Document History

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12 WATER RESOURCES, QUALITY AND HYDROLOGY

12.1 Introduction

12.1.1. This Chapter reports the outcome of the assessment of likely significant effects arising from the Proposed Scheme upon water resources, quality and hydrology. The focus of the assessment is on establishment of baseline conditions, identification of key water environment receptors and likely potential impacts, identification of risks to water resources and water quality, and flood risk to and caused by the Proposed Scheme.

12.1.2. The Chapter describes the assessment methodology; the baseline conditions at the Site and in the surrounding area; any mitigation adopted for the purposes of the assessment; a summary of the likely significant effects taking into account national and local legislation and policy; further mitigation measures required to prevent, reduce or offset any significant negative effects; and the likely residual effects after these measures have been employed.

12.1.3. This Chapter (and its associated figures and appendices) is intended to be read as part of the wider ES, with particular reference to Chapter 9 (Biodiversity) and Chapter 11 (Ground Conditions) and a standalone Flood Risk Assessment (FRA, Document Reference 6.8).

12.2 Policy, Legislation and Guidance

Policy

12.2.1. The applicable policy framework is summarised as follows:

- Water Framework Directive Act (2000/60/EC) (Ref. 12.1).
- Groundwater Directive (2006/118/EC) (Ref. 12.2).
- Overarching National Planning Policy Statement for Energy (EN-1) (Ref. 12.3).
- National Policy Statement for fossil Fuel Electricity Generating Infrastructure (EN-2) (Ref. 12.4).
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref. 12.5).
- National Policy Statement for Electricity Infrastructure (EN-5) (Ref. 12.6).
- National Planning Policy Framework (Ref. 12.11).
- Selby District Core Strategy Plan (2013) (Ref. 12.7).

Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000) (ref. 12.1)

12.2.2. The overall objective of the Water Framework Directive (WFD) is to bring about the effective co-ordination of water environment policy and regulation across Europe. The main aims of the directive are to ensure that all surface water and groundwater reaches ‘good’ status (in terms of ecological and chemical quality and water quantity, as appropriate), promote sustainable water use, reduce pollution and contribute to the mitigation of flood and drought.

Groundwater Directive (DIRECTIVE 2006/118/EC of the European Parliament and of the Council of 12 December 2006) (Ref. 12.2)

12.2.3. The Groundwater Directive aims to set groundwater quality standards and introduce measures to prevent or limit pollution of groundwater, including those listed with the 'List of Priority Substances'. The Directive has been developed in response to the requirements of Article 17 of the WFD, specifically the assessment of chemical status of groundwater and objectives to achieve 'good' status.

Overarching National Planning Policy Statement for Energy (EN-1) (Ref. 12.3)

12.2.4. The Overarching National Policy Statement for Energy (NPS EN-1) recognises that infrastructure can have adverse effects on the water environment. It states that the effects could lead to adverse impacts on health or on protected species and habitats and could result in surface waters, groundwaters or protected areas failing to meet environmental objectives established under the WFD.

12.2.5. It states that where projects are likely to have effects on the water environment, applicants should undertake an assessment of the existing status of, and impacts of, the proposed project on water quality, water resources and physical characteristics of the water environment as part of the Environmental Statement (ES). The ES should particularly describe: existing quality of watercourses, existing water resources, existing physical characteristics of the water environment and impacts on protected waterbodies and areas.

12.2.6. Section 5.7 (Flood risk) of NPS EN-1 details that projects of 1 hectare or greater in Flood Zone 1 in England and all proposals for energy projects located in Flood Zones 2 and 3 in England should be accompanied by a Flood Risk Assessment (FRA). The requirements for FRAs are that they should (paragraph 5.7.5 of NPS EN-1):

- Be proportionate to the risk and appropriate to the scale, nature and location of the project.
- Consider the risk of flooding arising from the project in addition to the risk of flooding to the project.
- Take the impacts of climate change into account, clearly stating the development lifetime over which the assessment has been made.
- Be undertaken by competent people, as early as possible in the process of preparing the proposal.
- Consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure.
- Consider the vulnerability of those using the Site, including arrangements for safe access.
- Consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made.
- Consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes.

- Include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular project.
- Consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems.
- Consider if there is a need to be safe and remain operational during a worst case flood event over the development's lifetime.
- Be supported by appropriate data and information, including historical information on previous events.

12.2.7. In determining an application for development consent, the SoS should be satisfied that where relevant (paragraph 5.7.9 of NPS EN-1):

- The application is supported by an appropriate FRA; the sequential test has been applied as part of site selection.
- A sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk.
- The proposal is in line with any relevant national and local flood risk management strategy.
- Priority has been given to the use of sustainable drainage systems (SuDS).
- In flood risk areas the project is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed over the lifetime of the development.

12.2.8. Section 5.15 (Water quality and resources) of NPS EN-1 details that where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of, the proposed project on water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent. The ES should in particular describe:

- The existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges;
- Existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies).;
- Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics; and
- Any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.

National Policy Statement for fossil Fuel Electricity Generating Infrastructure (EN-2) (Ref. 12.4)

12.2.9. NPS EN-2 states that where a project is likely to have an effect on water quality or resources the applicant for development consent should undertake an assessment which should particularly demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water. The applicant should demonstrate measures to minimise adverse impacts on water quality and resources including specific measures to minimise fish impingement and/or entrainment and excessive heat from discharges to receiving waters.

National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref. 12.5)

12.2.10. NPS EN-4 states that when designing routes for new pipelines, applicants should research relevant constraints including below surface usage, proximity to environmentally sensitive areas (for example the River Ouse), and watercourse crossings.

12.2.11. The selection of the pipeline route should also seek to avoid and minimise any adverse impacts from usage below the surface, with the implementation of mitigation measures if necessary. These suggested mitigation measures include horizontal directional drilling. It also states that constructing pipelines can affect watercourses, aquifers, water abstraction and discharge points, areas prone to flooding and ecological receptors. The impacts of the pipeline could include excessive or inadequate drainage, interference with groundwater flow pathways, mobilisation of contaminants present in the ground, introduction of new pollutants, flooding disturbance to water ecology, pollution due to silt from construction and disturbance to species and their habitats.

National Policy Statement for Electricity Infrastructure (EN-5) (Ref. 12.6)

12.2.12. NPS EN-5 states that with regard to climate change, applicants should set out to what extent the proposed development is expected to be vulnerable and, as appropriate, how it would be resilient to flooding, particularly for substations that are vital for the electricity transmission and distribution network.

National Planning Policy Framework (NPPF) (Ref. 12.11)

12.2.13. The NPPF sets out the Government's planning policies for England and provides a framework which allows Local Authorities to produce their own plans that better reflect the specific needs of their communities. Planning Practice Guidance (PPG) has been published alongside the NPPF, and is regularly updated, to provide guidance on the implementation of the planning policies, including those relating to flood risk, set out in the NPPF. The NPPF also sets out the requirements for a site specific FRA to be undertaken and states that development should not increase flood risk elsewhere.

12.2.14. A revised version of the NPPF is currently under consultation. The draft revised NPPF (March 2018) provides more detailed requirements related to climate change and sustainable drainage from a flood risk and planning perspective, in relation to the current March 2012 NPPF:

- To meet the challenge of climate change, flooding and costal change, plans should have regard to the cumulative impacts of flood risk, rather than just looking at the flood risk impact of individual development sites.
- Sites that have been allocated in the development plans have already applied the sequential test, however the exception test, informed by site specific FRA, may need to be re-applied (depending on the nature and extent of flood risk, and the time passed since the initial assessment was carried out).
- Developments within areas at risk of flooding should demonstrate that they incorporate sustainable drainage systems (unless there is a clear evidence that this would be inappropriate), and safe access and egress routes are provided as part of an agreed emergency plan.
- A site-specific FRA is required for all sites currently located in Flood Zone 1, but identified in a SFRA as being at increased risk of flooding in the future.

Selby District Core Strategy Plan (2013) (Ref. 12.7)

12.2.15. The following policies relate to drainage and flood risk:

- Policy SP15 (Sustainable Development and Climate Change) sets out to promote sustainable development, and determine scheme layouts which are resilient to climate change:
  - Section A Part D: Ensure that development in areas of flood risk is avoided wherever possible through the application of the sequential test and exception test; and ensure that where development must be located within areas of flood risk that it can be made safe without increasing flood risk elsewhere.
  - Section A Part E: Support sustainable flood management measures such as water storage areas and schemes promoted through local surface water management plans to provide protection from flooding; and biodiversity and amenity improvements.
  - Section B Part C: Incorporate water-efficient design and sustainable drainage systems which promote groundwater recharge.
- Policy SP18 (Protecting and Enhancing the Environment) sets out to protect the District's environment, in particular by:
  - Section 7. Ensuring that new development protects soil, air and water quality from all types of pollution.
  - Section 8. Ensuring developments minimise energy and water consumption, the use of non-renewable resources, and the amount of waste material.
  - Section 9. Steering development to areas of least environmental and agricultural quality.

12.2.16. The Local Plan identifies a number of primary issues which should be considered. Two of these issues are relevant to the Proposed Scheme in relation to the water environment:

- Protection of groundwater: The District is underlain by the Sherwood Sandstone and the Magnesian Limestone aquifers, both of which provide a significant groundwater supply. Where there are no superficial deposits over the aquifers, groundwater contamination is a serious concern so consideration must be given to the prevention of pollution and the protection of water quality within the groundwater.

Water conservation measures are promoted across the District to adapt to the future pressures of climate change.

- Flood Risk management: Significant flood risks exist across large areas of Selby District, most developments therefore require the application of the Sequential Test.

12.2.17. The promotion of SuDS across the District encourages infiltration and groundwater discharge.

Legislation

12.2.18. The applicable legislative framework is summarised as follows:

- Flood and Water Management Act 2010 (Ref. 12.8).
- Environmental Permitting (England and Wales) Regulations 2016 (Ref. 12.9).
- Land Drainage Act 1991 (Ref. 12.10).

Flood and Water Management Act 2010 (Ref. 12.8)

12.2.19. The Flood and Water Management Act created the role of the Lead Local Flood Authority (LLFA) to take responsibility for leading the co-ordination of local flood risk management in their areas. In accordance with the Flood and Water Management Act, the Environment Agency (EA) is responsible for the management of risks associated with main rivers, the sea and reservoirs. LLFAs are responsible for the management of risks associated with local sources of flooding such as ordinary watercourses, surface water and groundwater. The Act is also guiding the role of the LLFA in the review and approval of surface water management systems, leading to LLFAs reviewing and commenting on significant development in regard to the Non-Statutory Technical Standards for Sustainable Drainage Systems (explained further below).

Environmental Permitting (England and Wales) Regulations 2016 (Ref. 12.9)

12.2.20. Under the Environmental Permitting Regulations it is an offence to cause or knowingly permit a water discharge activity, including the discharge of polluting materials to freshwater, coastal waters, relevant territorial waters or groundwater, unless complying with an exemption or an environmental permit (obtained from the EA). The EA sets conditions which may control volumes and concentrations of particular substances or impose broader controls on the nature of the effluent, taking into account any relevant water quality standards from EC Directives. The Environment Permitting Regulations also manage works that have the potential to affect a watercourse under the jurisdiction of the EA. Any works in, under or near a main river require permission from the EA to ensure no detrimental impacts on the watercourse.

Land Drainage Act 1991 (Ref. 12.10)

12.2.21. Local Authorities and Internal Drainage Boards (IDBs) have additional duties and powers associated with the management of flood risk under the Land Drainage Act. Consent must be given for any permanent or temporary works that could affect the flow within an ordinary watercourse under their jurisdiction in order to ensure that local flood risk is not increased. The Land Drainage Act also sets out the maintenance responsibilities riparian owners have in order to reduce local flood risks.

Guidance

12.2.22. The following guidance documents have been used during the preparation of this Chapter:

- Non Statutory Technical Standards for Sustainable Drainage Systems (2015) (Ref. 12.12).
- Environment Agency Groundwater Protection Guides (2017) (Ref. 12.13).
- North Yorkshire County Council SUDS Design Guidance (Ref. 12.14).
- Selby Area Internal Drainage Board Bye-Law (Ref. 12.15).
- Selby Area Internal Drainage Board Policy Statement on Flood Protection and Water Level Management (Ref. 12.16).
- Design Manual for Road and Bridges (DMRB) Volume 11 Section 3 Part 10 (Ref. 12.17).

Non Statutory Technical Standards for Sustainable Drainage Systems (2015) (Ref. 12.12)

12.2.23. The Non-Statutory Technical Standards set out the core technical standards for sustainable drainage systems (SuDS) proposed within England. These standards should be used in accordance with the National Planning Policy Framework and Planning Practice Guidance. The standards include guidance on controlling flood risk within a development boundary and elsewhere, peak flow and runoff volume control, and the structural integrity of SuDS.

Environment Agency Groundwater Protection Guides (2017) (Ref. 12.13)

12.2.24. The EA is the statutory body responsible for the protection and management of groundwater resources in England. The groundwater protection guides published in March 2017 set out the framework for the EA regulation, and replace Groundwater Protection: Principles and Practice GP3. In summary, Section C sets out the EA's position statements and approach to managing and protecting groundwater in relation to infrastructure developments.

North Yorkshire County Council SUDS Design Guidance (Ref. 12.14)

12.2.25. North Yorkshire County Council (NYCC) SUDS Design Guidance provides principles for design of SUDS measures. The following principles should be followed during design of surface water drainage:

- Surface water runoff should be managed in accordance with the SUDS management train.
- The peak runoff rate from the developed site for the 1 in 1 year, 1 in 30 year and 1 in 100 year events must not exceed the peak greenfield runoff rate from the site for the same event.
- Greenfield runoff rates should be determined using the Institute of Hydrology Report 124 (IH124) or Flood Estimation Handbook (FEH).
- Discharge runoff rate/volume from a whole or part brownfield site should be limited to the 70% of existing positively drained runoff rate/volume for those rainfall events or to the current greenfield runoff rate/volume, however greenfield runoff rate/volume should be achieved where possible.

- Greenfield runoff rate is maximum 1.4 l/s/ha unless modelling conclusively demonstrates greenfield runoff to be greater than this.
- The runoff volume from the developed site for the 1 in 100 year 6 hour rainfall event must not exceed the greenfield runoff volume for the same event.
- Should infiltration methods not be suitable and it is not possible to achieve greenfield runoff volume then it must be demonstrated that the increased volume will not increase flood risk on or off site.
- SUDS design must ensure that the quality of any receiving water body is not adversely affected and preferably enhanced.
- Appropriate ground exceedance flow paths must be included in a site design so in case of SUDS failure or rainfall that exceeds the design capacity of the drainage system, any exceedance flows do not cause flooding of properties on or off site.
- Surface water runoff generated in a development must be contained within the drainage system for all events up to and including the 1 in 30 year event.
- Surface water runoff from rainfall in excess of a 1 in 100 year event must be managed to ensure no increased risk of flooding to people and properties both on and off site.
- SUDS features located in highway and that serve those highways can be adopted by NYCC Highway Authority and maintained as part of the wider highways maintenance subject to agreement with Highway Authority.
- An allowance of 30% increase in rainfall intensity must be considered in SUDS design to allow for climate change.
- An urban creep of 10% must be considered in the drainage design.
- Information on adoption and maintenance of SUDS must be submitted to the Council.

Selby Area Internal Drainage Board Bye-Law (Ref. 12.15)

12.2.26. Selby Area Internal Drainage Board Bye-Laws provide a summary of the requirements related to any works planned to be undertaken within or in close proximity to the ordinary watercourses located in the area under the jurisdiction of the IDB. The bye-law also provides information on the requirements related to drainage discharge rates to the watercourses under the jurisdiction of the IDB. The requirements are summarised below:

- Any works that may impact the IDB's watercourses and any discharge into these watercourses require appropriate consent from the IDB. The consent should be obtained prior to the works commencing.
- No temporary or permanent structure should be constructed within 7 m of the edge of the watercourse without previous consent from the Board.

Selby Area Internal Drainage Board Policy statement on Flood Protection and Water Level Management (Ref. 12.16)

12.2.27. This policy statement summarises the Board’s approach to the management of flood risk and water levels in the area under the jurisdiction of the Board. The Board’s approach consider the following:

- To encourage the provision of adequate and cost effective flood warning system.
- To encourage the provision of adequate, economically, technically and environmentally sound and sustainable flood and coastal defences.
- To discourage inappropriate development in areas at risk of flooding.

Design Manual for Roads and Bridges (DMRB) volume 11 Section 3 Part 10 (Ref. 12.17)

12.2.28. Volume 11 Section 3 Part 10 of DMRB gives guidance on the assessment and management of the impacts that road projects may have on the water environment. These include possible impacts on the quality of water bodies and on the existing hydrology of the catchments through which roads pass. Although DMRB relates to road schemes, it also provides a good guidance for assessments of the impacts that any development may have on the water environment.

12.3 Scoping Opinion and Consultation

Consultation

12.3.1. Table 12-1 provides a summary of the consultation activities undertaken in support of the preparation of this Chapter.

Table 12-1 - Summary of Consultation Undertaken to Date (Water Resources, Quality and Flood Risk)

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
Environment Agency	Consultation email sent to EA in November 2017, response letter received from EA via email on 8 January 2018, letter reference RA/2017/137861/02	• The FRA will need to clearly demonstrate that flood risk to others will not be increased as a result of the development. Any increase in risk to others will have to be mitigated, including provision of floodplain compensation if required. • The Upper Humber hydraulic model is being currently developed, and the final report is envisaged to be issued in April 2018. If the Humber model data is available, it should be used to support the assessment. However, if the data is not available at the time of assessment, the best available data should be used. If best available data changes during the assessment period or during the planning process, the assessment may need to be updated using the latest data. • The current climate change policy and guidance should be used in the assessment. If new policy/guidance comes into force during the application process, the assessment should be updated accordingly. • No objections to the proposed study areas, but at this stage cannot determine whether they are appropriate. Study area to be properly	• A pre- and post-development hydraulic model of the 1 in 200 year breach scenario was undertaken as part of the assessment. The existing River Ouse hydraulic model was adopted for this purpose. • The Selby Area IDB and North Yorkshire County Council who act as LLFA for the area of the Proposed Scheme were consulted as part of EIA process. • The EA's Climate Change Guidance 2016 is considered in the assessment;

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
		defined and justified in line with relevant guidance. A source-pathway-receptor model to be used to assess risks to groundwater and define appropriate areas of study. • The EA's Land Contamination Risk Management guidance should be used to establish groundwater quality and the potential impacts on its quality. • The EA advised that the method of the construction of the Gas Pipeline should be discussed with the Lead Local Flood Authority and the Internal Drainage Board as they are the regulating body for ordinary watercourses. • If the 2009 River Ouse hydraulic model is used, it is appropriate to re-run the model in ISIS. If the Upper Humber hydraulic model is used, then the model should be re-run using the same software used to develop the model. • The EA advised that they do not determine the application of the Sequential Test. • A breach scenario should be included. The breach location can be the same as that used for the White Rose Scenario, unless the Upper Humber modelling is available, in which case the breach data from this model should be used.	

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
		• The design scenario that should be used for the scheme is the 1 in 100 year event plus climate change allowance, or the 1 in 200 year event (tidal) level if greater.	
Environment Agency	22 January 2018, Meeting	• EA advised that the early results from the new Upper Humber hydraulic modelling indicate a change in the fluvial and tidal interaction, with the tidal limit possibly shifting and fluvial flows having more of a dominant effect. It is likely to be caused by climate change. Considering this information, the EA will confirm which modelling scenario should be used. • EA confirmed that the hydrology and survey in the 2009 River Ouse model do not need to be updated but need to show no effect on local communities. • The sensitivity analysis will be undertaken as per usual modelling specification. • No need to consider the undefended scenario. • Historic flooding records will be requested. • An assessment of shallow perched water should be undertaken, if drilling techniques are used. • IDB consent is required for any open cut crossings and silt management procedures would be required.	• The EA's 2009 River Ouse hydraulic model was used to support the assessment. • The sensitivity test was undertaken as per standard specification. • A pre- and post- development hydraulic model was developed for the defended scenario only. • Further consultations with the EA regarding WFD assessment were undertaken as part of the assessment. • Impacts of the Proposed Scheme on the groundwater resources were assessed as part of the assessment.

