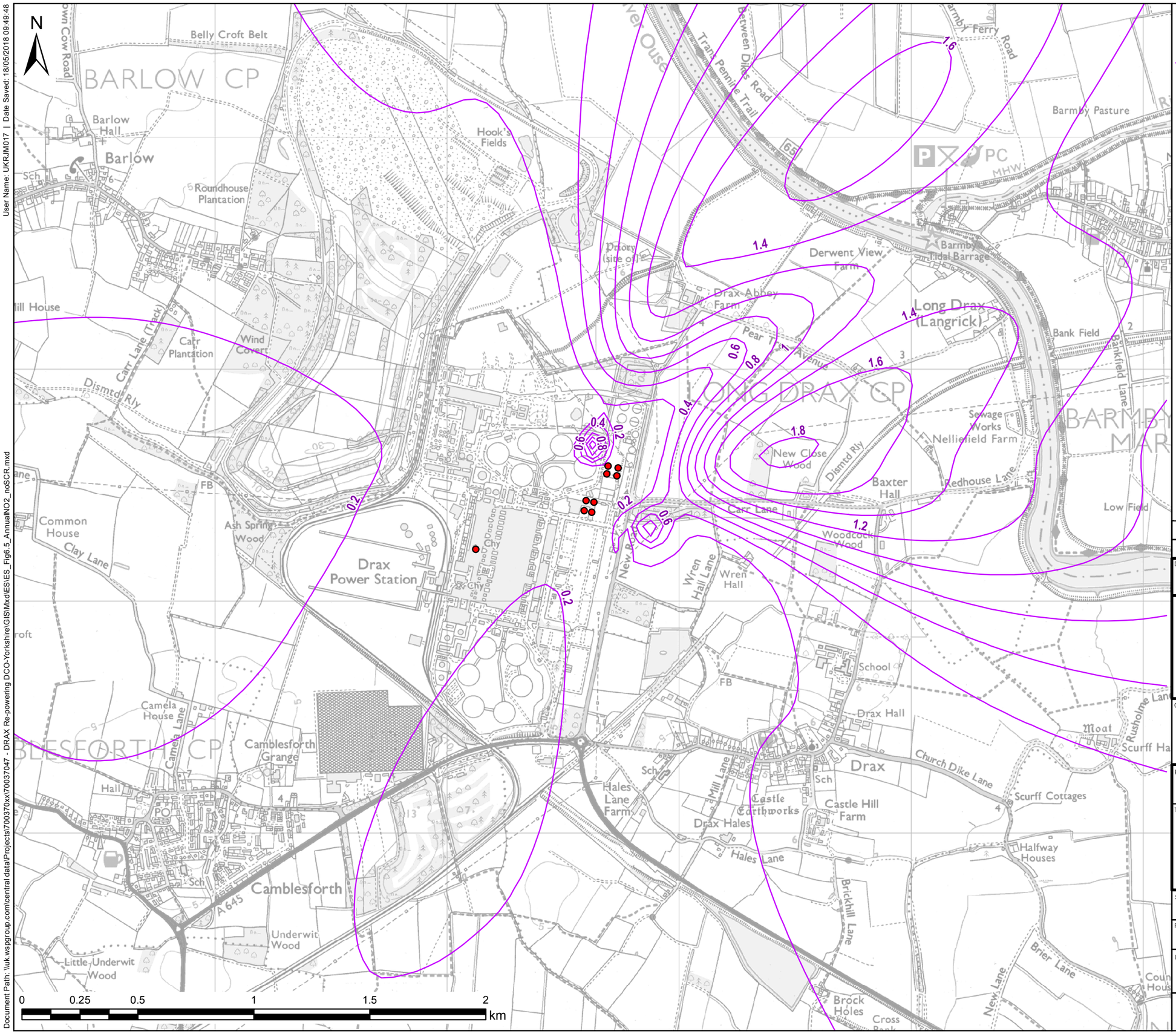

Key

- Stack Locations
- Annual Mean NO_2 (µg/m^3)

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TITLE:

Figure 6.5
Annual Mean NO_2
Process Contribution - Scenario A1 (µg/m^3)

SCALE @ A3:	CHECKED:	APPROVED:
16,000 @ A3	IG	BTJ

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70037047-6.5	A

N

0 0.25 0.5 1 1.5 2 km

Key

- Stack Locations
- Hourly Mean NO_2 (µg/m^3)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)

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TITLE:

Figure 6.6
Hourly Mean NO_2 (99.9th Percentile) Process Contribution - Scenario A1 (µg/m^3)

SCALE @ A3:	CHECKED:	APPROVED:
16,000 @ A3	IG	BTJ

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N

0 0.5 1 2 3 4 5 km

Key

- Stack Locations
- Annual Mean NO_x (µg/m^3)