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
		• WFD assessment may not be required as construction works are unlikely to be undertaken in close proximity to the River Ouse. This is to be confirmed as the project progresses.	
Environment Agency	26 January 2018, Letter via email, letter reference RA/2017/137861/03	• The 2009 River Ouse model data, along with the same methodology used for the White Rose Carbon Capture model will provide a sufficiently robust approach, such that the assessment will not have to be updated using the new Upper Humber model when it becomes available. • The hydraulic model supporting the FRA will have to be reviewed by the EA to determine whether it is fit for purpose.	• The hydraulic model of the pre- and post-development scenario was based on the same methodology used for the White Rose Carbon Capture model. • The hydraulic model of the Proposed Scheme was sent to the EA for review. No official response was received yet.
Environment Agency	26 January 2018, Letter via email, letter reference RA/2017/137861/03-L02	• The site presents high risk of contamination that could be mobilised during construction. • The EA's Approach to Groundwater protection guidance should be followed. • Temporary surface water controls and management of any material movement on site is critical to protect controlled waters near the site. • Discharge of surface water or foul water is not allowed onto land impacted by contamination.	• Potential risk of soil contamination and potential mobilisation of the contaminants during construction is assessed as part of this EIA.

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
		• No discharge to made ground or directly to the groundwater resources is allowed. • Appropriate risk assessment is required if penetrating methods are used during construction.	
Environment Agency	27 February 2018,Letter via email (response to consultation on the PEIR), letter reference RA/2018/138164/01	• EA advised that the FRA should be undertaken in accordance with the EA comments received in January 2018. • Any work or structures in, under, over or within 16m of the top of the bank of the tidal River Aire (main river) will require an Environmental Permit. • An Environmental Permit will also be required for any temporary structures or stockpiles of materials within the floodplain. • EA advised that no further action is required if the current licensed abstraction volumes and conditions will remain unchanged.	• The FRA is prepared in accordance with the comments received from the EA in January 2018. • No works are proposed to be undertaken within 16m of the River Ouse. • No change to the existing abstraction volumes is proposed during the operational phase of the Proposed Scheme. Appropriate consent will be obtained from the EA if water would have to be temporarily pumped from the excavations during construction of the Gas Pipeline.
Environment Agency	05 March 2018, Conference call	• The results of the hydraulic modelling and flood mitigation options were discussed.	• No further action required.

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
Environment Agency	14 March 2018, Email	• The FRA should demonstrate no increase in risk pre- and post-development scenarios. • If there is no development within 8 m of fluvial main river or 16m of tidal main river then there is no requirement to complete a WFD assessment, however the impact on groundwater resources should be assessed as part of the EIA.	• A flood relief channel is proposed to be constructed to mitigate potential impact on the flood risk. . • No works are proposed to be undertaken within 16m of the River Ouse. • WFD Screening Assessment related to the surface water and groundwater resources was submitted to the EA.
Environment Agency	15 March 2018, Email	• The EA's Geomorphologist advised that the proposed Gas Pipeline crosses Rusholme Lane Drain, an ordinary watercourse but designated a WFD waterbody, and therefore the WFD assessment is required.	• Extensive consultation with the EA regarding the need for WFD assessment related to surface water and groundwater resources was undertaken as part of this EIA.
Environment Agency	20 March 2018 Email	• Advised that a screening exercise should be carried out to assess the impact on WFD waterbodies. • With respect to groundwater, further assurance was going to be obtained, but the provisional guidance was that if the risks to groundwater are managed in line with all the other guidance	• WFD Screening Assessment related to the surface water and groundwater resources was submitted to the EA as part of this EIA.

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
		provided by the EA then the requirements of WFD will be met by default.	
Environment Agency	22 March 2018 Email	• Confirmation that there is no requirement to do a WFD from a groundwater perspective. • Confirmed the requirement to do a screening exercise for surface waterbodies in line with the guidance provided in earlier correspondence.	• WFD Screening Assessment related to the surface water and groundwater resources was submitted to the EA as part of this EIA.
Environment Agency	27th April 2018 Email	• Outcome of the model review by the EA indicates a few minor changes are required to the model before the EA will sign it off.	• An addendum, addressing the points raised has been prepared and issued to the EA. Awaiting a response at the time of submission.
Environment Agency	30 April 2018, letter via email, letter reference RA/2018/138339/02	• Confirmation that the proposed works will not have any adverse impacts on hydromorphology or groundwater from the perspective of the WFD and therefore no full WFD assessment is required.	• No further action required.
Environment Agency	10 May 2018, letter via email, letter reference RA-2018-138541-01	• Confirmation that the FRA is considered acceptable – subject to the confirmation that the hydraulic model supporting the FRA is considered fit for purpose.	• No further action required

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
Selby Area Internal Drainage Board	December 2017 – February 2018, Email and telephone conference	• The proposed study areas are acceptable. • The IDB confirms that they have no preference for the method of installation of the Gas Pipeline beneath the watercourses. The Gas Pipeline should be installed with a minimum clearance of 1m below the bed of the watercourse. Where pipes are installed by open cut trenching, the banks of the watercourse are to be reinstated to the same line and slope, and grass seeded as soon as practicable after installation. The use of a bio-degradable mat (or similar) may be necessary in some installations to hold the grass seed and aid the re-growth of vegetation. The position of each crossing is to be marked by marker posts, one on each bank. • Surface water runoff from additional new impermeable areas should be limited to the pre-development greenfield runoff rate or 1.4l/s/ha, whichever is the least. • Existing discharge points should be used wherever possible. • New outfalls should be set back from the bank and not protrude into the watercourse. Appropriate erosion prevention measures should be applied if required. A marker post	• The Board's requirements are considered in the proposed surface water drainage strategy. • If temporary pumping of groundwater from the excavation will be required, appropriate separate consents from the EA and the Selby Area IDB will be obtained. •

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
		should be provided near a new outfall to highlight the presence of the outfall for maintenance operatives. • Groundwater levels are frequently high in this area and the applicant will need to consider buoyancy of the Gas Pipeline and associated buried apparatus. • General pollution prevention measures should be applied. • Temporary pumping of groundwater in excavations will require a separate consent. It will be necessary for the applicant to monitor the quantity of temporary pumping as a payment is likely to be required per cubic metre of pumped water as part of the temporary consent. Note also the new EA abstraction regulations now consider the temporary pumping of groundwater to be an abstraction, and a separate abstraction consent will be required from the EA. • No special restrictions regarding discharge of surplus process water if applicant is following general Pollution Prevention Guidance. • There are no requirements for permanent monitoring and sampling. Flow measurement	

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
		will be required for any temporary pumping of groundwater. • The IDB does not have any historic flood records or water quality data.	
Selby Area Internal Drainage Board	30 April 2018, Email	• Confirmation that the IDB do not perceive any adverse impacts from a WFD perspective caused by the proposed works.	• No further action required.
Selby District Council	January – February 2018, Email	• In accordance with NPPF, the Sequential Test does not need to be carried out. However, it is likely that inspectors reviewing the application would expect that the sequential approach was applied in the design process.	• The FRA outlines the sequential approach adopted in the design process.
NYCC	November 2017, Email	• The Council advised that the proposal is located within the area of the IDB and therefore, the IDB should be consulted in relation to works near the watercourses. No consent from NYCC is required as the proposed works are located in the area under the jurisdiction of the IDB. • EA guidance on pollution prevention measures and the NYCC SuDS Design Guidance should be followed.	• The Selby Area IDB was consulted as part of this EIA. • A FRA prepared to support this FRA provides a comprehensive assessment of a pre- and post-development flood risk. • The proposed surface water drainage strategy considered the requirements provide by the NYCC.

Body / Organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions	Comment
		• The FRA should clearly explain how the potential impacts on flood risk will be mitigated. • Surface water runoff should be contained within the site boundary for all events up to the 1 in 30 year event. • The design of the site must ensure that flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that avoid risk to people and property both on and off site.	

Scope of the Assessment

12.3.2. 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.

12.3.3. An EIA Scoping Report was submitted to the SoS in September 2017, as presented in Appendix 1.1. A Scoping Opinion was received by the Applicant from the Planning Inspectorate (on behalf of the SoS) on 23 October 2017, including formal responses from statutory consultees. The responses from the Planning Inspectorate/SoS in relation to water and how those requirements should be addressed by the applicant are set out in Table 12-2.

12.3.4. The Preliminary Environmental Impact Report (PEIR) was submitted to relevant stakeholders in January 2018, as part of the statutory consultation. Their comments in relation to the water environment and how the Applicant has considered those responses are set out in Table 12-3.

Table 12-2 - Scoping Opinion Summary Table (Water Resources, Quality and Hydrology)

Section of Scoping Report	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of Response
7.8.2	Surface water runoff associated with operation of the Gas Pipeline	The Scoping Report (section 4.12) explains that areas of the site are at risk from surface water flooding, predominantly those areas along field boundaries and in local depressions. However, the Applicant explains that as the Gas Pipeline will be buried (and ground surface reinstated to current levels), its operation will not change the rate, volume or quality of surface water runoff. The Inspectorate is in agreement that this matter can be scoped out for the operational phase. However, the effects on surface water runoff from above ground structures associated with the Gas Pipeline should be considered.	The potential impacts associated with surface water runoff from above ground structures associated with the Gas Pipeline are being assessed within the standalone FRA (Document Reference 6.8).
7.8.2	Changes to fluvial and tidal flood risk during the operation of the Gas Pipeline	The Applicant explains that following construction, the existing ground surface associated with the buried Gas Pipeline will be reinstated to current levels. The Inspectorate agrees that the potential for significant effects is therefore unlikely and that effects from the Gas Pipeline itself can therefore be scoped out. However, the Inspectorate considers that the effects on flood risk from above ground structures associated with the Gas Pipeline should be considered.	The potential impacts associated with fluvial and tidal flooding associated with above ground structures associated with the Gas Pipeline are assessed within the standalone FRA.

Section of Scoping Report	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of Response
4.11	Consultation	The Inspectorate notes section 4.11 of the Scoping Report, where Selby Area Internal Drainage Board (IDB) is described as the Lead Local Flood Authority (LLFA) for the area. The Inspectorate advises that North Yorkshire County Council is the LLFA for the area covering the application site.	NYCC is being consulted as LLFA. Other relevant authorities are also being consulted.
5.2.5	Water abstraction and discharge	The Inspectorate notes from section 5.2.5 of the Scoping Report the new generating station would utilise cooling water from the River Ouse. The existing abstraction/discharge arrangements are proposed as the likely route of delivery. Any changes to this arrangement should be fully described and assessed in the ES. The ES should demonstrate measures that will avoid or minimise adverse impacts of abstraction and discharge of cooling water. Potential inter-related effects should be considered in the relevant topic chapters, such as any effects on ecology, navigation and health.	There will be no change to the existing abstraction and discharge rates in line with the current licences.
7.7.4	Impacts on navigation	The Applicant's attention is drawn to the consultation response from the Canal and River Trust, which explains that any changes to the abstraction (or any discharge) rates compared to existing rates have the potential to affect navigation on the River Ouse. The Applicant is	There will be no change to the existing abstraction and discharge rates in line with the current licenses. No use of the existing Drax Jetty is envisaged and transportation by road is the preferred option. The Trust advised that the justification

Section of Scoping Report	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of Response
		advised to consult with the Canal and River Trust regarding any changes to the existing abstraction/ discharge situation and any implications for navigation on the River Ouse. Suitable cross reference should be made to the Traffic and Transportation chapter of the ES.	for the use of road transport over the use of the River Ouse Navigation needs to be fully justified as part of the ES. This is addressed in Chapter 5 (Transport).
4.11; 7.8.1	Impacts on designated wildlife sites	The Applicant identifies watercourses which would be crossed by the Gas Pipeline or are located in proximity to the Proposed Scheme in section 4.11 of the Scoping Report. It is understood that these all drain into the River Ouse, a main river which flows within 0.1 km to the north of Route Option A. Approximately 3.5 km downstream of the application site, the River Ouse for part of the Humber Estuary Ramsar site, SAC, SPA and SSSI. The section of the SSSI closest to the application site is noted to be in 'unfavourable – recovering' condition. The potential effects on these sites from water pollution should be identified and assessed, with any necessary mitigation measures identified and agreed with the relevant consultees. In addition, the Inspectorate agrees with the MMO that consideration should be given to potential for impacts on the River Derwent SAC.	An assessment of the potential impacts on the downstream protected areas of the Humber Estuary Ramsar site, SAC, SPA and SSSI is contained within this ES. The potential impacts on the River Derwent SAC is assessed in the Chapter 9 (Biodiversity).

Section of Scoping Report	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of Response
7.8.3	WFD	The Scoping Report identifies the potential for construction of the Gas Pipeline to affect the WFD status of groundwater within a Principal Aquifer. In addition, the Inspectorate notes from Figure 2 of the Scoping Report a number of surface water WFD waterbodies which either cross through or are in the vicinity of the Proposed Scheme which should also be considered. The Inspectorate supports the preparation of a separate WFD assessment, which should clearly explain any impacts on WFD waterbodies and how the requirements of the WFD have been met. This should be prepared in consultation with the EA. The Applicant's attention is drawn to the Inspectorate's advice note on the WFD (Advice Note 18) and to the comments of the EA.	Consultation with the EA on 22 March 2018 confirmed that a WFD assessment was not required in relation to groundwater resources. Consultation with the EA on 22 March 2018 also confirmed that a screening exercise should be completed to determine the need for a WFD assessment in relation to surface water features. The WFD Screening Assessment was issued to the EA on 23 April 2018. On 30 April 2018 the EA confirmed that the proposed works will not have any adverse impacts on hydromorphology or groundwater from the perspective of the WFD and therefore full WFD assessment is not required. On 30 April 2018 the Selby Area IDB also confirmed that the proposed works are not considered to cause any adverse impacts from a WFD perspective.
7.8.4	Study Area	The Inspectorate notes the proposed study areas for surface water and groundwater features (0.5 km); and for features in hydraulic connectivity and groundwater abstractions (approximately 1 km). It is stated that the study areas are considered appropriate based on 'professional judgement…and current knowledge of the area'.	The EA were consulted in November 2017 and had no comments on the study area at that stage. NYCC referred this matter to the IDB. Selby IDB confirmed that the proposed study area is acceptable. The study area has been justified in the ES.

Section of Scoping Report	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of Response
		The study areas should be agreed with the EA and the LLFA and justified in the ES.	
7.8.4	FRA	The Inspectorate welcomes that a Flood Risk Assessment (FRA) will be prepared to support the EIA and stresses the need for early discussions with the EA. The Applicant should agree the scope of the FRA with the EA and ensure that up to date and appropriate climate change allowances are utilised in any modelling. Large parts of the site fall within Flood Zones 2 and 3 on the EA Flood Maps (as illustrated on Figure 2 of the Scoping Report). The FRA should therefore demonstrate that the requirements of the sequential and exception tests are satisfied. The approach and conclusions of the FRA should be agreed with the EA prior to submission of the DCO application, with evidence of such agreement provided (for example in a draft SoCG).	Early and extensive engagement has been held with the EA throughout the preparation of the FRA.
7.8.4	Impacts	In accordance with paragraph 5.15.3 of NPS EN-1, the ES should describe any impacts on source protection zones (SPZs) around potable groundwater abstraction points. The Applicant should consider the interrelated impacts to the SPZ which may result from	Engagement has been held with the Applicant's biodiversity and ground conditions teams to ensure all potential impacts are identified and assessed in the ES.

Section of Scoping Report	Applicant's Proposed Matter	Planning Inspectorate's Comments	Summary of Response
		changes to the water environment but also changes to geology and soils. The Inspectorate notes the potential for other inter-related impacts, most notably between the water environment, ground conditions and biodiversity chapters. The Applicant is advised to include clear cross referencing between these chapters to ensure all potential impacts are identified and assessed.	
7.8.4	Water Quality Sampling	The Applicant's attention is drawn to paragraph 5.15.3 of NPS EN-1, which states that the ES should describe 'the existing quality of waters affected by the proposed project…' The Scoping Report notes that it is not proposed to undertake water quality sampling to inform the impact assessment. The Applicant is therefore advised to agree the approach to establishing the baseline environment with the relevant consultees.	Consultation with EA, LLFA and IDB is being undertaken to agree the approach to establishing the baseline environment.

Table 12-3 - Statutory Consultation Table – Response to the PEIR (Water Resources, Quality and Hydrology)

Body/ Organisation	Comments	Response
Environment Agency	The FRA should be undertaken in accordance with the EA comments received in January 2018.	The EA comments provided in January 2018 are considered in the FRA.
Environment Agency	Any work or structures in, under, over or within 16m of the top of the bank of the tidal River Aire (main river) will require an Environmental Permit.	No works are proposed within 16 m of any main river.
Environment Agency	An Environmental Permit will be required for any temporary structures or stockpiles of materials within the floodplain. A permit is separate to and in addition to any planning permission/DCO granted.	Drax Power Ltd will be applying for the environmental permit.
Environment Agency	No further action is required if the current licensed abstraction volumes and conditions will remain unchanged. Otherwise, changes to the current licensed abstractions will be required.	The current licensed abstraction volumes and discharge rates will remain unchanged.
Selby Area Internal Drainage Board	The Board provide advice on the requirements regarding works within or in the vicinity of the watercourses that are under the jurisdiction of the IDB, pollution control measures and discharge rates. The Board also confirmed that the proposed study areas are acceptable. Details of the response are provided in Table 12.1 of this Chapter.	The Proposed Scheme will be designed in accordance with the requirements provided by the IDB.
North Yorkshire County Council	The Council advised that the proposal is located in the area under the jurisdiction of the Shire Group of Internal Drainage Boards and therefore the IDB should be consulted in regards to works in the vicinity of the ordinary watercourses, discharge rates into these watercourses and the extent of the study area. The council advised that the EA guidance on pollution prevention and the NYCC SUDS Design Guidance should be considered in the scheme design. The Council confirmed that requirement for the Sequential Test should be confirmed with	The proposal is located within the area of the Selby Area IDB and the Board has been consulted on the Proposed Scheme. The Proposed Scheme will be designed and constructed in accordance with the EA pollution prevention guidance. The NYCC SUDS Guidance has been considered in the scheme design.

Body/ Organisation	Comments	Response
	Selby District Council which is the Local Planning Authority for this area. The proposed works do not require consent from NYCC as the proposed works are located in the area under the jurisdiction of the IDB. The FRA should clearly state how the flood risk will be mitigated and how any loss of floodplain will be compensated, as the proposal is located within the functional floodplain. The Council also confirmed that they are a LLFA for the area of the proposal.	Selby District Council was consulted on the requirement for the Sequential Test. The FRA will include a pre and post-development assessment of flood risk, including proposed mitigation measures supported by a hydraulic modelling.
Selby District Council	In accordance with the NPPF, the Sequential Test is not required. However, the sequential test approach should be considered in the scheme design. The works proposed in Flood Zone 3 require the Exception Test to be passed. All essential infrastructure should be designed in order to remain operational and safe in times of flood. Selby District Local Plan Policy EMP10 remains a part of the adopted development plan. The Council advised that the policy relates to additional/ancillary industrial development at or close to Drax rather than the continuing development/repowering within Drax Power Station.	The sequential approach was considered in the scheme design. The Exception Test was undertaken for the works proposed in Flood Zone 3 as part of the FRA. Further details are provided in the standalone FRA attached to this ES. The important infrastructure will be located above the 1 in 200 year flood level with recommended 600 mm freeboard to ensure that they remain operational during flood events.
Canal & River Trust	Although the Trust noted that no changes to the existing abstraction and discharge rates are predicted, the Trust understands that it is not fully confirmed. The Trust requests that full details of any potential changes to the abstraction and return volumes should be fully clarified as part of the Environmental Statement. Any changes to the current abstraction license should be agreed with the Trust as the water abstracted is from the River Ouse Navigation that the Trust manage as navigation authority. Should a potential discharge to the River Ouse be required, the	The current licensed abstraction volumes and discharge rates will remain unchanged.