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Figure 6.7
Annual Mean NO_x
Process Contribution - Scenario A1 (µg/m^3)

SCALE @ A3:	CHECKED:	APPROVED:
60,000 @ A3	IG	BTJ

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N

0 0.5 1 2 3 4 5 km

Key

- Stack Locations
- 24 Hour Mean NO_x ($\mu g/m^3$)

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TITLE:

Figure 6.8
24 Hour Mean NO_x
Process Contribution - Scenario A1 ($\mu g/m^3$)

SCALE @ A3:	CHECKED:	APPROVED:
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N

0 0.5 1 2 3 4 5 km

Key

- Stack Locations
- Annual Mean NO_x (µg/m^3)

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TITLE:

Figure 6.9
Annual Mean NO_x
Process Contribution - Scenario B (µg/m^3)

SCALE @ A3:	CHECKED:	APPROVED:
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N

0 0.5 1 2 3 4 5 km

Key

- Stack Locations
- 24 Hour Mean NO_x ($\mu g/m^3$)

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Figure 6.10
24 Hour Mean NO_x
Process Contribution - Scenario B ($\mu g/m^3$)

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N

0 0.5 1 2 3 4 5 km

0.005 0.001 0.005 0.009 0.005 0.037 0.033 0.029 0.033 0.031 0.025 0.021 0.017 0.013

Key

- Stack Locations
- Annual Mean NH_3 (µg/m^3)

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TITLE:

Figure 6.11
Annual Mean NH_3
Process Contribution - Scenario B (µg/m^3)

SCALE @ A3:	CHECKED:	APPROVED:
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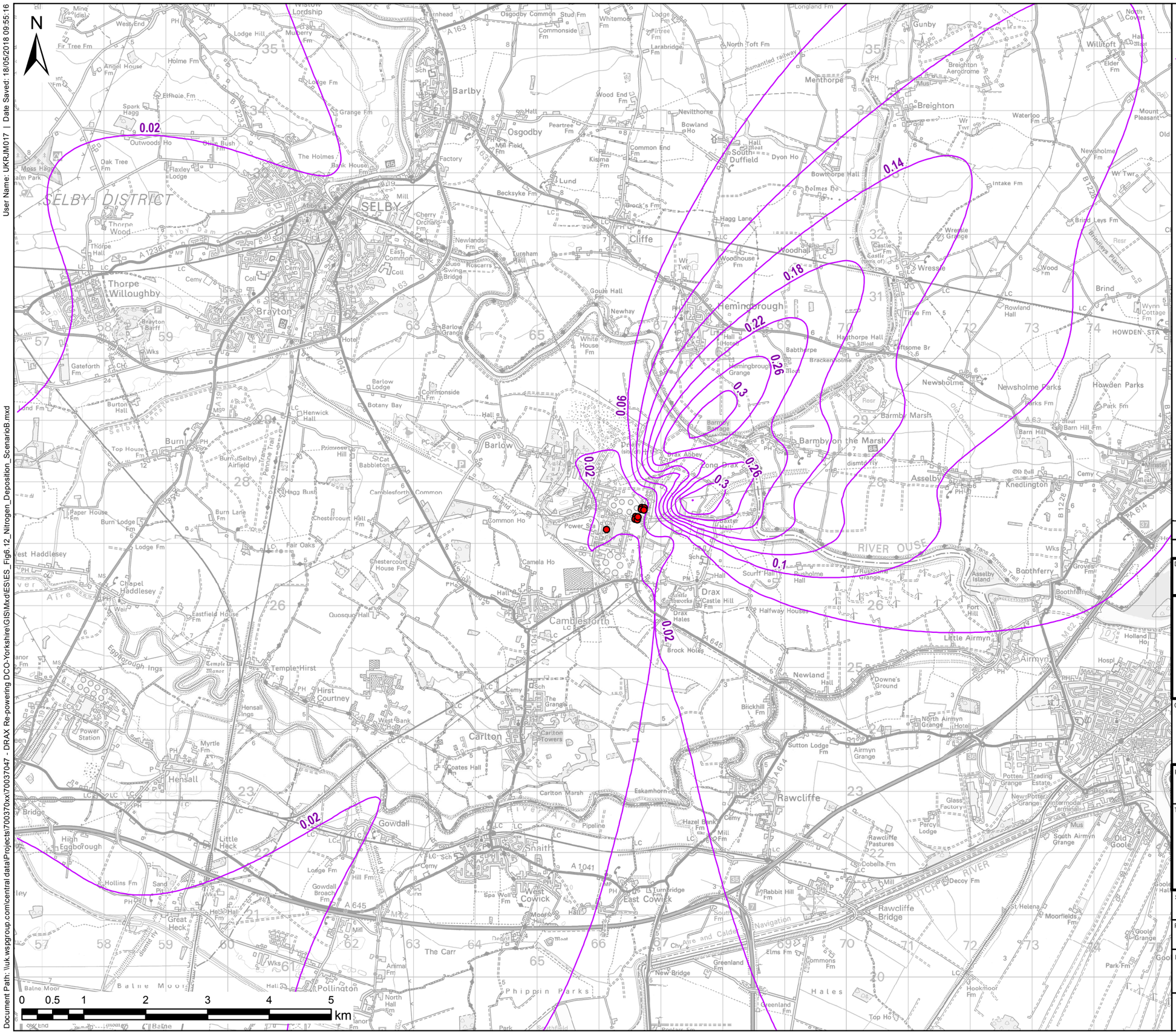