Body/ Organisation	Comments	Response
	discharge rates and the location of discharge should be agreed with the Trust.	
Canal & River Trust	Works to the jetty will require consent by the Trust. Works on the jetty may require dredging or bed levelling on the jetty berth pocket to accommodate craft, or the removal of vegetation around the facility. These can have indirect impacts upon craft movements upon the river. The Environmental Statement therefore would need to confirm whether such works are required, and assess the impacts of these works on the river.	No works are proposed to the jetty.
Canal & River Trust	The Trust note that the applicants suggest that transportation by road is the preferred option and given this it requests that, should this be the favoured option at submission, the justification for the use of road transport over the use of the River Ouse Navigation needs to be fully justified as part of the Environment Statement.	This issue is discussed in Chapter 4 (Consideration of Alternatives) and Chapter 5 (Transport).
Canal & River Trust	The Trust encourage that the appropriate liaison takes place between the applicant and EA in order to ensure that the Environmental Assessment is adequately informed on biodiversity, flood and water management matters relating to the River Ouse Navigation. The Trust notes that works to the Jetty and works to install the southern pipeline option would result in works close to the River Ouse Navigation, and a comprehensive Construction and Environmental Management Plan is therefore advised to limit any potential contamination of the river during construction.	No works to the jetty are proposed. An appropriate robust CEMP will be prepared to ensure potential risks to the quality of the River Ouse are appropriately mitigated.
Dempster Internal Drainage Board	The IDB advised that the proposal will not affect the area under the jurisdiction of the Dempster IDB.	No further action required.
Doncaster East Internal Drainage Board	The IDB advised that the proposal will not affect the area under the jurisdiction of the Doncaster East IDB.	No further action required.

Body/ Organisation	Comments	Response
Danvm Drainage Commissioners	The Commissioners did not consider the proposed repower works would affect their drainage district.	No further action required.
Ouse and Humber Internal Drainage Board	The IDB confirmed that the proposal would have no impact in their drainage district.	No further action required.
Ouse and Derwent Internal Drainage Board	The IDB confirmed that the proposal would have no impact in their drainage district.	No further action required.

Insignificant Effects

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

- Surface water runoff from the operational Gas Pipeline will not be assessed as the Gas Pipeline will be buried underground with existing ground surface reinstated. The Gas Pipeline is therefore not considered to change the rate, volume or quality of surface water runoff that would impact flood risk, groundwater quality or surface water quality. This has been agreed with the SoS in the Scoping Opinion.
- Changes to fluvial and tidal flood risk during the operation of the Gas Pipeline as the existing ground surface will be reinstated to current levels and therefore the fluvial and tidal flood risk will not change from the current status. This has been agreed with the SoS in the Scoping Opinion.
- Impacts on the quality of the River Derwent designated SSSI and SAC. The River Derwent discharges to the River Ouse approximately 1.5km downstream of the proposed works. The flows from the River Ouse will not enter the River Derwent as it is located approximately 1.5km upstream. The River Derwent therefore can be scoped out of the assessment. The potential impacts to the River Derwent SSSI and SAC are assessed in Chapter 9 (Biodiversity).
- Impacts to surface water features that are located greater than 0.5 km from the Proposed Scheme and that are not hydraulically linked to watercourses within 0.5 km of the Proposed Scheme. It is considered unlikely that surface-borne pollutants would migrate overland or via groundwater flow to surface water features that are located further than 0.5 km from the Proposed Scheme. This position was discussed in PEIR and no further comments were received.
- Impacts to groundwater features that are located greater than 0.5 km from the Proposed Scheme and groundwater abstractions that are located greater than 1 km from the Proposed Scheme. This position was discussed in PEIR and no further comments were received.
- Impacts to the quality and quantity of groundwater resources not associated with surface-borne pollutants. Risks to the quality, quantity and flow of groundwater

resources associated with other aspects such as contaminated land are discussed in Chapter 11 (Ground Conditions and Contamination).
- Impacts to ecology, including sensitive and/or important aquatic species and habitats. These risks are discussed in Chapter 9 (Biodiversity).

Potentially Significant Effects

12.3.6. The potentially significant environmental effects considered in this chapter are as follow:

Construction Phase

- Increased sedimentation caused by land clearance, excavation, dewatering of excavations, stockpiles, wheel washings and movement of materials to and from the site.
- Increased risk of pollution from accidental spillages and leakage of fuel and other hazardous substances that could be conveyed to surface water features or infiltrate to the groundwater resources.
- Increased level of dust and debris caused by the demolition works that maybe blown into the local surface water features.
- Increased risk of flooding to construction workers, residential properties, people and agricultural land caused by temporary works within the area of the existing floodplain;
- Impacts to catchment hydrology caused by changes to subsurface flows within the superficial deposits and aquifer due to the Gas Pipeline.
- Potential deterioration of WFD status of groundwater resources.
- Potential deterioration of WFD status of Rusholme Lane Drain and the River Ouse.
- Potential deterioration of water quality and habitats of the Humber Estuary designated Ramsar site, SSSI, SAC and SAP due to works near watercourses that could convey potential pollutions into these designated sites.
- Disturbance of contaminated land that can have direct effects to groundwater quality and indirect effects to surface water quality.

12.3.7. The Proposed Scheme will be designed to operate for up to 25 years after which the continued operation of infrastructure will be reviewed. If it is not appropriate to continue operation, the plant will be decommissioned. It is expected that all above ground plant structures will be removed (except for any part of the electrical connection owned by National Grid), while the Gas Pipeline and AGI under National Grid's ownership would remain in situ. The decommissioning phase is likely to take place over several months.

12.3.8. The effects on the water environment during the decommissioning stage would be similar to those identified during the construction phase. As such, the potential effects of the Proposed Scheme during decommissioning are summarised in the construction phase section.

Operation Phase

- Increased flood risk associated with an increase in the rate and volume of surface water runoff from increase in impermeable areas at the Power Station Site, AGI and GRF associated with the new Gas Pipeline.
- Increased flood risk to the Proposed Scheme associated with the potential breach or overtopping of defences along the River Ouse.
- Increased flood risk to the Proposed Scheme associated with the diversion of North Perimeter Ditch (reference SW03 on the Water Constraints map (Figure 12.1a).

- Increased risk of flooding to the Proposed Scheme, people and properties elsewhere caused by loss of the existing floodplain storage associated with Proposed Scheme.
- Impacts to catchment hydrology caused by changes to subsurface flows within the superficial deposits and aquifer due to the Gas Pipeline.
- Deterioration of the quality of surface water features caused by potential pollutants contained in the routine runoff generated in the Power Station Site and the above ground facilities associated with the Gas Pipeline.

12.3.9. Flood risk has been assessed in greater detail in the FRA with a review of hydraulic modelling (Document Reference 6.8).

12.4 Assessment Methodology and Significance Criteria

Scenarios Assessed

12.4.1. The Proposed Scheme will be constructed in stages as outlined in Table 3-8 in Chapter 3, Site and Project Description and summarised in Table 12-4.

Table 12-4 - The Project Stages

Stage	Title
-	Current Baseline
-	Future Baseline
0	Site Reconfiguration Works
1	Construction of Unit X, the battery storage building and the Gas Pipeline
2	Operation of Unit X and construction of Unit Y
3	Operation of Units X and Y
4	Decommissioning

12.4.2. The current baseline scenario for the Proposed Scheme is described as a scenario where three biomass fired units and three coal fired units will be operational at the existing Drax Power Station complex until late 2018. The future baseline scenario is described as a scenario when four biomass fired units and two coal fired units will operate at the Existing Drax Power Station Complex from late 2018 onwards. The envisaged changes to the number of the biomass and coal units operating at the Drax Power Station are not considered to have an impact on the baseline conditions of the water environment. Therefore, the baseline conditions will be assessed based on the current situation i.e. only the current baseline as outlined in Chapter 3 (Site and Project Description) will be assessed.

12.4.3. Two scenarios are currently being considered for air quality mitigation and for the electrical connection as outlined in Chapter 3 (Site and Project Description). The different scenarios under consideration are not anticipated to have an impact on the baseline conditions of the water environment, therefore separate assessments have not been conducted for these scenarios.

12.4.4. Site Reconfiguration Works and decommissioning works will involve demolition activities that could have an impact on the water environment. Although the potential impacts caused by

demolition works are not considered to be as significant as impacts that could occur during Stage 1, Stage 2 and Stage 3, Site Reconfiguration Works and decommissioning works will also be assessed in this Chapter. The effects on the water environment are likely to be similar in nature to those identified during the construction phase and, as such, the potential effects of works during reconfiguration and decommissioning works will be combined.

12.4.5. Stage 1, which consists of construction of Unit X and the battery storage building, along with the construction of the Gas Pipeline with associated infrastructure, could have potentially the most significant impact on the water environment in terms of construction works. Stage 1 is therefore assessed in this Chapter as it represents a realistic worst case scenario.

12.4.6. Stage 2 consists of construction of Unit Y and operational phase of Unit X. The impacts to the water environment and the receptors during construction of Unit Y are considered similar to the construction impacts during Stage 1 but much less intrusive, and therefore are discussed in the Stage 1 scenario. The impacts to the water environment and the receptors during the operational phase of Unit X are the same as in Stage 3 scenario, which represents the operational phase of the entire Proposed Scheme (when both units are repowered). Considering this information, no separate assessment is provided for Stage 2 as the potential impacts to the water environment during construction are discussed in the assessment of Stage 1, and the impacts during operational phase are discussed in the assessment of Stage 3. The proposed approach also covers the combined effect of the construction effects from Unit Y and operational effects from Unit X.

12.4.7. Stage 3 is the operational phase of Units X and Y. The potential impacts to the water environment that may occur during the operation of the Proposed Scheme will be discussed in the assessment of Stage 3 of the Proposed Scheme.

Embedded Mitigation

Construction Phase and Decommissioning Phase

12.4.8. The Proposed Scheme will be carried out in accordance with the Construction Environmental Management Plan (CEMP) (the approval and implementation of which is secured by a requirement in Schedule 2 of the draft DCO (Document Ref. 3.1) and Decommissioning Environmental Management Plan (DEMP) that will include mitigation measures to protect the water environment. This will set out how construction activities will be undertaken in accordance with appropriate good practice guidance, such as CIRIA's control of water pollution from construction sites (C532). Although withdrawn, the Pollution Prevention Guidelines (PPG) published by the EA still provide good practice guidance, particularly PPG1 - General guide to the prevention of water pollution; PPG2 - Above ground oil storage tanks; PPG 5 - Works in, near or liable to affect watercourses; and PPG 6 - Working at construction and demolition sites.

12.4.9. The CEMP and DEMP will contain construction method statements and work instructions for on-site staff that will inform them of the way that they should work on Site to reduce the risk of polluting the surrounding environment. It will include instructions on dealing with certain situations such as general good site practice, adverse weather conditions, environmental incidents and complaints.

12.4.10. There will be inspections and audits along with general monitoring and reporting of the effectiveness of control measures.

12.4.11. At minimum, measures that are likely to be included in the construction method statements and work instructions for managing risks to the water environment include:

- Management of water that collects on Site or within excavations.
- Management of polluting substances that are being brought on Site and used as part of the construction process.
- Management of sediments and pollution during open cutting of watercourses.

12.4.12. The mitigation strategies implemented would be reviewed regularly to best suit the practices currently being undertaken on Site.

12.4.13. The CEMP and DEMP will detail procedures such as sediment and pollution management in order to prevent potential deterioration of the WFD status of surface and groundwater features. The CEMP will also describe the procedures in the event of an environmental emergency such as a fuel or chemical spillage.

12.4.14. The CEMP and DEMP will implement, but it will not be limited to, the following mitigation measures with regards to water resources, quality and hydrology:

Increased Sediment Loads

12.4.15. Construction and decommissioning works are likely to involve land clearance, excavation, dewatering of excavations, stockpiles, wheel washings and movement of materials to and from the Site. These activities have potential to create increased sediment loads which could be harmful for the surface water features.

12.4.16. These activities will be undertaken in accordance with good site practice which includes:

- No stockpiling and minimal use of machinery within 10 m of any surface water feature or drainage lines.
- Minimise land clearance in the vicinity of surface water features.
- Only removing vegetation when necessary and keep gradients as shallow as possible to prevent large amounts of earth being washed away during periods of heavy rainfall and areas which are exposed will be reseeded or surfaced as soon as practicable.
- Provision of wheel washing facilities.
- Provision of cut off ditches along the perimeter of the site to capture any runoff from the site.
- Provision of settlement tanks or lagoons for surface water runoff generated in the site to allow sediments to settle before water is discharged to a water feature.
- Using straw bales during works near or within the drains to capture potential increased sediment load and other pollutants.
- Cut off ditches and appropriate drainage system should be used to manage site runoff.
- Minimise period of time required for construction works near/within watercourses as far as practicable.

Release of Hydrocarbons and Oils and use of Hazardous Materials

12.4.17. There is potential risk of hydrocarbons and oils entering the water environment caused by a larger number of vehicles accessing the site, refuelling of vehicles and plant, leakage from

oil/fuel storage tanks and accidental spillages leading to polluted runoff migrating to surface water and groundwater features. The use of hazardous products on site also can present a pollution risk because of the potential for accidental spillages, and the uncontrolled release of washdown water and surface water runoff, particularly containing concrete and cement products.

12.4.18. The construction and decommissioning works will be undertaken in accordance with best practice and the following in-design mitigation measures will be implemented, but not limited to:

- Appropriate interceptors will be incorporated in the on-site drainage systems.
- Spill containment equipment will be stored on Site.
- Hazardous substances, oil and fuel will be store in bunded areas, which will not be located within 10 m of water bodies or drainage lines.
- Refuelling of machinery will be undertaken in bunded areas, which will not be located within 10 m of water bodies or drainage lines.
- Drip trays used for diesel pumps and standing plant will be regularly maintained to prevent leaks.
- Storage and bunded areas will be constructed of impervious floors and walls with the capacity for the contents of the storage tank and an additional 10% safety margin.
- Construction materials, such as cement, will be mixed in designated areas located away from water bodies and drainage lines.
- Topsoil and other construction materials will be stored outside the 1 in 100 year (undefended) floodplain extent.

Dust and Debris

12.4.19. Dust management procedures will be applied which are typically implemented for air quality management issues, such as damping down to suppress the creation of dust. Further reduction of amount of dust released during demolition works could be achieved by wrapping the buildings that are to be demolished in an anti-dust netting. Contractors will also implement good site practice, perimeter fences and tight control of materials and waste to minimise the risk of debris entering water bodies. Dust emissions will also be managed in accordance with the Environmental Management System already used on the Site.

12.4.20. The crossings of the Gas Pipeline with the watercourses will be constructed using trenchless crossing techniques to minimise impact on the watercourses.

12.4.21. The construction works will be also undertaken in accordance with the following requirements of the Selby Area IDB:

- The pipe crossings with a watercourse will be installed a minimum of 1m below the bed level of this watercourse.
- The position of each crossing will be marked by marker posts, one on each bank.
- New outfalls will be set back from the bank and not protrude into the watercourse. The velocity of the discharge will be considered and suitable protection provided to prevent erosion of the bank, where necessary. A marker post will be provided near a new outfall to highlight the presence of the outfall for maintenance operatives.

- Temporary pumping of groundwater in excavations will require a separate consent. The quantity of temporary pumping will be monitored as a payment is likely to be required per cubic metre of pumped water as part of the temporary consent.
- A new discharge consent will be obtained from the Selby Area IDB for any new discharge into the IDB's watercourse.
- Appropriate consent for works in and within the 8 m of the channel of a watercourse will be obtained from the Selby Area IDB.
- No temporary or permanent structure should be constructed within 7 m of the edge of the watercourse without previous consent from the Board.

12.4.22. If temporary pumping of groundwater in excavations will be required, appropriate consents will be obtained from the Selby Area IDB and the EA.

12.4.23. Part of the North Perimeter Ditch will be locally diverted to allow for construction of the Battery Storage Building. The ditch forms part of the existing drainage system serving the Existing Drax Power Station Complex. The ditch will be diverted to ensure that it will manage the surface water runoff in a similar way as it currently does. The diverted channel will be combined with the proposed flood relief channel.

Operational Phase

12.4.24. Surface water runoff generated in the area of the Proposed Scheme will be appropriately managed to ensure no increase in the risk of flooding in the area or elsewhere. The existing outfalls will be utilised wherever possible and the existing discharge rates will be unchanged. A new outfall to Dickon Field Drain is proposed to be built to discharge surface water runoff generated in the area of the AGI and the associated access road. The discharge rate will be estimated in accordance with the Selby Area IDB requirements to ensure no increase in the flood risk.

12.4.25. In accordance with the requirements of the Selby Area IDB, surface water runoff generated in the area of AGI and the associated access road will be attenuated and the discharge rate will be limited to pre-development greenfield runoff rates or 1.4 l/s/ha, whichever is less. The proposed drainage system will include an oil separator to ensure appropriate pollution prevention.

12.4.26. Surface water runoff generated in the additional impermeable areas within the Existing Drax Power Station Complex and in the area of GRF will be discharged to the existing drainage system serving the Drax Power Station. The existing drainage system includes appropriate pollution prevention measures hence the runoff from the Proposed Scheme is unlikely to impact the quality of the receiving watercourse. The existing discharge rates from Drax Power Station will be maintained.

12.4.27. The Proposed Scheme is proposed to be constructed in the existing floodplain which could reduce the capacity of the existing flood storage. As part of the in-design mitigation a flood relief channel will be constructed that reinstates a flow route through the Existing Drax Power Station Complex (as part of Work No. 3A of the authorised development as described in Schedule 1 to the draft DCO (Document Ref. 3.1)). The results of hydraulic modelling of the proposed flood relief channel shows that it will provide appropriate mitigation so the Proposed Scheme is unlikely to increase risk of flooding in the area or elsewhere.

12.4.28. The finished floor levels of the new infrastructure will be established 600 mm above the predicted flood level during the 1 in 200 year flood event with climate change.

12.4.29. For groundwater, construction mitigations such as groundwater recycling; whereby sump pumped groundwater is returned to the groundwater system, could be employed to ensure no flow loss to the wider aquifer unit occurs during the construction process. The quality of the returned water would need to be assessed prior to discharge. During the operational phase the local surface water-groundwater hydrodynamics will need to be defined to inform upon potential flow loss. To ensure no long lasting reduction of flow is experienced, groundwater recycling should be employed if the flow rates to water users and groundwater dependent features (surface waters) are proven to be impeded by the pipeline operation. To define the surface water-groundwater hydrodynamics, borehole installations, stilling well installations, continuous groundwater and surface water level monitoring, permeability testing, aquifer testing and numeric modelling may be required. In the first instance WSP advise that continuous long term groundwater level monitoring and water user groundwater level and/or surface water level monitoring be completed for baseline purposes to assess hydraulic linkages, if linkages exist then further works will be required.

12.4.30. In accordance with the EA Climate Change Guidance, the proposed surface water management strategy will consider 20% and 40% increases in the peak rainfall intensity to ensure that the Proposed Scheme and people and property elsewhere will not be at increased flood risk during the design life of the Proposed Scheme.

12.4.31. A surface water management system will be developed to ensure that the existing and the proposed surface water drainage system will be appropriately maintained.

12.4.32. The existing Drax Emergency Plan (Ref. 12.43) will be reviewed to include information on flood risk and evacuation procedures. If not yet signed, the Existing Drax Power Station Complex will sign up to the EA Floodline to receive up to date flood warnings for the area.

Extent of the Study Area

12.4.33. The study area encompasses surface water features up to a minimum of 0.5 km from the Proposed Scheme for the assessment of direct effects (i.e. associated with overland migration of pollutants directly to a surface feature, overland flows and works within or near to a river channel). Features that are further than 0.5 km from the Proposed Scheme but are in hydraulic connectivity with the study area are also considered, including surface water abstractions and downstream watercourses. Based on the professional judgement of the assessor and knowledge of the area, features located up to a distance of approximately 1 km from the Proposed Scheme are considered.

12.4.34. The study area encompasses groundwater features and abstractions up to 1 km from the Proposed Scheme. This distance is considered appropriate for the assessment of surface-borne pollutants migrating to groundwater features.

12.4.35. Selby Area IDB is responsible for the management of flood risk and ordinary watercourses in the area of the Proposed Scheme. The Selby Area IDB confirmed that the proposed study areas are considered acceptable. The EA have been consulted and had no comments on the study area.

Method of Baseline Data Collation

12.4.36. Information regarding the baseline water environment and flood risk has been obtained from the following sources:

- EA Flood Map for Planning (Ref.12.18) available online, accessed March 2018 https://flood-map-for-planning.service.gov.uk/;
- EA Flood Risk from Surface Water and Flood Risk from Reservoirs mapping (Ref.12.19) available online, accessed March 2018 https://flood-warning-information.service.gov.uk/long-term-flood-risk/;
- EA Groundwater mapping (Ref.12.20) available online, accessed March 2018 http://apps.environment-agency.gov.uk/wiyby/default.aspx;
- Natural England's MAGIC online mapping (Ref.12.21) http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx;
- British Geological Survey (BGS) Geology of Britain Viewer (Ref.12.22) available online, accessed March 2018 http://mapapps.bgs.ac.uk/geologyofbritain/home.html;
- Cranfield Soil and Agrifood Institute Soilscapes mapping (Ref.12.23) available online, accessed March 2018 http://www.landis.org.uk/soilscapes/index.cfm;
- North Yorkshire County Council Local Flood Risk Strategy (Ref.12.24), downloaded from the Council's website in March 2018;
- Selby Level 1 Strategic Flood Risk Assessment Update, October 2015 (Ref.12.25);
- Selby Level 2 Strategic Flood Risk Assessment, Living Document, February 2010 (Ref.12.26);
- EA River Ouse Catchment Flood Management Plan, 2010 (Ref.12.27);
- EA Humber River Basin Management Plan, 2016 (Ref.12.28);
- Existing Drainage Plans received from Drax Power Ltd (Ref.12.29);
- Selby Area Internal Drainage Board mapping showing the watercourses under the jurisdiction of the Board, obtained from Selby Internal Drainage Board (Ref.12.30);
- EA River Ouse 1D-2D ISIS hydraulic model, 2009 (Ref.12.31);
- Draft Drax Power Station Stage 1 Flood Risk Assessment, by Peter Brett, February 2018 (Ref.12.32);
- White Rose Carbon Capture and Storage Project Flood Risk Assessment, Volume 2 of Environmental Statement, Chapter C.1, November 2014 (Ref.12.33);
- White Rose Carbon Capture and Storage Project Surface Water and Flood Risk Technical Report, Volume 2 of Environmental Statement, Chapter C, November 2014 (Ref.12.34);
- Envirocheck Report, Lendmark Information Group, October 2017 (Ref.12.35);
- Drax Repower Hydraulic Modelling Report, HR Wallingford, March 2018 (Ref.12.36);
- Environment Agency Catchment Data Explorer (Ref.12.37), accessed March 2018 http://environment.data.gov.uk/catchment-planning/;
- EA Water Abstraction License mapping (Ref. 12.38) , accessed March 2018 http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683&y=355134&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=water_abstractions;
- Water quality data for Carr Dyke and River Ouse, obtained from the EA in September 2017 and February 2018 respectively (Ref. 12.39); and
- Topographical information received from Drax Power Ltd (Ref. 12.40).

Assessment Methodology

12.4.37. The assessment was undertaken following the principles of Environmental Impact Assessment as set out within the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 10 (HD 45/09) (Ref. 12.17) as this provides a good basis for assessing effects of schemes on the water environment. The DMRB promotes the following approach:

- Estimation of the sensitivity of the attribute (Table 12-5). The importance of the feature or resource is based on the value and sensitivity of the feature or resource.
- Estimation of the magnitude of the impact (Table 12-6). The magnitude of an impact is estimated based on the potential size or scale of change compared to the baseline, and is independent to the importance of the attribute.
- Assessment of the significance of the effect (Table 12-7) based on the sensitivity of the attribute (Table 12-5) and the magnitude of the impact (Table 12-6).

12.4.38. Guidance for estimating these factors is provided in Table 12-4, Table 12-5 and Table 12-6 below.

12.4.39. The basic approach to assessing the impacts of the Proposed Scheme is to consider how sensitive the receptors may be to changes in surface water or groundwater conditions, including flows and water quality. The indicators used in making a professional judgement on the importance of a water feature under consideration include quality, scale, rarity and substitutability where:

- Quality is a measure of the physical condition of the attribute.
- Scale requires consideration of the geographical scale at which the attribute matters to both policy makers and stakeholders, at all levels.
- Rarity requires consideration of whether the water feature is commonplace or scarce and the scale at which it matters.
- Substitutability requires consideration of whether water attributes are replaceable over a given time frame.

12.4.40. The assessment considered the likely significant effects of the Proposed Scheme on the chemical, ecological, hydromorphological and quantitative quality of surface water and groundwater features within the study area. The Selby Area IDB confirmed that long-term water quality monitoring is not considered necessary to inform the assessment of potential effects.

12.4.41. The assessment considered the likely significant effects of the development on flood risk from all sources to people and property elsewhere, as well as the risk of flooding to the Proposed Scheme. A detailed assessment of flood risk and associated assessment methodology is provided within the FRA (Document Reference 6.8).

Significance Criteria

12.4.42. The assessment of potential effects as a result of the Proposed Scheme has taken into account both the construction and operational phases. The construction phase includes enabling works, demolition, earthworks and construction activities as set out in Chapter 3 (Site and Project Description).

12.4.43. The significance level attributed to each effect during both the construction and operational phases has been assessed based on the magnitude of change due to the Proposed Scheme

and the sensitivity of the affected receptor, as well as a number of other factors that are outlined in more detail in this Chapter. The sensitivity of the affected receptor is assessed on a scale of high, medium, low and negligible, and the magnitude of change is assessed on a scale of large, medium, small and negligible (as shown in this Chapter).

12.4.44. Magnitude of change and the sensitivity of the affected receptor/receiving environment have been assessed adapting the relevant tables within DMRB HD 45/09: Road Drainage and the Water Environment (Ref.12.7). Although this document relates to potential impacts of road schemes on the water environment, it provides a general framework which can be used to provide a consistent assessment of the effects of development proposals on the water environment.

12.4.45. Table 12-5 outlines the criteria used to assess the sensitivity of receptors as part of this assessment.

Table 12-5 - Estimating the Sensitivity of Water Environment Receptors

Sensitivity	Criteria	Example
Very High	Receptor has a high quality and rarity on regional or national scale	Water Quality • Water body of very good or good chemical or biological quality, i.e. WFD Class 'High' or 'Good'. • Site protected/designed under EU or UK habitat legislation (SAC, SPA, SSSI, Water Protection Zone (WPZ), Ramsar site). Species protected by EU legislation. • Principal Aquifer providing a regionally important resource or supporting site protected under EC and UK habitat legislation. • Source Protection Zone (SPZ) 1. A source used for public or local potable water supply. • Water body of high amenity value, including areas of bathing and where water emersion sports are regularly practised. • Flood Risk • Floodplain or defence protecting more than 100 residential properties from flooding. • Areas where highly vulnerable development is at risk of flooding. These can include essential infrastructure, emergency services and basement dwellings.
High	Receptor has a high quality and rarity on local scale	Water Quality • Water body of moderate chemical and biological quality, i.e. WFD Class 'Moderate'. • Species protected under UK legislation. • Principal Aquifer providing locally important resource or supporting river ecosystem. • SPZ 2. A source used for domestic non-potable water supply.

Sensitivity	Criteria	Example
		• Water body of a moderate amenity value including public parks, boating, non-contact water sports, popular footpaths adjacent to watercourses, or watercourses running through housing developments/town centres. Flood Risk • Floodplain or defence protecting between 1 and 100 residential properties or industrial premises from flooding. • Areas where development that is more vulnerable is at risk of flooding. These can include hospitals, residential units, educational facilities and waste management sites.
Medium	Receptor has a medium quality and rarity on local scale	Water Quality • Water body of fair chemical or biological quality, i.e. WFD Class 'Moderate'. • Aquifer providing water for agricultural or industrial use with limited connection to surface water. • SPZ 3. • Water body of particular local social/cultural/educational interest. Water body of low amenity value with only casual access, e.g. along a road or bridge in a rural area. Flood Risk • Floodplain or defence protecting 10 or fewer industrial properties from flooding. • Areas where less vulnerable development is at risk of flooding. These can include retail, commercial and general industrial units, agricultural/forestry sites and water/sewage treatment plants.
Low	Receptor has a low quality and rarity on local scale	Water Quality • Water of poor or bad chemical or biological quality, i.e. WFD Class 'Poor' • Low sensitivity aquatic ecosystem. • Non-Aquifer. • Water body of no amenity value, seldom used for amenity purposes, in a remote or inaccessible area. Flood Risk • Floodplain with limited constraints and a low probability of flooding of residential and industrial properties. • Areas that are considered to be water-compatible. These can include flood control infrastructure, docks/marinas, pumping stations and recreational/landscape areas.

12.4.46. The criteria for determining the magnitude of change is detailed in Table 12-6.

Table 12-6 - Criteria for Assessing the Potential Magnitude of an Impact

Magnitude	Criteria	Example
Major Adverse	Results in loss of attribute and / or quality and integrity of the attribute	• Loss or extensive change to a fishery/designated nature conservation site. • Loss of, or extensive change to, an aquifer/groundwater supported designated wetlands. • Change to the environmental status/classification of a water feature, including water quality classification. • Changes to site resulting in an increase in discharge/runoff of > 75% with flood/sewerage exceedance potential. • Increase in peak flood level (1% annual probability event) > 100 mm. • Loss of functional floodplain flood storage areas.
Moderate Adverse	Affects integrity of attribute, or loss of part of attribute	• Partial loss or change to a fishery/designated nature conservation site. Loss in the productivity of a fishery. • Partial loss or change to an aquifer/groundwater supported designated wetlands. • Pollution of a receiving water body, but insufficient to change the environmental status/classification, including water quality classification. • Changes to site resulting in an increase in discharge/runoff of > 50% with flood/sewerage exceedance potential. • Increase in peak flood level (1% annual probability event) > 50 mm
Minor Adverse	Results in some measurable change in attribute's quality or vulnerability	• Potential low risk of some pollution to a surface water or groundwater body, but insufficient to cause loss in quality, fishery productivity or biodiversity. • Changes to site resulting in an increase in discharge/runoff of > 25% with flood/sewerage exceedance potential. • Increase in peak flood level (1% annual probability event) > 10 mm.
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use of integrity	• The proposed scheme is unlikely to affect the integrity of the water environment. • No measurable impact upon an aquifer • Negligible change in peak flood level (1% APE) < +/-10 mm

Magnitude	Criteria	Example
No Change	Results in no change to the receptor	• No predicted adverse or beneficial impact to the receptor.
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	• Potential for slight reduction in pollution to a surface water or groundwater body, but insufficient to cause noticeable benefit in quality, fishery productivity or biodiversity. • Changes to site resulting in a decrease in discharge/runoff > 25%. • Reduction in peak flood level (1% APE) > 10 mm.
Medium Beneficial	Results in moderate improvement of attribute quality	• Moderate improvement to a fishery / designated Nature Conservation Site. Potential increase in the productivity of a fishery. • Reduced pollution of a receiving water body, but insufficient to change the environmental status/classification, including water quality classification. • Changes to site resulting in a decrease in discharge/runoff > 50%. • Reduction in peak flood level (1% APE) > 50 mm.
High Beneficial	Results in major improvement of attribute quality	• Significant improvement to a fishery / designated Nature Conservation Site. • Removal of existing polluting discharge, or removing the likelihood of polluting discharges occurring. • Change to the environmental status/classification of a water feature, including water quality classification. • Changes to site resulting in a decrease in discharge/runoff of > 75%. • Reduction in peak flood level (1% APE) > 100 mm.

Effect Significance

12.4.47. 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.
- Moderate effect: where the Proposed Scheme could be expected to have a noticeable effect (either positive or negative) on receptors.
- Minor effect: where the Proposed Scheme could be expected to result in a small, barely noticeable effect (either positive or negative) on receptors.
- Negligible: where no discernible effect is expected as a result of the Proposed Scheme on receptors.

12.4.48. Potential effects associated with the Proposed Scheme, assessed as having a significance classified as minor and above, are considered to have a likely significant effect on the water

environment. Potential effects assessed as having a negligible impact are considered to not be significant as they are unlikely to have an impact on the water environment.

12.4.49. The overall significance of effects considered both the magnitude of the impact against the sensitivity of the receptor, as demonstrated in Table 12-7.

Table 12-7 - Criteria for Assessing Significance of Effect

Stage	Magnitude of Impact				
	No Change	Negligible	Minor	Moderate	Major
Very High	Negligible	Minor	Moderate	Major	Major
High	Negligible	Minor	Minor	Moderate	Major
Medium	Negligible	Negligible	Minor	Minor	Moderate
Low	Negligible	Negligible	Negligible	Minor	Minor

12.5 Baseline Conditions

Current Baseline

Surface Water Features and Water Quality

12.5.1. The area of the Proposed Scheme and the surrounding areas are served by a complex system of field drains. The drains are designated as ordinary watercourses under the jurisdiction of the Selby Area IDB. All the drains eventually discharge to the River Ouse designated as a main river under the jurisdiction of the EA.

12.5.2. The surface water features that could potentially be affected by the Proposed Scheme are summarised in Table 12-8. All these features are shown on the Water Constraints map in Figure 12.1

Table 12-8 - Surface Water Features that have the Potential to be Affected by the Proposed Scheme

Water Feature (reference on the Water Constraints map)	Description
Carr Dyke (reference SW01)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It is culverted under the north-western part of the Power Station Site and flows in an easterly direction towards the River Ouse. It becomes Lendall Drain before confluencing with the River Ouse. Construction office site is proposed to be located immediately to the south of the outfall of the culvert under the Power Station Site. Surface water runoff generated by the Proposed Scheme and from additional impermeable areas as a result of the Proposed Scheme will be discharged to Carr Dyke.

Water Feature (reference on the Water Constraints map)	Description
	The quality of the watercourse is not assessed against the objectives of the WFD. However a review of the EA Catchment Data Explorer shows that Carr Dyke is located in the catchment of the River Ouse called 'Ouse from River Wharfe to Upper Humber' that is assessed against the objectives of the WFD. Its overall status is assessed to be moderate, with moderate ecological status and failing chemical status. A review of the water quality data for Carr Dyke received from the EA indicate that levels of Arsenic, Cadmium, Chromium, Manganese, Mercury in Carr Dyke are below the maximum allowable standards in accordance with the WFD surface water quality standards (Ref. 12.42). Consultation with the project ecologist suggests that otters, which are protected under EU regulations, are present in the dyke.
Unnamed drain north of the northern cooling towers (reference SW02)	Part of the drainage system serving the Existing Drax Power Station Complex. It flows along a footpath and then turns north and discharges to Carr Dyke. The drain flows along the north-western boundary of the proposed construction compound (Area B i.e. the carbon capture readiness reserve space in Figure 1.3). The quality of the drain is not assessed against the objectives of the WFD. Consultation with the Applicant's project ecologist indicates that the drain was found dry during the site survey. However, the project ecologist also suggests that the drain is suitable for commuting and foraging by otters and water voles.
North Perimeter Ditch (reference SW03)	Part of the existing drainage system serving the Existing Drax Power Station Complex. It flows along the green area to the north of the northern cooling towers. The new battery storage building is proposed to be constructed in the area of the ditch. Consultation with the Applicant's project ecologist indicate that due to close proximity to the Power Station infrastructure, the ditch is unlikely to be used by otters and water voles, and it is unlikely that the ditch provides an appropriate environment for protected species.
Unnamed Selby Area IDB drain with reference 44 (reference SW04)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It flows along the perimeter of the woodland area located in the north-eastern part of the Power Station Site, and then flows along the eastern side of New Road towards the north-east. The drain flows along the north-western boundary of the proposed main construction compound (Area A). In addition, a new flood mitigation channel and potential sludge lagoons (if two unit repowering option is taken further) will be constructed to the west and south of the upstream end of the drain respectively. The quality of the drain is not assessed against the objectives of the WFD. Consultation with the project ecologist indicates that the drain was partially

Water Feature (reference on the Water Constraints map)	Description
	dry at the time of the site survey. However, the project ecologist also suggests that the drain is suitable for commuting and foraging by otters and water voles.
Pond 1 (reference SW05)	Located at Drax Abbey Farm, immediately to the west of New Road. The main construction compound (Area A) is proposed to be located approximately 30 m to the east of the pond. A review of the Envirocheck Report (Ref. 12.35) and the EA's Water Abstraction Licenses map indicate that the pond is used for spray irrigation for agriculture. The Envirocheck Report also describes the pond as a fish pond. Consultation with the project ecologist suggests that protected species are unlikely to be present in the pond.
Unnamed drain along the eastern side of New Road (reference SW06)	The drain is not identified on the Selby Area IDB plan, hence it is likely that it forms part of the existing highway drainage system. The drain flows along the western boundary of the proposed main construction compound (Area A). Consultation with the project ecologist indicates that the drain was found dry during the site survey. However the project ecologist also suggests that the drain is suitable for commuting and foraging by otters and water voles.
Unnamed Selby Area IDB drain with reference 18/4 (reference SW07)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It flows along the woodland area immediately to the east of the Power Station Site. The Gas Receiving Facility is proposed to be constructed adjacent to this drain, with the Gas Pipeline constructed approximately 30 m south of the drain. The quality of the drain is not assessed against the objectives of the WFD. Consultation with the project ecologist suggests that the drain is suitable for commuting and foraging by otters and water voles.
Drainage ditches (references SW20 and SW21)	The ditches are located along the eastern and western boundaries of Area H in the southern part of the Existing Drax Power Station Complex. The ditches are parts of the drainage system serving the Existing Drax Power Station Complex. The ditches are of unknown quality. Consultation with the project ecologist confirmed that no protected species were present during the site survey, and the ditches are unlikely to be used by the local wildlife.
Carr Lane Drain (reference SW08)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It flows along the northern side of Carr Lane, which will form the southern boundary of the main construction compound (Area A). The quality of the drain is not assessed against the objectives of the WFD. Consultation with the project ecologist suggests that the drain is suitable for commuting and foraging by otters and water voles.

Water Feature (reference on the Water Constraints map)	Description
River Ouse (reference SW09)	Designated as a main river under the jurisdiction of the EA. It flows approximately 1.2 km, in its closest distance, to the north of the Power Station Site. The River Ouse also flows approximately 0.1 km north of the proposed Gas Pipeline and associated infrastructure at its closest point. No works are proposed within 16 m of the River Ouse. The quality of the River Ouse is assessed against the objectives of the WFD; overall status is assessed to be moderate, with moderate ecological status and failing chemical status. Approximately 4 km downstream of the of the most southern part of the Site Boundary, the River Ouse forms part of the Humber Estuary Ramsar site, SAC, SPA and SSSI. The River Ouse is therefore considered a migratory path for protected species into the Humber Estuary.
Back Lane Drain (reference SW10)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It flows approximately 300 m to the east of Wren Hall Lane. The new Gas Pipeline is proposed to cross this drain approximately 180 m east of Wren Hall. The quality of the Back Lane Drain is not assessed against the objectives of the WFD. Consultation with the project ecologist suggests that the drain is suitable for commuting and foraging by otters and water voles.
Unnamed Selby Area IDB drain with reference 18/1 (reference SW11)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It flows along the western side of Main Road adjacent to Baxter Hall. The drain is partially culverted. The new Gas Pipeline is proposed to cross the drain approximately 180 m to the south of Baxter Hall. The quality of the drain is not assessed against the objectives of the WFD. Consultation with the project ecologist suggests that water vole, which are protected under the UK regulations are present in the drain.
Black Tom Drain (reference SW12)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It flows approximately 180 m to the south-east of Baxter Hall. The new Gas Pipeline is proposed to be constructed approximately 60 m to the south-west of the drain. The quality of the Black Tom Drain is not assessed against the objectives of the WFD. Consultation with the project ecologist suggests that the drain is suitable for commuting and foraging by otters and water voles. Potential pollutants are unlikely to travel 180 m overland to this drain. It is therefore unlikely that the construction works will impact the quality of the drain and therefore it is not considered as a receptor and it is not discussed further.
Unnamed Selby Area IDB drain with reference 18/3	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It is located approximately 300 m to the east of Poultry House. The new Gas Pipeline is proposed to be constructed parallel to the drain and approximately 30 m to the east of the drain.