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Key

- Stack Locations
- Nitrogen Deposition (kgN/ha/yr)

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TITLE:

Figure 6.12
Nitrogen Deposition
Process Contribution - Scenario B (kgN/ha/yr)

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REFERENCES

- Ref. 6.1 Department of Energy and Climate Change (DECC) (July 2011). National Policy Statements (NPS) for Energy.
- Ref. 6.2 Department of Communities and Local Government (DCLG) (March 2012). National Planning Policy Framework (NPPF)
- Ref. 6.3 Ministry of Housing, Communities and Local Government (HCLG) (March 2018) Draft NPPF
- Ref. 6.4 Selby District Council (2013). Selby District Core Strategy Local Plan, Adoption Version 22 October 2013.
- Ref. 6.5 Selby District Council (2008). Selby District Local Plan 2005, Saved Policies and Directions.
- Ref. 6.6 Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2).
- Ref. 6.7 The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928.
- Ref. 6.8 The Air Quality (England) (Amendment) Regulations 2002- Statutory Instrument 2002 No.3043.
- Ref. 6.9 The Air Quality Standards Regulations 2010- Statutory Instrument 2010 No. 1001.
- Ref. 6.10 Environment Protection Act 1990 – Control of dust and particulates associated with construction (Section 79).
- Ref. 6.11 Environment Act 1995 (1995)
- Ref. 6.12 Industrial Emission Directive (2010) Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
- Ref.6.13 Environment Agency (last updated August 2016). **https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit** (last update August 2016).
- Ref. 6.14 Defra (2016) Part IV The Environment Act 1995 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG16.
- Ref. 6.15 Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017). Land Use Planning & Development Control: Planning for Air Quality.
- Ref. 6.16 Institute of Air Quality Management (Version 1.1 Updated June 2016). Guidance on the Assessment of Dust from Demolition and Construction.
- Ref. 6.17 DMRB, Volume 11, Section3, Part 1, HA207/07 Air Quality.
- Ref. 6.18 UK APIS, Website: **www.apis.ac.uk**
- Ref. 6.19 SDC (2014) Air Quality Planning Guidance Note, April 2014
- Ref. 6.20 Department of Communities and Local Government (DCLG) (March 2014). Planning Practice Guidance.
- Ref. 6.21 Ministry of Housing, Communities and Local Government (HCLG) (March 2018) Draft Planning Practice Guidance.
- Ref. 6.22 SDC (2017) Selby District Council Air Quality Annual Status Report (2017).
- Ref. 6.23 Defra Local Air Quality Management (LAQM) Support Pages. Available at: http://laqm.defra.gov.uk/ Accessed on 14/03/2017

- Ref.6.24 Environment Agency https://data.gov.uk/search?filters%5Bpublisher%5D=Environment+Agency
- Ref. 6.25. Drax Power Limited Annual Reports Review of Management Plan to Ensure Compliance with the AQS Objectives, March 2009,2010, 2012,2011, 2013, 2015
- Ref. 6.26 Environment Agency's advice note for conversion ratios for NOx and NO2. Available at **http://webarchive.nationalarchives.gov.uk/20140328084622/http:/www.environment-agency.gov.uk/static/documents/Conversion_ratios_for__NOx_and_NO2_.pdf**
- **Ref 6.27 Environment Agency (2006) AQTAG06 Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air.**
- **Ref. 6.28 IAQM (2015). Position Statement: Mitigation of Development Air Quality Impacts.**
- Ref. 6.29 Eggborough Power Ltd (2017) Environment Statement: Volume I Chapter 8 – Air Quality (May 2017).
- Ref. 6.30 Eggborough Power Ltd (2017) Environment Statement: Volume III Appendix 8A – Air Quality (May 2017).
- Ref. 6.31 Eggborough Power Ltd (2017) Deadline Submission Applicant response to Examining Authorities First Written Questions – Deadline 2, Appendix 3 - Technical Note on air quality impacts (November 2017).
- Ref 6.32 Thorpe Marsh – Section 36 Variation Environmental Information Report July 2016
- Ref 6.33 BAT Conclusions of 31 July 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for large combustion plants (notified under document C(2017) 5225)