Water Feature (reference on the Water Constraints map)	Description
(reference SW13)	The quality of the drain is not assessed against the objectives of the WFD. Consultation with the project ecologist suggests that the drain is suitable for commuting and foraging by otters and water voles. Potential pollutants are unlikely to travel overland to this drain. It is therefore unlikely that the construction works will impact the quality of the drain and therefore it is not considered as a receptor and it is not discussed further.
Rusholme Lane Drain also known as Willow Row Drain (reference SW14)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It flows along Rusholme Lane and then at Scurff Cottages it flows further north towards the River Ouse. The new Gas Pipeline is proposed to cross the Rusholme Lane Drain approximately 300m north of Scurff Cottages. In addition, the area of Rusholme Lane north of the junction with Church Dike Lane is proposed to be widened to allow for construction access. Rusholme Lane Drain flows approximately 20 m to the east of the proposed widening area. A review of the EA Catchment Data Explorer shows that Rusholme Lane Drain is located in the catchment of the River Ouse called 'Ouse from River Wharfe to Upper Humber' that is assessed against the objectives of the WFD. Its overall status is assessed to be moderate, with moderate ecological status and failing chemical status. Consultation with the project ecologist indicates that Rusholme Lane Drain in the area of the proposed Gas Pipeline crossing was found dry during the time of the site survey. However, the project ecologist suggests that the drain is suitable for commuting and foraging by otters and water voles.
Unnamed Selby Area IDB drain with reference 16/1 (reference SW15)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. It flows approximately 270 m to the north of the junction of Church Dike Lane with Rusholme Lane. The drain will form a northern boundary of the proposed Rusholme Lane widening area. The quality of the drain is not assessed against the objectives of the WFD. Consultation with the project ecologist indicates that the drain was found dry during the time of the site survey. However, consultation with the project ecologist suggests that the drain is suitable for commuting and foraging by otters and water voles.
Dickon Field Drain (reference SW16)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. The AGI associated with the new Gas Pipeline and the new access road are proposed to be constructed adjacent to this drain. During operational of the Proposed Scheme, surface water runoff generated from the new access road is proposed to be discharged to the drain. The quality of the drain is not assessed against the objectives of the WFD. Consultation with the project ecologist indicates that Dickon Field Drain was found dry during the time of the site survey. However, the project

Water Feature (reference on the Water Constraints map)	Description
	ecologist advised that evidence of otters, which are protected under the EU regulations, has been recorded in Dickon Field Drain.
Clough Drain (reference SW17)	Designated as an ordinary watercourse under the jurisdiction of the Selby Area IDB. Dickon Field Drain discharges to Clough Drain approximately 100 m to the south of Rusholme Lane. The new access road associated with the AGI is proposed to be constructed along the drain. Surface water runoff generated in the new access road is proposed to be discharged to the drain. The quality of Clough Drain is not assessed against the objectives of the WFD. Consultation with the project ecologist indicates that Clough Drain was found dry during the time of the site survey. However, consultation with the project ecologist suggests that the drain is suitable for commuting and foraging by otters and water voles.
Pond 2 (reference SW19)	The pond is located approximately 80 m to the south of Wren Hall Lane. The pond is located approximately 400 m to the east of the construction works. It supports no known water abstractions and no known ecological designations. Considering the distance from the works and unlikely hydrological connectivity with the Proposed Scheme, the pond is unlikely to be affected by the proposals and therefore it is not discussed further.

Surface Water Abstractions and Discharges

12.5.3. A review of the Envirocheck report (Ref.12.35) and the EA Water Abstraction Licences mapping (Ref. 12.38) indicates 11 licensed surface water abstractions within 1km of the Proposed Scheme. The abstracted water is used for spray irrigation and industrial purposes. The nearest abstraction point is associated with Carr Dyke and is located within the Site Boundary. Details of the indicated surface water abstraction points are summarised in Table 12.9 and their locations are shown on the Water Constraints map in Figure 12.1.

12.5.4. A review of the Envirocheck report (Ref.12.35) also indicates 25 licensed discharges to surface water features within 1 km of the Proposed Scheme. Details of the indicated discharge points are shown in Table 12-10 and their locations are shown on the Water Constraints map in Figure 12.1.

Table 12-9 - Active Licensed Surface Water Abstraction Points within 1km of the Proposed Scheme (Envirocheck Report, October 2017)

Reference on the Water Constraints Map	Location	Purpose	Daily Rate (m^3)	Yearly Rate (m^3)	NGR	
					E	N
WA01_S	Carr Dyke/Lendall Drain – Tidal	General Agriculture: Spray irrigation – Direct	820	41,000	466300	428000
WA02_S	Drax Abbey Fish Pond – Tidal	General Agriculture: Spray irrigation – Direct	820	10,000	467000	428200
WA03_S	Lendall Drain at Drax Abbey Farm	General Agriculture: Spray irrigation – Direct	Not supplied	Not supplied	466998	428510
WA04_S	River Ouse – Tidal – Long Drax	Production of Energy: Boiler Feed and Production of Energy: general Use (Medium Loss)	Not supplied	Not supplied	467580	428700
WA05_S	River Ouse 3 – Tidal	General Agriculture: Spray irrigation – Direct	Not supplied	Not supplied	467537	428825
WA06_S	River Ouse – Tidal	General Agriculture: Spray irrigation – Direct	Not supplied	Not supplied	468520	427500
WA07_S	River Ouse 1 – Tidal	General Agriculture: Spray irrigation – Direct	Not supplied	Not supplied	469800	426860
WA08_S	River Ouse – Tidal	Construction: Hydraulic Testing	Not supplied	Not supplied	469530	426980
WA09_S	River Ouse Pump	Spray Irrigation	720	34,773	469220	427170
WA10_S	River Derwent	Unclassified (Other)	Not supplied	Not supplied	468100	428600
WA11_S	Tidal River Ouse – Ash Conditioning	Other Industrial/Commercial/Public Services: Evaporative Cooling	Not supplied	Not supplied	467800	428700

Table 12-10 - Active Licensed Discharge Consent Points to Surface Water within 1km of the Proposed Scheme (Envirocheck Report, October 2017)

Reference on the Water Constraints Map	Location	Discharge Type	Receiving Watercourse	NGR	
				E	N
DC01	Station House and Cottage, Drax, Selby	Trade Effluent	Not supplied	466700	426500
DC02	Bungalow Baxter Hall, red House Lane, Drax	Sewage Discharge – Final/Treated Effluent – Not Water Company	Black Tom Drain/River Ouse	467100	426100
DC03	Bungalow, Main Road, Drax	Sewage Discharge – Final/Treated Effluent – Not Water Company	Tributary of River Ouse	467200	426100
DC04	Drax Power Station	Trade Effluent	Northern Perimeter Drain to Carr Dyke	466460	427725
DC05	Drax Power Station	Trade Effluent	Carr Dyke	466600	427700
DC06	Drax Power Station	Trade discharges – Site Drainage	Northern Perimeter Drain to Carr Dyke	466635	427705
DC07	Drax Power Station	Unspecified	Carr Dyke	466280	428020
DC08	Drax Power Station	Trade Effluent	Northern Perimeter Drain to Carr Dyke	466705	427800
DC09	Drax Power Station	Trade Effluent	Northern Perimeter Drain to Carr Dyke	466240	427840
DC10	Drax Power Station	Trade Effluent	Northern Perimeter Drain to Carr Dyke	466700	427700
DC11	Drax Power Station	Trade Effluent	Northern Perimeter Drain to Carr Dyke	466300	427725
DC12	Drax Power Station	Trade Effluent	Northern Perimeter Drain to Carr Dyke	466205	427795

Reference on the Water Constraints Map	Location	Discharge Type	Receiving Watercourse	NGR	
				E	N
DC13	Drax Power Station	Trade Effluent	Northern Perimeter Drain to Carr Dyke	466200	427925
DC14	Ready Mixed Concrete Depot, Drax	Trade Discharge – Process Water	Tributary of River Ouse	466200	427700
DC15	Toilet Accommodation, purge Pump House Sub-Station, Selby	Sewage Discharge – Final/Treated Effluent – Not Water Company	River Ouse	466500	428100
DC16	The Norwood, Sharp Hill, Long Drax	Sewage Discharge – Final/Treated Effluent – Not Water Company	Tributary of River Ouse	467600	427500
DC17	Not Supplied	Trade Effluent	Not Supplied	466100	427700
DC18	Drax Power Station	Sewage Discharge – Final/Treated Effluent – Not Water Company	Carr Dyke	466000	427700
DC19	Drax Power Station	Sewage Discharge – Final/Treated Effluent – Not Water Company	Carr Dyke	465900	427700
DC20	Drax Pump Station No 125A, Overflow facility	Trade Effluent Discharge – Site Drainage	Carr Dyke to River Ouse	465855	427495
DC21	Drax Power Station	Trade effluent	Carr Dyke	465800	427395
DC22	Drax Power Station	Trade Effluent Discharge – Treated Effluent	River Ouse	465450	427350
DC23	Drax Power Station	Trade Effluent	Not supplied	465400	427300
DC24	Drax Wpc Works, Drax, Selby	Sewage Discharge – Final/Treated Effluent – Not Water Company	River Ouse	468000	427000
DC25	Drax Power Station	Trade Effluent	River Ouse	468520	427520

Geology and Hydrogeology

12.5.5. A review of British Geology Survey (BGS) mapping (Ref. 12.22) shows that the Power Station Site and the Pipeline Area are underlain by Hemingbrough Glaciolacustrine Formation, Breighton Sand Formation, Alluvium and Warp superficial deposits. The Hemingbrough Glaciolacustrine Formation is comprised as Clay and is classified as Unproductive Strata (aquitard – limited capability to transmit groundwater). The Breighton Sand Formation, Alluvium and Warp superficial deposits are all classified by the Environment Agency as Secondary A Aquifers. These superficial deposits are underlain by Sherwood Sandstone bedrock which is comprised of interbedded Sandstone and Conglomerate. The Sherwood Sandstone is classified by the Environment Agency as a Principal Aquifer

- Principal Aquifer is described as layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. Principal Aquifers may support water supply and/or river base flow on a strategic scale.
- Secondary A Aquifer is described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Unproductive Strata is described as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
- Unproductive Strata is described as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

12.5.6. No hydraulic barriers exist between the superficial deposits and the bedrock aquifers, therefore the aquifers are assumed to be in hydraulic connectivity to one and other i.e. water is exchanged between the two geologies and behaviour is as one ‘aquifer’ unit although some degree of lag time will occur with superficial deposits that are more clay rich having a longer lag time in comparison to superficial deposits that are more permeable such as sands.

12.5.7. Considering the current land use, there is potential for contaminated soil to be present within the boundary of the Existing Drax Power Station Complex. It is discussed in detail in Chapter 11 (Ground Conditions).

12.5.8. A review of the BGS borehole logs (Ref. 12.22) recorded within the boundary or in the vicinity of the Existing Drax Power Station Complex shows the Sandstone bedrock to be located at depth of approximately 17-19m below ground level (bgl). Local borehole logs record groundwater strikes at depths of between approximately 4.9m bgl (borehole reference SE62NE29, dated 7 December 1979) and 2.20m bgl (borehole reference SE62NE126, dated 1 November 1963) in the north-eastern and southern part of the area of the Power Station Site respectively.

12.5.9. The borehole logs recorded in the vicinity of the Pipeline Area show layers of sand logged at depth of approximately 17 - 19m bgl, with competent Sandstone bedrock recorded at depths greater than 20m bgl. Seepage of groundwater was recorded between depths of approximately 1.8m bgl and 3.9m bgl (borehole references SE62NE137 and SE62NE136, drilled 31 October 1963 and 2 October 1963 respectively).

12.5.10. Groundwater strikes are water ingress occurrences during the drilling process and do not constitute rest groundwater levels. Rest groundwater levels are generally in excess of groundwater strikes and should only be used for indicative purposes.

12.5.11. The Shoothill Gaugemap.co.uk website (Ref. 12.44) that presents a database of hydrometric data and the nearest groundwater level monitoring station is Newlands Station, located approximately 3 km south east of the Power Station Site. The BGS borehole log SE62SE47 in the Newlands Station vicinity shows that the station is founded upon the very similar superficial and bedrock geology to that of the Power Station Site; superficial deposits extent to 19m bgl until the Sandstone is met, and it is therefore assumed that the groundwater regime at Newlands is similar to that of the Power Station Site. The Newlands Station groundwater levels appear to be recorded on 15 minute intervals and show no tidal influence, however, groundwater is reactive to recharge events and a maximum groundwater level of 4.66m AOD was recorded on 9 August 2017 (monitoring record dates back to 26 March 2014). The Power Station Site is located at approximately 5-6m AOD meaning that rest groundwater levels could be located up-to 1.5m bgl on the Power Station Site.

12.5.12. A surface water level monitoring station located 2.6 km North East of the Existing Drax Power Station Complex shows that the River Ouse is tidally influenced. A water level low recording (non-tidally influenced surface water level) of 1.265m AOD, recorded at 7am on 17 April 2018, corresponds to a groundwater level recording at Newlands Monitoring station of 3.75m AOD. This data implies the River Ouse is a gaining system (receives base flow from groundwater) at this location, unless laterally extensive low permeable barriers underlay the River. Tidal influence increases surface water levels to approximately 4.2m AOD and there is potential for short-term tidal backflow into the groundwater system, suggesting that saline pollution could arise.

12.5.13. The EA's Groundwater mapping (Ref. 12.20) shows that the Existing Drax Power Station Complex and the Pipeline Area are located with a total catchment (Zone 3) of a groundwater Source Protection Zone (SPZ).

12.5.14. Total catchment (Zone 3) is a numerically predicted area around a water supply source within which all groundwater recharge will be received by the abstraction source. SPZs are typically used to protect abstractions for public water supply.

12.5.15. The quality of groundwater resources in this catchment is monitored by the EA in accordance with the WFD objectives. The Existing Drax Power Station Complex was founded upon the Wharfe and Lower Ouse Sherwood Sandstone groundwater body which has a current (Cycle 2 – 2015 assessment) poor chemical, poor quantitative status and poor overall status. The Environment Agency justifies the reasoning for not achieving ‘good’ status, for both chemical and flow (quantitative), to be due to saline intrusion. It also predicts the groundwater body to be of both good chemical and quantitative status by 2021 (Cycle 3). This will be achieved by employing ‘an Embargo on future abstraction in this aquifer to prevent further saline intrusion’; by pumping less the extent of saline intrusion should lessen.

12.5.16. A review of the Soilscapes mapping (Ref. 12.23) shows that the Power Station Site and the Pipeline Area are underlain by slowly permeable naturally wet and clayey soils. Soilscapes mapping provides an interpretive summary of regional soil characteristic in England and Wales

and the data within the mapping should be used for indicative purposes only as site specific soil characteristics may vary.

12.5.17. The BGS groundwater vulnerability map classifies the Power Station Site as Minor Aquifer High and Non-Aquifer ground material, suggesting the productive superficial deposits here are permeable. The risk classification does lessen to Minor Aquifer Intermediate and Low risk zones towards the pipeline area. A map of the groundwater vulnerability zones is shown within the Envirocheck report (Ref.12.35). As above, this dataset should only be used for indicative purposes only as site specific soil characteristics may vary.

Ground Investigation: Groundwater level and Soil Infiltration data

12.5.18. Two site investigations were undertaken by Terrasol in 2010 and 2014 (Ref. 12.34) for the White Rose Carbon Capture and Storage Project, adjacent to the Existing Drax Power Station Complex. Ten and thirty-five boreholes were installed during the 2010 and 2014 ground investigations respectively. Post construction groundwater level monitoring was completed between March 2014 and October 2014, revealing groundwater levels between -1m AOD to -5m AOD. This time period represents summer conditions, where groundwater level is expected to be at its lowest. The winter period is defined as October to February of any given year by ICE Earthwork Guidance 2015. Please note that the monitoring included for 12 rounds of discrete manual dips only and did not include for continuous data logged information, meaning tidal and groundwater abstraction influence (see paragraph 1.5.20 onwards).

12.5.19. A number of in-situ permeability tests were undertaken at the observation boreholes as a part of the site investigation, the results of which show moderate-low permeability ranging between 5.3 x 10-5m/s and 6.97 x 10-8 m/s, the higher permeability results are generally from the sand and sandstone units. No Permeability tests engaged the upper 5 m of ground.

12.5.20. These permeability rates suggest that the on-site ground materials are not ideal for infiltration techniques; however, areas with laterally defined permeable materials could be used for infiltration.

Groundwater Abstractions and Discharges

12.5.21. A review of the Envirocheck report (Ref. 12.35) and the EA Water Abstraction Licenses mapping (Ref. 12.38) indicates five active licensed groundwater abstraction points within 1 km of the Proposed Scheme. The abstracted water is used for spray irrigation and industrial purposes. Details of the indicated groundwater abstraction points are summarised in Table 12.11 and their locations are shown on the Water Constraints map in Figure 12.1.

12.5.22. A review of the Envirocheck report (Ref.12.35) indicates no licensed discharges to groundwater resources within 1 km of the Proposed Scheme.

Table 12-11 - Active Licenced Groundwater Abstraction Points within 1km of the Proposed Scheme (Envirocheck Report, October 2017)

Reference on the Water Constraints Map	Location	Purpose	Volume (m^3)	NGR	
				E	N
WA15_G	Camblesforth Grange, Brigg Lane	General Agriculture – Spray irrigation – Direct	Not supplied	465800	426500
WA16_G	Camblesforth Grange, Brigg Lane	General Agriculture – Spray irrigation – Direct	Not supplied	465770	426230
WA17_G	Camblesforth Grange, Brigg Lane	General Agriculture – Spray irrigation – Direct	Daily: 1,000 Yearly: 110,000	465700	426200
WA18_G	Camblesforth Grange, Brigg Lane	General Agriculture – Spray irrigation – Direct	Not supplied	465750	426560
WA19_G	Drax Power Station	Mineral products: General Use (Medium Loss)	Not supplied	465257	427321

Existing Drainage

12.5.23. Information on the existing drainage system serving the Existing Drax Power Station Complex was received from Drax Power Ltd. Surface water runoff generated within the Existing Drax Power Station Complex is managed by a complex drainage system that combines gravity and pumped systems with open ditches, culverts, land drainage and lagoons. These systems collect and convey surface water runoff to a consented outfall into Carr Dyke in the north-western part of the site. From here, Carr Dyke conveys the surface water to Lendall Drain from where it outfalls to the River Ouse via the Lendall Pumping Station.

12.5.24. A series of ditches are located around the perimeter of the Existing Drax Power Station Complex, arranged to collect on-site and off-site surface water runoff and convey the water into Carr Dyke located to the north-west of the Power Station.

12.5.25. The ash mound located to the north-west of the Existing Drax Power Station Complex has a self-contained surface water management system with a consented outfall to Carr Dyke.

12.5.26. Surface water runoff from the remaining coal and ash mounds is conveyed via drains to treatment lagoons where sediment is settled and filtered. The filtered water is then pumped to the purge pump house and discharged to the River Ouse via the consented purge water discharge.

12.5.27. Surface water runoff generated in areas likely to pick up oily contaminants, such as oil tank storage areas and car parks, is passed through oil separators prior to discharge purge discharge to the River Ouse.

12.5.28. All foul effluent from toilets and welfare facilities is drained via a separate drainage system to an on-site sewage treatment plant. From here, the treated foul effluent is pumped to the cooling water system, then to the River Ouse via the consented purge water discharge.

Flood Risk

12.5.29. A site-specific FRA was undertaken for the Proposed Scheme. This section provides a summary of the existing flood risk in the area of the Proposed Scheme. Detailed assessment of the baseline and post-development flood risk is provided in the standalone FRA (Document Reference 6.8).

12.5.30. The River Ouse is tidally influenced at the location of the Proposed Scheme. The risk of flooding in this area is therefore a combination of fluvial, tidal and flooding, with domination of tidal influences.

12.5.31. The flood records received from the EA show that there are no known historic records of flooding in the area of the Proposed Scheme and its vicinity.

12.5.32. The EA's Flood Map for Planning shows that the area of the Proposed Scheme is partially located within the medium risk Flood Zone 2 and partially located within the high risk Flood Zone 3. The EA's Flood Map for Planning shows the extent of the floodplain during the 'undefended scenario', not taking the presence of the existing flood defences into account.

- Flood Zone 2 is described as land having between a 1 in 100 and 1 in 1000 annual probability of fluvial flooding, or between a 1 in 200 and 1 in 1000 annual probability of tidal flooding.
- Flood Zone 3 is described as land having a 1 in 100 or greater annual probability of fluvial flooding, or land having a 1 in 200 or greater annual probability of tidal flooding.

12.5.33. The EA confirmed that the existing flood defences located along the banks of the River Ouse are in 'fair' and 'good' condition and provide protection for flood events up to and including the 1 in 200 annual probability event. During the consultation the EA advised that there are no plans to remove the existing flood defences therefore the risk of flooding to the area of the Proposed Scheme should focus on a breach/overtopping of the existing flood defences. The EA also noted that a breach of the existing flood defences is unlikely to happen as flood defences are regularly inspected and maintained by the EA to ensure they provide appropriate level of protection.

12.5.34. Hydraulic modelling of the 1 in 200 annual probability breach scenario with climate change allowance was undertaken as part of a FRA prepared for the Proposed Scheme. As the River Ouse is tidally dominated at the location of the Proposed Scheme the hydraulic model was run for the 1 in 200 tidal flood level with a predicted sea level rise equivalent to a 50 year climate change allowance (calculated in accordance with the EA Climate Change Guidance (2016)) (Ref. 12.41) in combination with a present-day 1 in 5 year fluvial allowance. This approach was agreed with the EA during the consultation.

12.5.35. The results of the hydraulic modelling show that the northern cooling towers and the area immediately north of the cooling towers (where the new battery storage building and the sludge lagoons are proposed to be constructed, being within the areas shown on the Works Plans (Document Ref. 2.3) corresponding to Work Nos. 3 and 12B) and the area immediately east of Existing Drax Power Station Complex (where the gas insulated switch gear, Unit Y, substation and cable sealing ends with overhead conductors will be constructed, being within the areas shown on the Works Plans (Document Ref. 2.3) corresponding to Work Nos. 2, 4 and 8) could be flooded following a breach of the defences during this modelled event. The results also show that the area of the proposed Gas Pipeline route with associated AGI and GRF could also be flooded following a breach of the defences during this modelled event.

12.5.36. A review of the EA's Risk of Flooding from Surface Water mapping shows that isolated areas within the Power Station Site and in the Pipeline Area are indicated to be at low to medium risk of flooding from surface water. It is likely that the risk of flooding is associated with localised areas of low ground where water would pond during or after severe or prolonged rainfall events.

12.5.37. The area of the Proposed Scheme is considered to be at low risk of flooding from groundwater, sewers and reservoirs.

12.5.38. A detailed assessment of flood risk is provided in the standalone FRA report (Document Reference 6.8).

Designated Sites

12.5.39. There are a number of sites designated for their ecological importance with hydrological dependencies in the vicinity of the Proposed Scheme.

12.5.40. The River Derwent flows on the eastern bank of the River Ouse from the north-east to south-west and discharges to the River Ouse approximately 750 m downstream of the confluence of Carr Dyke with the River Ouse. The River Derwent is a designated SSSI and SAC. However, as discussed above the Proposed Scheme is not predicted to pose risk to the quality of the River Derwent and the river will therefore not be included within the assessment.

12.5.41. The Humber Estuary is located approximately 4 km downstream of the Proposed Scheme. The Humber Estuary is a designated Ramsar site, SSSI, SAC and SPA. It is a muddy, macro-tidal estuary, fed by the Rivers Ouse, Trent and Hull, Ancholme and Graveney. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast.

Climate Change Impact

12.5.42. The River Ouse in the area of the Proposed Scheme is tidally dominated, therefore the most significant change in the baseline conditions is likely to be associated with an increase in sea level associated with the potential effects of climate change. The 50 year climate change allowance used in the hydraulic modelling undertaken as part of the FRA was calculated for the year 2065. The predicted sea level rise was calculated in accordance with the EA Climate Change Guidance (2016) (Ref. 12.41) and reflects the intended design life of the Proposed Scheme up to c.2052. The future baseline breach scenario has therefore been considered in this assessment.

12.5.43. Peak rainfall intensity may also increase as a result of climate change, which could increase the risk of surface water flooding to the Site. In accordance with the EA Climate Change Guidance (2016) (Ref. 12.41) the total potential change anticipated up to 2115 is 20% (central allowance) and 40% (upper end allowance). The proposed outline surface water drainage strategy will consider these increases in the peak rainfall intensity to ensure that the Proposed Scheme and people and property elsewhere will not be at increased flood risk during the design life of the Proposed Scheme.

12.5.44. There is presently no industry standard for forecasting/predicting future groundwater change due to climate change. However, it would be sensible / best practice to document the current baseline fluctuation through data logger monitoring particularly in the Winter as per ICE Earthworks Guidance 2015 (Ref. 12.45) and CIRIA 753 (Ref. 12.46) recommendation and add 25% of this fluctuation to the maximum recorded level to account for climate change. If this climate change level is above surface, then the climate change assessment should assume groundwater levels at surface as groundwater is unconfined at this location.

Sensitive Receptors

12.5.45. Table 12-12 summarises following the sensitive receptors that have been identified based on the baseline information (with reference to the Water Constraints map in Figure 12.1). The identified receptors are considered in the further assessment.

Table 12-12 - Sensitive Receptors

Receptor (reference on the Water Constraints map)	Description	Sensitivity
River Ouse (reference SW09)	Main river with moderate water quality. Known water abstraction for irrigation and production of energy. Considered to be a migratory path for protected species into the Humber Estuary Ramsar site, SSSI, SAC and SAP.	Very High
Pond 1 (reference SW05)	Source of water used for irrigation in agriculture. Likely to be also a fishing pond. No known ecological designation.	Medium
Carr Dyke (reference SW01)	Ordinary watercourse with unknown water quality. Presence of otters has been recorded.	High
Unnamed drain north of cooling towers (reference SW02)	The drain forms part of the drainage system serving the Existing Drax Power Station Complex. Suitable for commuting and foraging by otters and water voles.	High
Drainage ditches in Area H (references SW20 and SW21)	The ditches form part of the drainage system serving the Existing Drax Power Station Complex. No protected species recorded in the ditches. Unlikely to be used by the local wild life.	Low

Receptor (reference on the Water Constraints map)	Description	Sensitivity
Unnamed drain along New Road (reference SW06)	Part of the existing highway drainage. Suitable for commuting and foraging by otters and water voles.	High
North Perimeter Ditch (reference SW03)	Part of the existing drainage serving Drax Power Station. No know ecological designation.	Low
Carr Lane Drain	Ordinary watercourses with unknown water quality and no known water abstractions. Suitable for commuting and foraging by otters and water voles.	High
Unnamed Selby Area IDB drains reference 44, 18/4, 18/1, 18/3 and 16/1 (reference SW04, SW07, SW11, SW13, SW15)	Ordinary watercourses with unknown water quality and no known water abstractions. Suitable for commuting and foraging by otters and water voles.	High
Back Lane Drain (reference SW10)	Ordinary watercourse with unknown water quality and no known water abstractions. Considered to be suitable for commuting and foraging by otters and water voles.	High
Rusholme Lane Drain (reference 14)	Ordinary watercourse with moderate water quality with no known water abstractions. Considered to be suitable for commuting and foraging by otters and water voles.	High
Dickon Field Drain (reference SW16)	Ordinary watercourse with unknown water quality with no known water abstractions. Presence of otters has been recorded.	High
Clough Drain (reference SW17)	Ordinary watercourse with unknown water quality with no known water abstractions. Considered to be suitable for commuting and foraging by otters and water voles.	High
North Perimeter Ditch (reference SW03)	Part of the existing drainage system serving the Existing Drax Power Station Complex. Unlikely to be used by otters and water voles.	Low
Sherwood Sandstone Groundwater Aquifer	Principal Aquifer with water abstracted for irrigation and industrial purposes. Poor water quality.	High
Water Users	Groundwater abstraction within the Principal or Secondary A Aquifer.	High

Receptor (reference on the Water Constraints map)	Description	Sensitivity
Superficial Deposits Aquifer	Secondary A Aquifer.	Medium
Agricultural Land	Agricultural land surrounding the Proposed Scheme.	Medium
People and Properties	The village of Drax and a number of farms are located in the area of the Proposed Scheme.	Very High
Drax Power Station and Employees	The Existing Drax Power Station Complex is classified as essential infrastructures in accordance with Planning Practice Guidance 'Flood Risk and Coastal Change'.	Very High

12.6 Assessment of Likely Significant Impacts and Effects

12.6.1. As discussed in Section 12.4, the scenarios assessed in this Chapter are summarised in Table 12-13.

Table 12-13 - Scenarios Considered in Assessment

Scenario	Notes
Stage 0 – Site Reconfiguration Works	Site Reconfiguration Works will involve inter alia demolition activities that could have an impact on the water environment. The effects on the water environment are therefore likely to be similar in nature to those identified during the decommissioning works and, as such, the potential effects of the Site Reconfiguration Works and during decommissioning works will be combined and discussed in Stage 0 scenario. The works consisting a diversion of the North Perimeter Ditch and potential localised culverting of the two ditches adjacent to Area H could have an impact on the existing habitats in these features. These works are likely to be undertaken in Stage 0, hence their potential impacts are discussed in Stage 0. Other reconfiguration works proposed during Stage 0 are considered likely to have similar effects to the water environment and flood risk to those experienced during the construction phase in Stage 1. Impacts that may occur during Stage 0 are therefore considered to be no worse than the construction impacts that form part of the Stage 1 works.
Stage 1 – Construction of Unit X, Gas Pipeline, GRF, AGIs and battery storage building	Stage 1, which consists of construction of Unit X and the battery storage building, along with the construction of the Gas Pipeline with associated infrastructure, could have potentially the most significant impact on the water environment in terms of construction works. Stage 1 is therefore assessed in this Chapter as it represents a realistic worst case scenario.

Scenario	Notes
Stage 2 - Operation of Unit X and construction of Unit Y	Stage 2 consists of construction of Unit Y and operational phase of Unit X. The impacts to the water environment and the receptors during construction of Unit Y are considered to be similar to the construction impacts during Stage 1 but much less intrusive, and therefore are discussed in Stage 1 scenario. The impacts to the water environment and the receptors during the operational phase of Unit X are considered similar to the impacts that could occur in Stage 3 scenario, which represents the operational phase of the entire Proposed Scheme. In comparison to Stage 1, no additional impacts to the water environment are envisaged during Stage 2. Considering this information, no separate assessment is provided for Stage 2 as the potential impacts to the water environment during construction are discussed in the assessment of Stage 1, and the impacts during operational phase are discussed in the assessment of Stage 3. In comparison to Stage 1 and Stage 3, the combination of the operational impacts of Unit X and the construction impacts of Unit Y is not envisaged to have additional impacts to the water environment. The combination of the construction and operational impacts is not envisaged to provide impacts to the water environment no worse than the impacts assessed separately in Stage 1 and Stage 3. Therefore, no separate assessment of Stage 2 is provided, as all the potential impacts are discussed in Stage 1 and Stage 3.
Stage 3 – Operation of Unit X and Unit Y	Stage 3 represents the operational phase of the Proposed Scheme.
Decommissioning	The decommissioning works consists of demolition works and therefore the effects on the water environment are likely to be similar in nature to the effects caused by demolition works identified during the Site Reconfiguration Works. As such, the potential effects of demolition works during site reconfiguration and decommissioning works will be combined and discussed in Stage 0 scenario. The potential effects of other works involve in decommissioning works are comparable and considered no worse than the Stage 1 effects. Impacts that may occur during decommissioning are therefore assessed as construction impacts that form part of the Stage 1 works.

Stage 0 – Site Reconfiguration Works

Increased Risk of Pollution from Dust and Debris Caused by Demolition Works

12.6.1. The following surface water features are located further than 400 m from the proposed Site Reconfiguration Works and are therefore unlikely to be adversely affected by dust or debris blown into these features:

- Carr Dyke (reference SW01 on the Water Constraints map).
- Pond 1 (reference SW05 on the Water Constraints map).
- River Ouse (reference SW09 on the water Constraints map).
- Unnamed Selby Area IDB drains reference 16/1, 18/1, 18/3 and 44 (reference SW15, SW11, SW13 and SW04 on the Water Constrains map).
- North Perimeter Ditch (reference SW03 on the Water Constraints map).
- Unnamed drain north of cooling towers (reference SW02 on the Water Constraints map).
- Back Lane Drain (reference SW10 on the Water Constraints map).
- Rusholme Lane Drain (reference SW14 on the Water Constraints map).
- Dickon Field Drain (reference SW16 on the Water Constraints map).
- Clough Drain (reference SW17 on the Water Constraints map).

12.6.2. The impact magnitude is considered to be no change. The residual effect to these features is therefore considered to be of negligible significance.

12.6.3. The following surface water features are located approximately 100 m from the proposed demolition works forming part of the Site Reconfiguration Works and may therefore be adversely affected by dust or debris blown into these features:

- Carr Lane Drain (reference SW08 on the Water Constraints map).
- Unnamed Selby Area IDB drain reference 18/4 (reference SW07 on the Water Constraints map).
- Unnamed drain along New Road (reference SW06 on the Water Constraints map).

12.6.4. Due to the implementation of a CEMP, including air pollution measures to mitigate release of dust, the Site Reconfiguration Works are unlikely to impact the quality of these watercourses.

12.6.5. The sensitivity of these features is considered to be high. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be negligible adverse, therefore there is likely to be an in-direct, temporary and short-term effect on these features of minor adverse significance.

Loss of Habitat due to Diversion of North Perimeter Ditch

12.6.6. The battery storage building is proposed to be constructed in the area crossed by the North Perimeter Ditch, which is part of the existing drainage system serving the Existing Drax Power Station Complex. The ditch will be diverted along the northern boundary of the power station, and the existing channel is likely to be in-filled. The magnitude of change prior to mitigation is considered to be major adverse until a new habitat re-establish in the replacement ditch (diversion channel) (to be provided as part of the authorised works described in Work No. 3A in Schedule 1 to the draft DCO (Document Ref. 3.1) would replicate the lost ditch. The sensitivity of North Perimeter Ditch is considered to be low. Therefore there is likely to be direct, temporary, long-term effect on the North Perimeter Ditch of minor adverse significance prior to the implementation of mitigation measures.

Impact on habitat due to Potential Localised Culverting of the Drainage Ditches Adjacent to Area H

12.6.7. The existing drainage ditches (references SW20 and SW21 on the Water Constraints map) adjacent to the proposed contractor's village (Area H) may be culverted where the alignment protrudes into the proposed village area. The potential culverting could impact the existing habitat in the ditches. Consultation with the project ecologist confirmed that no protected species were recorded in these features during the site visit. It is also unlikely that the ditches are used by the local wild life. The magnitude of the potential impact is therefore considered to be no change.

Increased Risk of Pollution from Increased Sediment Load

12.6.8. The Contractor's Village is proposed to be constructed in the area adjacent to the existing drainage ditches (references SW20 and SW21) located in the vicinity of the southern cooling towers. The Contractor's Village will comprise contractors' site offices, welfare, storage compounds and parking areas. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be negligible. Therefore, the significance of effect to these features is considered to be of negligible significance.

Increased risk of pollution to surface water features from accidental spillages of oil, hydrocarbons and hazardous substances

12.6.9. The construction works associated with the construction of the contractor's village (Area H) are adjacent to the drainage ditches (references SW20 and SW21 on the Water Constraints Map) serving the Existing Drax Power Station Complex. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be negligible. Therefore, the significance of effect to these features is considered to be of negligible significance.

Stage 1 – Construction of Unit X, battery storage building and the Gas Pipeline

Increased Risk of Pollution from Increased Sediment Load

12.6.10. This is typically caused by site runoff containing elevated suspended sediment levels migrating to adjacent surface water features. This can result from land clearance, excavation, dewatering of excavations, stockpiles, wheel washings and movement of materials to and from the Site. Increased sediment loads can also be caused by works undertaken within or immediately adjacent to a watercourse, for example when extending channel culverts or undertaking works to bridge structures.

12.6.11. Runoff with high sediment load can have direct adverse effects on adjacent water bodies through increasing turbidity (thus reducing light penetration and reducing plant growth), and by smothering vegetation and bed substrates (thus impacting on invertebrate and fish communities through the destruction of feeding areas, refuges and breeding / spawning areas). Indirect adverse effects can also be associated with suspended sediments that have inorganic or organic contaminants (e.g. heavy metals and pesticides, respectively).

12.6.12. The new Gas Pipeline will cross Back Lane Drain, the unnamed drain reference 18/1 on the Selby Area IDB plan, and Rusholme Lane Drain. It is likely that the crossings will be constructed using trenchless crossing techniques to reduce impact on the drains. The sensitivity of Back

Lane Drain, the IDB's unnamed drain reference 18/1 and Rusholme Lane Drain is considered to be high. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be no change. Therefore, the significance of effect to these features is considered to be of negligible significance.

12.6.13. Temporary culverts are likely to be required in Back Lane Drain, the IDB's unnamed drain reference 18/1 and Rusholme Lane Drain to allow for construction access along the Gas Pipeline route. Construction of temporary culverts could increase sediment load and therefore impact the quality of these water features. With the implementation of CEMP including best practice, the magnitude of change is considered to be minor adverse. Therefore, there is likely to be a direct, temporary, short-term effect on Back Lane Drain, the IDB's unnamed drain reference 18/1 and Rusholme Lane Drain of minor adverse significance. The works are considered unlikely to deteriorate the WFD status of Rusholme Lane Drain as the potential impact will be temporary and short-term.

12.6.14. The River Ouse flows approximately 150 m downstream of the proposed temporary culvert in Rusholme Lane Drain and within 600 m of Back Lane Drain and the IDB's unnamed drain reference 18/1. Increased sediment load could be conveyed downstream to the River Ouse, however considering the small size of Rusholme Lane Drain and other drains, the amount of increased sediment load released during construction of the temporary culverts is unlikely to be significant. Sediments will also settle, be trapped by vegetation and diluted before reaching the River Ouse and are therefore unlikely to affect the integrity of the river. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be negligible adverse. Given that the sensitivity of the River Ouse is considered to be very high, there is likely to be an in-direct, temporary, short-term effect on the River Ouse of minor adverse significance. The increased sediment load is unlikely to deteriorate the WFD status of the River Ouse as the potential impact will be temporary and short-term.

12.6.15. The following watercourses have the potential to be affected by proposed construction works within the Site:

- The unnamed drain located along eastern edge of New Road, the unnamed Selby Area IDB drain reference 44 and Carr Lane Drain located along the boundaries of the main construction compound in Area A i.e the carbon capture readiness reserve space.
- The unnamed drain north of the cooling towers that forms the north-western boundary of the construction compound in Area B.
- The unnamed Selby Area IDB drain reference 16/1 located along the northern boundary of the construction compound associated with the widening of Rusholme Lane.
- The unnamed Selby Area IDB drains reference 18/3, 18/4, Dickon Field Drain and Clough Drain adjacent to the construction works associated with the GFR and AGIs with access road.

12.6.16. Construction works will be undertaken in accordance with the measures in the CEMP, including robust in-design mitigation and appropriate method statements, which will largely mitigate potential impacts to these water features. However, considering the close proximity of the works to these features, a residual risk of increased sedimentation will be present. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be negligible adverse. The sensitivity of the unnamed drain located along

eastern edge of New Road, unnamed drain north of the cooling towers, the unnamed Selby Area IDB drains reference 16/1, 18/3, 18/4, 44, Carr Lane Drain and Clough Drain is considered to be high; and the sensitivity of Dickon Field Drain is considered to be very high. Therefore, there is likely to be a direct, temporary, short-term effect on all these features of minor adverse significance.

12.6.17. Carr Dyke flows approximately 160 m downstream of the unnamed drain located north of the cooling towers. Sediments conveyed in this drain are likely to settle, be trapped by vegetation and diluted before reaching Carr Dyke, but there may be still some residual effect. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be negligible. The sensitivity of Carr Dyke is considered to be very high, therefore there is likely to be a direct, temporary, short-term effect on Carr Dyke of minor adverse significance.

Increased Risk of Pollution to Surface Water Features from Accidental Spillages of Oil, Hydrocarbons and Hazardous Substances

12.6.18. The release of oils and hydrocarbons is typically caused by a larger number of vehicles accessing the site, refuelling of vehicles and plant, leakage from oil/fuel storage tanks and accidental spillages leading to polluted runoff migrating to surface water features. The release of hydrocarbons and oils into on-site drainage systems or from direct runoff is the second most common form of pollution after increased sediment loading. Hydrocarbons form a film on the surface of the water body, deplete oxygen levels and can be toxic to freshwater fish. Even at very low concentrations the film can negatively impact on the visual appearance of the water body.

12.6.19. The use of hazardous products on site can present a pollution risk because of the potential for accidental spillages, and the uncontrolled release of washdown water and surface water runoff, particularly containing concrete and cement products. If materials and activities are not stored and carried out in designated areas, runoff and washdown may enter a water body and adversely affect the aquatic environment or contaminate surface water abstractions. The most common source of pollution is from concrete and cement products. These products are highly alkaline and corrosive - fish can be physically damaged and their gills blocked, and both vegetation and the bed of the receiving water body can be smothered.

12.6.20. The River Ouse is located over 1km downstream of the Power Station Site where the main construction works will be undertaken. The new Gas Pipeline will cross a number of drains that could convey pollutants to the River Ouse. However, trenchless crossing techniques are likely to be used. This reduces the potential release of pollutants into the watercourses and therefore downstream to the River Ouse. Pollutants are also likely to be sufficiently diluted and trapped before they reach the River Ouse. With the implementation of the CEMP including robust in-design mitigation, the works are unlikely to impact the quality of the River Ouse with a likely impact magnitude of negligible adverse.

12.6.21. The construction works will be undertaken adjacent to Clough Drain which discharges directly to the River Ouse approximately 100 m downstream of the proposed construction works associated with the construction of the AGI and the access road. Robust in-design mitigation,

included in the CEMP, will be implemented during construction works. The potential impacts on the quality of the River Ouse are considered to be negligible adverse.

12.6.22. The sensitivity of the River Ouse is considered to be very high. With the implementation of CEMP and best practice measures, there is likely to be an indirect, temporary, short-term effect on the River Ouse of minor adverse significance.

12.6.23. The following watercourses have the potential to be affected by accidental spillages of oil, hydrocarbons and hazardous substances from construction compounds within the Power Station Site:

- The unnamed drain located along eastern edge of New Road, the unnamed Selby Area IDB drain reference 44 and Carr Lane Drain located along the boundaries of the main construction compound in Area A.
- The unnamed drain north of the cooling towers that forms the north-western boundary of the construction compound in Area B.
- The unnamed Selby Area IDB drain reference 16/1 located along the northern boundary of the construction compound associated with the widening of Rusholme Lane.

12.6.24. The construction compounds will be managed in accordance with the CEMP including best practice measures. Considering this information, the magnitude of change is therefore considered to be negligible adverse. The sensitivity of these features is considered to be high. Therefore, there is likely to be a direct, temporary, short-term effect on all these features of minor adverse significance.

12.6.25. The construction works associated with GRF are adjacent to the unnamed Selby Area IDB drains reference 18/3, 18/4, and the constriction works associated with AGI with access road are adjacent to Dickon Field Drain and Clough Drain. Construction works will be undertaken in accordance with the measures in the CEMP, including robust in-design mitigation and appropriate method statements, which will largely mitigate potential impacts to these water features. However, considering the close proximity of the works to these drains, there may be residual risk. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be negligible. The sensitivity of the unnamed Selby Area IDB drains reference 18/3, 18/4 and Clough Drain is considered to be high, and the sensitivity of Dickon Field Drain is considered to be very high. Therefore, there is likely to be a direct, temporary, short-term effect on all these features of minor adverse significance.

12.6.26. Carr Dyke flows approximately 160 m downstream of the unnamed drain located north of the cooling towers. Pollutants conveyed in this drain are likely to be trapped by vegetation and diluted before reaching Carr Dyke, but there may be still some residual effect. With the implementation of CEMP including best practice measures, the magnitude of change is considered to be negligible. The sensitivity of Carr Dyke is considered to be very high, therefore there is likely to be a direct, temporary, short-term effect on Carr Dyke of minor adverse significance.

12.6.27. The new Gas Pipeline will cross Back Lane Drain, the Selby Area IDB drain reference 18/1 and Rusholme Lane Drain. There is a potential risk of accidental spillages during construction of the new crossings. The construction works will be carried out in accordance with the CEMP measures including robust in-design mitigation and appropriate method statements. In

addition, the new crossings are likely to be constructed using trenchless crossing techniques to minimise impact on the drains. The construction works are therefore unlikely to impact the quality of Back Lane Drain, unnamed drain reference 18/1 and Rusholme Lane Drain with an impact magnitude of no change. The sensitivity of Back Lane Drain, the Selby Area IDB drain reference 18/1 and Rusholme Lane Drain is considered to be high. Therefore, the potential significance of the effect is considered to be of negligible significance.

12.6.28. The Humber Estuary designated Ramsar site, SSSI, SAC and SPA is located approximately 4km downstream of the proposed construction woks. Considering this distance, pollutants potentially released during construction works are likely to be sufficiently diluted before they reach the designated site. The construction works are therefore unlikely to impact the quality of the Humber Estuary with an impact magnitude of no change. The sensitivity of the Humber Estuary is considered to be very high. Therefore the potential significance of the effect on the Humber Estuary is considered to be of negligible significance.

12.6.29. Pond 1 at Drax Abbey Farm is located approximately 30 m to the west of the proposed main construction compound in Area A. However the presence of New Road located between the pond and the compound will provide a barrier for pollutants potentially carried in overland flows. The implementation of the CEMP including robust in-design mitigation, will further mitigate the risk and the construction works are unlikely to impact the quality of the pond, with a predicted impact magnitude of no change. The sensitivity of the pond at Drax Abbey Farm is considered to be medium. Therefore the potential significance of the effect on the pond is considered to be of negligible significance.

Increased Risk of Pollution to Groundwater Resources from Accidental Spillages of Oil, Hydrocarbons, Hazardous Substances and Pollution from Increased Sediment Load

12.6.30. The majority of the Power Station Site is underlain by unproductive strata, however, there are areas of superficial Secondary A Aquifer on site and around the periphery of the Existing Drax Power Station Complex. These superficial Secondary A aquifers are also present along the proposed Gas Pipeline route. Any contamination of these superficial aquifers may also impact upon the underling Principal Aquifer and associated groundwater abstractors. Following implementation of the CEMP as outlined in the sections above, the magnitude of change is considered to be negligible adverse for both features and there is likely to be an indirect, temporary and short term effect upon both aquifers creating a minor adverse impact to the Principal Aquifer and water users and a negligible adverse impact to the Secondary A aquifers.

Impacts to Catchment Hydrology Caused by Changes to Subsurface Flows within the Superficial Deposits and Aquifer due to the Gas Pipeline

12.6.31. The Gas Pipeline is expected to be founded within the superficial deposits on site, which are characterised as Clays (non-productive strata), Silts, and Sands and Gravels (Secondary A Aquifers). Construction of the Gas Pipeline may reduce or sever a degree of superficial groundwater base flow to the River Ouse which would naturally occur from the south of the proposed pipeline. The ground materials are likely to have low-moderate permeabilities indicating that river baseflow contributions from these ground materials are likely to be small, however, this will need to be defined through further groundwater study. Hydraulic control options during construction may consist of sheet piling, sump pumping or active dewatering,

the latter having a lateral drawdown effect away from the area of dewatering and potentially causing a temporary interference with groundwater baseflow to the watercourse.

12.6.32. The degree of hydraulic control may also be influenced by the time of year when the controls could be employed. During winter, after sustained periods of rainfall, groundwater levels will be elevated and likely near surface and construction during this time period would require greater dewatering than during the drier summer months. There is likely to be a direct, temporary, short-term effect on the subsurface flow of minor adverse significance prior to the implementation of mitigation measures. Further works to determine the local groundwater-surface water interactions will be required prior to design to quantify this potential impact. To define the surface water-groundwater hydrodynamics, borehole installations, stilling well installations, continuous groundwater and surface water level monitoring, permeability testing, aquifer testing and numeric modelling may be required. In the first instance WSP advice that continuous long term groundwater level monitoring and water user groundwater level and/or surface water level monitoring be completed for baseline purposes to assess hydraulic linkages, if linkages exist then further works will be required. In addition, any abstracted water would need to be suitably treated prior to discharge, notably if the discharge is to the water course. This would have to be discussed with the EA as the EA is currently in an interim period as to the need for a permit for construction de-watering activities.

Increased Risk of Flooding to the Power Station Site, Construction Workers, and People and Properties elsewhere Caused by Temporary Works in the Existing Floodplain

12.6.33. The works will be undertaken in areas that are protected by flood defences up to the 1 in 200 annual probability flood event. Breach of the existing flood defences is very unlikely to happen as the flood defences are regularly checked and maintained by the EA to ensure they provide appropriate protection. The construction works also will be temporary. The works are therefore highly unlikely to increase the risk of flooding to the Power Station Site, construction workers, or people and properties elsewhere, with an impact magnitude of no change. In the event of a breach in the flood defences, the existing Drax Emergency Plan will be followed that includes measures for securing and evacuating the site.

12.6.34. The sensitivity of the Power Station Site, construction workers, and people and properties elsewhere is considered to be very high. Therefore, the potential significance of the effect is considered to be of negligible significance.

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

12.6.35. As explained above, the effects for Stage 2 are comparable to, and will be no worse than those set out above for Stage 1.

12.6.36. The combination of the construction and operational impacts is envisaged to provide impacts to the water environment no worse than the impacts assessed separately in Stage 1 and Stage 3. Therefore, no separate assessment of Stage 2 is provided, as all the potential impacts are discussed in Stage 1 and Stage 3.

Stage 3 – Operation of Units X and Y

12.6.37. Stage 3 – Operation of Units X and Y represents the operational phase of the Proposed Scheme. The potential risks to the water environment predicted during the operational phase are discussed below.

Increased Flood Risk Associated with an Increase in the Rate and Volume of Surface Water Runoff from an Increase in Impermeable areas at the Power Station Site, and Above Ground Installations and Gas Receiving Facilities Associated with the New Gas Pipeline

12.6.38. The Proposed Scheme will increase the amount of impermeable area which will increase the rate and volume of surface water runoff generated in the Site, which could in turn increase the risk of flooding to the Power Station Site or people and properties elsewhere.

12.6.39. Surface water runoff from additional impermeable areas associated with the new Gas Pipeline infrastructure will be discharged to existing drains under the jurisdiction of the Selby Area IDB. In accordance with the IDB requirements, surface water runoff will be attenuated to pre-development greenfield runoff rates or 1.4 l/s/ha, whichever is less.

12.6.40. Surface water runoff generated from additional impermeable areas located within the current boundary of the Power Station Site will be discharged to the existing drainage system serving the Existing Drax Power Station Complex. Existing discharge rates from the system into the receiving Carr Dyke will be maintained.

12.6.41. The Proposed Scheme is therefore not expected to increase flood risk to the Power Station Site or people and properties elsewhere, with an impact magnitude of no change. The sensitivity of the Power Station Site and people and properties elsewhere is considered to very high. Therefore, the potential significance of the effect is considered to be of negligible significance.

Increased Risk of Flooding Caused by Loss of Floodplain

12.6.42. A detailed assessment of flood risk is provided in the FRA (Document Reference 6.8). A summary of this assessment is provided below.

12.6.43. The works will be undertaken in areas that are protected by flood defences up to the 1 in 200 annual probability flood event. Breach of the existing flood defences is very unlikely to happen as the flood defences are regularly checked and maintained by the EA to ensure they provide appropriate protection, however the potential impacts of the Proposed Scheme on flood risk elsewhere in the event of a breach have been considered.

12.6.44. Hydraulic modelling of a potential breach scenario was undertaken for the baseline and post-development scenario as part of the FRA. The post-development modelling has considered a flood relief channel that will be built immediately to the north of Drax Power Station as an in-design mitigation measure. The results of the hydraulic modelling exercise show localised minor increases in flood depth of less than 10 mm in Drax village. This is considered to be an impact magnitude of negligible adverse.

12.6.45. The sensitivity of people and properties in Drax village is considered to be very high. Therefore, there is likely to be an effect on people and properties of minor adverse significance prior to the implementation of mitigation measures.

Increased Flood Risk to the Proposed Scheme Associated with the Potential of a Breach or Overtopping of Defences along the River Ouse

12.6.46. A detailed assessment of flood risk is provided in the FRA (Document Reference 6.8). A summary of this assessment is provided below.

12.6.47. In accordance with Planning Practice Guidance 'Flood Risk and Coastal Change' the Proposed Scheme is considered as 'essential infrastructure' and should remain operational during flood events.

12.6.48. Hydraulic modelling of a potential breach scenario was undertaken for the 1 in 200 annual probability tidal flood event (with climate change allowance) and the 1 in 5 annual probability fluvial flood event. The predicted flood levels were used to establish appropriate finished floor levels for all new infrastructure. Floor levels will be set 600 mm above the predicted flood levels to ensure that the new infrastructure will remain operational during this potential flood event. In the event of a breach in the flood defences, the existing Drax Flood Evacuation Plan will be followed that includes measures for securing and evacuating the site. The magnitude of the impact is considered to be no change.

12.6.49. The sensitivity of the Proposed Scheme is considered to be very high. Therefore, the potential significance of the effect is considered to be of negligible significance.

Deterioration of the quality of surface water features caused by potential pollutants contained in routine runoff generated in the power station and the above ground facilities associated with the Gas Pipeline

12.6.50. Surface water runoff generated from the new impermeable areas located within the Existing Drax Power Station Complex and surface water runoff generated in the area of the Gas Receiving Facility will be discharged to the existing drainage system serving the Drax Power Station. The existing drainage system includes appropriate pollution prevention measures hence the routine runoff from the new development is unlikely to impact the quality of Carr Dyke that receives discharge from the existing site. The magnitude of the impact is considered to be no change.

12.6.51. Surface water runoff generated in the area of the Above Ground Installation and the associated access road will be routed through an appropriate oil separator before discharging to the nearby Dickon Field Drain. Routine runoff from this area is therefore unlikely to impact the quality of the receiving watercourse. The magnitude of the impact is considered to be no change.

12.6.52. The sensitivity of Carr Dyke and Dickon Field Drain is considered to be high. Therefore, the potential significance of the effect to Carr Dyke and Dickon Field Drain is considered to be of negligible significance.

12.6.53. Surface water runoff from the contractor village (Area H) is proposed to drain to the eastern and western drainage systems in a similar manner to the existing drainage in this area. A new ditch will be provided for the additional parking spaces created to the south of the site access road. Fuel storage areas will be bunded, with fuel handling areas drained through Class 1 oil separators in accordance with the existing site measures for pollution control. Routine runoff

from this area is therefore unlikely to impact the quality of the receiving watercourses. The magnitude of the impact is considered to be no change.

Increased Risk to the Existing Drax Power Station Complex due to Potential Localised Culverting of the Existing Drainage Ditches in the Southern Area of the Power Station Site

12.6.54. It is proposed that surface water runoff from the contractor village continues to drain to the eastern and western drainage systems in a similar manner to the existing drainage in this area. Additional local connections will be made where required. The existing ditches may be culverted where the alignment protrudes into the proposed village area. A new ditch will be provided for the additional parking spaces created to the south of the Area H access road. All the existing connections to the existing drainage ditches (reference SW20 and SW21 on the Water Constraints map) will be retained. The magnitude of the potential impact is therefore considered to be no change.

Increased Risk to the Existing Drax Power Station Complex due to Diversion of North Perimeter Ditch

12.6.55. The North Perimeter Ditch is part of the existing drainage system serving the Existing Drax Power Station Complex. The ditch will be diverted to allow for the construction of the battery storage building. The diversion channel will be designed to ensure no reduction in the existing capacity of the North Perimeter Ditch. The magnitude of the impact is considered to be no change.

12.6.56. The sensitivity of the Existing Drax Power Station Complex is considered to be high. Therefore, the potential significance of the effect is considered to be of negligible significance.

Impacts to Catchment Hydrology caused by Changes to Subsurface Flows within the Superficial Deposits and Aquifer due to the Gas Pipeline

12.6.57. During the operational phase, the Gas Pipeline could act as a preferential pathway for groundwater, depending on local groundwater levels, permeabilities, hydraulic gradients and base materials upon which the pipeline is installed e.g. pea gravel. This pathway could divert some groundwater baseflow away from the watercourse. Local groundwater-surface water interactions will need to be defined prior to design. There is likely to be direct, temporary, short-term effect on the subsurface flow of minor adverse significance prior the implementation of mitigation measures.

Decommissioning

12.6.58. The potential impacts on the water environment during decommissioning of the Proposed Scheme are considered to be the same as impacts that could occur during Stage 0 - Reconfiguration Works and Stage 1.

12.7 Mitigation and Enhancement Measures

12.7.1. This section provides a summary of proposed and recommended mitigation measures to control or reduce the potential impacts identified in Section 12.4 Embedded Mitigation. Many of these measures are incorporated into the proposed design of the Proposed Scheme, such as the operational surface water management system and construction of a flood relief

channel. Others will need to be developed further as the design of the Proposed Scheme progresses and construction method statements are developed.

12.7.2. Many of the watercourses and drains in the study area are considered to be of high or very high sensitivity. Impacts of negligible magnitude can therefore result in effects of minor adverse significance. The construction works near or within the watercourses therefore are of particular concern and robust mitigation techniques should be implemented. The principal contractor for the works is committed to managing risks to the water environment associated with the proposed works. The likely mitigation measures during construction are discussed in Section 12.4 (Embedded Mitigation).

12.7.3. The majority of mitigation required for the operational phase of the Proposed Scheme is embedded within the design of the Proposed Scheme. It has been described within the assessment of potential significant effects, and summarised in Section 12.4 (Embedded Mitigation).

12.7.4. No secondary mitigation is provided as part of this ES.

12.8 Residual Effects

12.8.1. The provision of, and adherence to, the measures outlined in the CEMP and DEMP and associated pollution control documents (as well as other recommend design and construction processes) is considered adequate to reduce the likelihood of increased sediment loading, the release of hydrocarbons and release of hazardous substances. Where direct impacts are expected due to construction works taking place directly in or adjacent to watercourses there may still be some residual risk, especially from sedimentation. No secondary mitigation has been provided as part of this ES.

Stage 0 – Reconfiguration Works

Release of Dust and Debris

12.8.2. The following watercourses could be affected by dust released during the proposed demolition works:

- Unnamed drain along the eastern side of New Road.
- Carr Lane Drain.
- Unnamed IDBs drain reference 18/4.

12.8.3. The implementation of CEMP, including air pollution mitigation measures, best practice and method statements will largely mitigate potential impacts to these water features. Considering the proximity of the water features to the proposed works, provision of additional secondary mitigation measures are not considered to result in a change to effect and there may be some residual impacts. The residual impacts are unlikely to affect the integrity of these watercourses. Also the impacts will be short-term and temporary.

12.8.4. The sensitivity of the unnamed drain along the eastern side of New Road, Carr Lane Drain and the IDBs drain reference 18/4 is high, and the magnitude of change, following mitigation, is negligible adverse. Therefore, there is likely to be in-direct, short-term, temporary effect on unnamed drain along the eastern side of New Road, Carr Lane Drain and the IDBs drain reference 18/4 of minor adverse significance following the implementation of the embedded mitigation measures. No secondary mitigation measures are not provided as part of this ES.

Stage 1 – Construction of Unit X, Gas Pipeline and Associated above Ground Infrastructure

Increased Risk of Pollution from Accidental Spillages of Oil, Hydrocarbons and Hazardous Substances

12.8.5. The following watercourses could be affected by accidental spillages during construction works:

- Unnamed drain located along eastern edge of New Road.
- Unnamed Selby Area IDB drain reference 44, 16/1, 18/3 and 184.
- Carr Lane Drain.
- Dickon Field Drain.
- Clough Drain.

12.8.6. Construction works will be undertaken in accordance with CEMP, including best practice and appropriate method statements, which will largely mitigate potential impacts to these water features. However considering close distance between the construction works and these drains, additional secondary mitigation measures are not considered to result in a change to effect and there may be still some residual risk, especially from sedimentation.

12.8.7. The sensitivity of these watercourses is considered to be high. The magnitude of change following the mitigation, is also considered to be negligible. Therefore there is likely to be direct, temporary, short-term residual effect on all these features of minor adverse significance following the implementation of the embedded mitigation measures.

12.8.8. Carr Dyke flows approximately 160 m downstream of the construction compound in Area B. The construction compound will be managed in accordance with CEMP, including best practice, and CIRIA 532 guidance, what will mitigate largely the potential impacts to the unnamed watercourse but considering the proximity of the compound to the drain there may be still some residual impacts. Potential residual amounts of pollutants could be conveyed into Carr Dyke. Considering the distance, the pollutants are likely to be partially diluted and trapped but some may reach Carr Dyke. However, the residual amounts of potential pollutants are unlikely to impact the integrity of the Dyke. Additional secondary mitigation measures are not provided as part of the ES.

12.8.9. The sensitivity of Carr Dyke is considered to be very high, and the magnitude of change following mitigation, is considered to be negligible. Therefore, there is likely to be an in-direct, temporary, short-term residual effect on Carr Dyke of minor adverse significance following the implementation of mitigation measures.

12.8.10. The River Ouse flows approximately 100 m downstream of the proposed construction works associated with the construction of the AGI and the access road. A robust CEMP, including in-design mitigation system and best practice will be implemented during construction works and would largely mitigate potential impacts to the River Ouse. However there still maybe some residual risk. The potential residual impacts on the quality of the River Ouse are considered to be negligible. Additional secondary mitigation measures are not considered to result in a change to the residual effect. Considering the residual impacts being short-term and temporary, it is unlikely that they will impact the WFD status of the River Ouse.

12.8.11. The sensitivity of the River Ouse is considered to be very high, and the magnitude of change following mitigation, is considered to be negligible. Therefore, there is likely to be an in-direct,

temporary, short-term residual effect on the River Ouse of minor adverse significance following the implementation of mitigation measures.

Increased Sediment Load

12.8.12. The crossings of the Gas Pipeline with Back Lane Drain, the unnamed IDB drain reference 18/1 and Rusholme Lane Drain will be constructed using trenchless crossing techniques, this will mitigate any impact on the quality of the watercourses and no residual effects are envisaged.

12.8.13. Temporary culverts are likely to be constructed within Back Lane Drain, the unnamed IDB drain reference 18/1 and Rusholme Lane Drain. Construction of temporary culverts could increase sediment load and impact the quality of these watercourses. In addition, the increase sediment load could be conveyed to the River Ouse. The implementation of CEMP, including a robust mitigation techniques related to mitigation of sedimentation, best practice and appropriate method statement will largely mitigate potential impacts on the drains. However, as the works will be undertaken within the watercourses, there still may be some residual impacts. Additional secondary mitigation measures are not considered to result in a change to the residual effect. However, the residual effect will be short-term and temporary and therefore are unlikely to deteriorate the WFD status of the River Ouse and Rusholme Lane Drain.

12.8.14. The sensitivity of the River Ouse is considered to be very high and the magnitude of change following mitigation, is considered to be negligible. Therefore, there is likely to be an in-direct, temporary, short-term residual effect on the River Ouse of minor adverse significance following the implementation of the embedded mitigation measures.

12.8.15. The sensitivity of Back Lane Drain, the unnamed IDB drain reference 18/1 and Rusholme Lane Drain is considered to be high, and the magnitude of change following mitigation, is considered to be negligible. Therefore, there is likely to be a direct, temporary, short-term residual effect on Back Lane Drain, the unnamed IDB drain reference 18/1 and Rusholme Lane Drain of minor adverse significance following the implementation of the embedded mitigation measures.

12.8.16. Carr Dyke flows approximately 160 m downstream of the smaller construction compound in Area B. The construction compound will be managed in accordance with CEMP, including best practice andCIRIA 532 guidance, what will mitigate largely the potential impacts to the unnamed watercourse but considering the proximity of the compound to the drain there may be still some residual impacts. Potential residual amounts of pollutants could be conveyed into Carr Dyke. Considering the distance the pollutants are likely to be partially diluted and trapped but some may reach Carr Dyke. However, the residual amounts of potential pollutants are unlikely to impact the integrity of the dyke. Additional secondary mitigation measures are not considered to result in a change to the residual effect.

12.8.17. The sensitivity of Carr Dyke is considered to be high, and the magnitude of change following mitigation, is considered to be negligible. Therefore, there is likely to be an in-direct, temporary, short-term residual effect on Carr Dyke of minor adverse significance following the implementation of mitigation measures.

Increased Risk of Flooding to People and Properties caused by Works in the Floodplain

12.8.18. The Proposed Scheme and surrounding areas are protected by the existing flood defences for up to the 1 in 200 year event. In case of unlikely breach of the flood defences or overtopping, the existing Drax Emergency Plan will be followed. Considering this information, no residual effects are envisaged.

Increased Risk of Pollution from Accidental Spillages of Oil, Hydrocarbons and Hazardous Substances to Groundwater Resources

12.8.19. Following the implementation of embedded mitigation options there is likely to be direct, temporary, short-term negligible residual effect of pollution risks to the groundwater regime. No secondary mitigation measures are provided as part of this ES.

Stage 3 – Operation of Units X and Y

Loss of Habitat caused by Diversion of North Perimeter Ditch

12.8.20. The proposed diversion of North Perimeter Ditch is likely to result in loss of the existing habitat. The diversion of the ditch will result in direct, temporary, long-term minor adverse significance of effect to the North Perimeter Ditch. When the habitat has re-established in the diverted channel, no residual effects are envisaged.

Impacts to catchment hydrology caused by changes to subsurface flows within the superficial deposits and aquifer due to the pipeline

12.8.21. Following the implementation of the embedded mitigation options there is likely to be direct, temporary, short-term negligible residual effect on the subsurface flow. No secondary mitigation is provided in this ES.

Decommissioning

12.8.22. The potential impacts to the water environment that could occur during decommissioning of the Proposed Scheme are considered similar as impacts that could occur during Stage 0 – Reconfiguration Works and Stage 1, and therefore are discussed in these sections.

12.9 Limitations and Assumptions

12.9.1. It is assumed that construction work areas, including construction compounds and temporary access roads, will be reinstated once the works are completed.

12.9.2. It is assumed that the Gas Pipeline crossings with the watercourses will be constructed using trenchless crossing techniques to mitigate potential impact on the watercourses.

12.9.3. It is assumed that no permanent crossings over the watercourses will be constructed. However, temporary crossings over watercourses will have to be constructed to allow for construction access to the Gas Pipeline. The temporary crossings will have to be agreed with the Selby Area IDB prior construction.

12.9.4. No temporary or permanent diversions of the IDB watercourses are expected.

12.9.5. Appropriate consents from Selby Area IDB will be obtained prior to construction.

12.9.6. If temporary pumping of groundwater from excavations will be required during construction, water abstraction consent will be obtained from the EA prior to construction.

12.9.7. Pipeline to be installed within 3m of surface.

12.9.8. The generating station equipment will be completed within the Power Station Site footprint and not require extending the vertical profile of the site.

12.10 Summary

12.10.1. An assessment of the potential impacts associated with construction, operation and decommissioning of the Proposed Scheme has been undertaken in relation to the water environment. The assessment identified the potential effects that the Proposed Scheme may have on the surrounding area and also assessed the potential implications of any such effects for the development. Mitigation measures have been proposed, where necessary, to minimise the scale of the impacts identified.

12.10.2. The assessment has been undertaken whilst taking national and local policies and legislation into account.

12.10.3. Through adherence to a CEMP, the site-specific work package plans and in-design mitigation measures, the risk of pollution to surface water and groundwater during construction is mitigated to be negligible. Many of the drains in the study area are considered to be of high or very high sensitivity due to recorded presence of otters or suitability for commuting and foraging by otters and water voles. All the drains eventually discharge to the River Ouse, which is also considered as a very high sensitivity receptor as it forms a migration path for species between designated sites of the River Derwent and the Humber Estuary. Considering the high and very high sensitivity of the receptors, impacts of negligible magnitude could result in effects of minor adverse significance. The construction works near or within the watercourses are therefore of particular concern and robust mitigation techniques will be required.

12.10.4. Through provision of an appropriate surface water drainage strategy, the risk of pollution to the receiving water environment is considered to be negligible. Similarly, the proposed surface water drainage strategy and layout of the proposed development is considered to adequately address flood risk issues.

Table 12-14 - Summary of Effects Table for [Water Resources, Hydrology and 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 – Reconfiguration Works				
Pollution from dust and debris	Unnamed drain along the eastern side of New Road, Carr Lane Drain, unnamed drain reference 18/4 on the Selby Area IDB plan	Minor / -/ T / I / ST		Minor / -/ T / I / ST
Loss of habitat	North Perimeter Ditch	Minor / - / T / D / LT		Minor / - / T / D / LT After few years – No residual effect
Stage 1 – Construction of Unit X				
Pollution from spillages of oils, hydrocarbons and hazardous substances	River Ouse	Minor / -/ T / I / ST		Minor / -/ T / I / ST
Pollution from spillages of oils, hydrocarbons and hazardous substances	Unnamed IDB's drains reference 16/1, 18/3, 18/4, 44, Carr Lane Drain, Dickon Field Drain, Clough Drain, unnamed drain north of cooling towers	Minor / - / T / D / ST		Minor / - / T / D / ST
Pollution from spillages of oils,	Carr Dyke	Minor / - / T / ID / ST		Minor / - / T / ID / ST

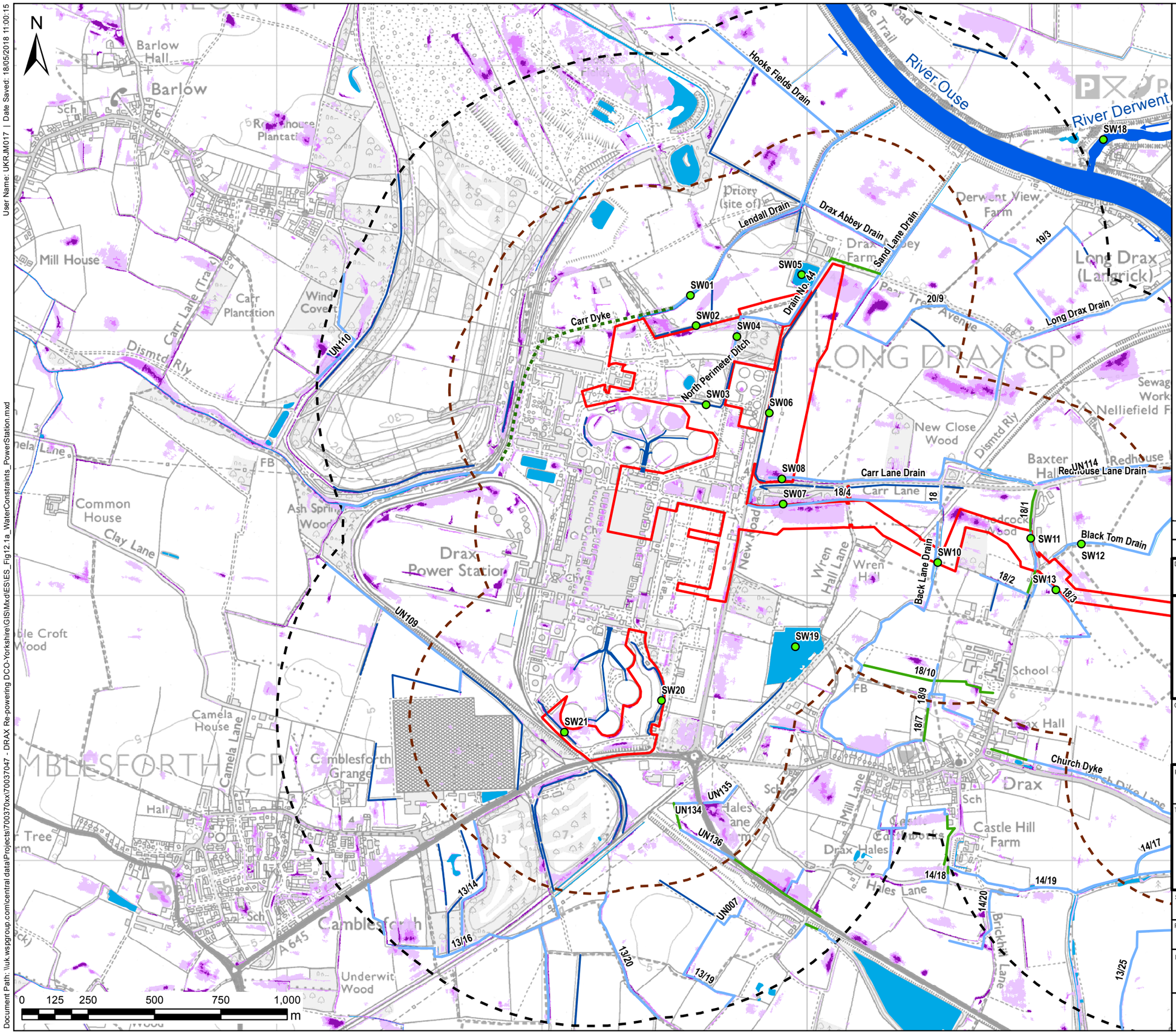
Description of Effects	Receptor	Significance and Nature of Effects Prior to Mitigation / Enhancement	Summary of Mitigation / Enhancement	Significance and Nature of Effects Following Mitigation / Enhancement (Residual)
hydrocarbons and hazardous substances				
Increased sediment load	Unnamed IDB's drains reference 16/1, 18/3, 18/4, 44, Carr Lane Drain, Dickon Field Drain, Clough Drain, unnamed drain north of cooling towers	Minor / - / T / D / ST		Minor / - / T / D / ST
Increased sediment load	River Ouse	Minor / - / T / ID / ST		Minor / - / T / ID / ST
Increased sediment load	Back Lane Drain, the IDB's unnamed drain reference 18/1, Rusholme Lane Drain	Minor / - / T / D / ST		Minor / - / T / D / ST
Increased sediment load	Carr Dyke	Minor / - / T / ID / ST		Minor / - / T / ID / ST
Stage 2 – Operation of Unit X and construction of Unit Y				
Pollution from spillages of oils, hydrocarbons and hazardous substances	River Ouse	Minor / -/ T / I / ST		Minor / -/ T / I / ST
Pollution from spillages of oils, hydrocarbons and hazardous substances	Unnamed IDB's drains reference 16/1, 18/3, 18/4, 44, Carr Lane Drain, Dickon Field	Minor / - / T / D / ST		Minor / - / T / D / ST

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)
	Drain, Clough Drain, unnamed drain north of cooling towers			
Pollution from spillages of oils, hydrocarbons and hazardous substances	Carr Dyke	Minor / - / T / ID / ST		Minor / - / T / ID / ST
Increased sediment load	Unnamed IDB's drains reference 16/1, 18/3, 18/4, 44, Carr Lane Drain, Dickon Field Drain, Clough Drain, unnamed drain north of cooling towers	Minor / - / T / D / ST		Minor / - / T / D / ST
Increased sediment load	River Ouse	Minor / - / T / ID / ST		Minor / - / T / ID / ST
Increased sediment load	Back Lane Drain, the IDB's unnamed drain reference 18/1, Rusholme Lane Drain	Minor / - / T / D / ST		Minor / - / T / D / ST
Increased sediment load	Carr Dyke	Minor / - / T / ID / ST		Minor / - / T / ID / ST
Impacts to catchment hydrology caused by changes to subsurface flows	Secondary A Aquifer - superficial deposits.	Minor / - / T / D / ST		Negligible / - / T / D / ST
Stage 3 – Operation of Units X and Y				

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)
Loss of habitat	North Perimeter Ditch	Minor / - / T / D / LT		Minor / - / T / D / LT After few years – No residual effect
Decommissioning				
Pollution from dust and debris	Unnamed drain along the eastern side of New Road, Carr Lane Drain, unnamed drain reference 18/4 on the Selby Area IDB plan	Minor / -/ T / I / ST		Minor / -/ T / I / ST

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



Key

- Site Boundary
- 500m Buffer
- 1km Buffer
- Main Rivers
- Waterbodies
- Surface Water Features
- Ordinary watercourse under the jurisdiction of the Selby Area IDB – culverted section
- Ordinary watercourse under the jurisdiction of the Selby Area IDB – open channel
- Carr Dyke - culverted channel under the responsibility of Drax Power Ltd
- Private / Other Drains

Risk of Flooding from Surface Water (Probability of Occurrence)

- High (Greater than 1 in 30 years)
- Medium (Between 1 in 30 years and 1 in 100 years)
- Low (Between 1 in 100 years and 1 in 1000 years)

Note: Water Constraints - Surface Water Features, Risk of Flooding from Surface Water map is split accross two seperate Figures; Figure12.1a - Power Station Site and Figure 12.1b - Gas Pipeline

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

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A	23/04/2018	RMcC	FIRST ISSUE	LM	CT

DRAWING STATUS: FINAL

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Order

TITLE: Figure 12.1a
Water Constraints - Power Station Site:
Surface Water Features,
Risk of Flooding from Surface Water

SCALE @ A3:	CHECKED:		APPROVED:
14,000 @ A3	LM		CT
PROJECT No: 70037047	DESIGNED: ES	DRAWN: RMcC	DATE: 23/04/2018

DRAWING No: 70037047-12.1a REV: A

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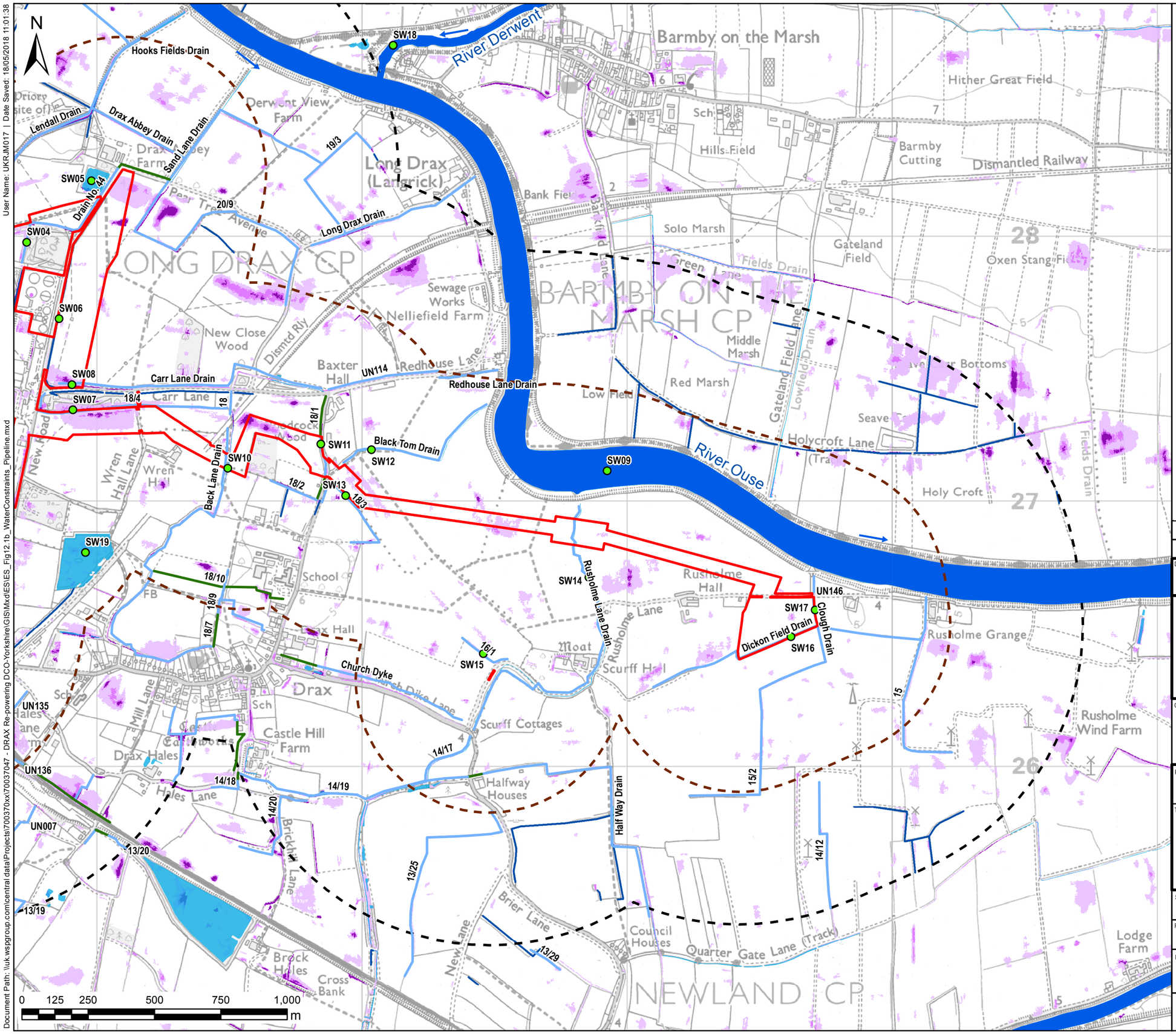

Key

- Site Boundary
- 500m Buffer
- 1km Buffer
- Main Rivers
- Waterbodies
- Surface Water Features
- Ordinary watercourse under the jurisdiction of the Selby Area IDB – culverted section
- Ordinary watercourse under the jurisdiction of the Selby Area IDB – open channel
- Carr Dyke - culverted channel under the responsibility of Drax Power Ltd
- Private / Other Drains

Risk of Flooding from Surface Water (Probability of Occurrence)

- High (Greater than 1 in 30 years)
- Medium (Between 1 in 30 years and 1 in 100 years)
- Low (Between 1 in 100 years and 1 in 1000 years)

Note: Water Constraints - Surface Water Features, Risk of Flooding from Surface Water map is split accross two seperate Figures; Figure12.1a - Power Station Site and Figure 12.1b - Gas Pipeline

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

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Order

TITLE: Figure 12.1b Water Constraints - Gas Pipeline: Surface Water Features, Risk of Flooding from Surface Water

SCALE @ A3:	CHECKED:	APPROVED:
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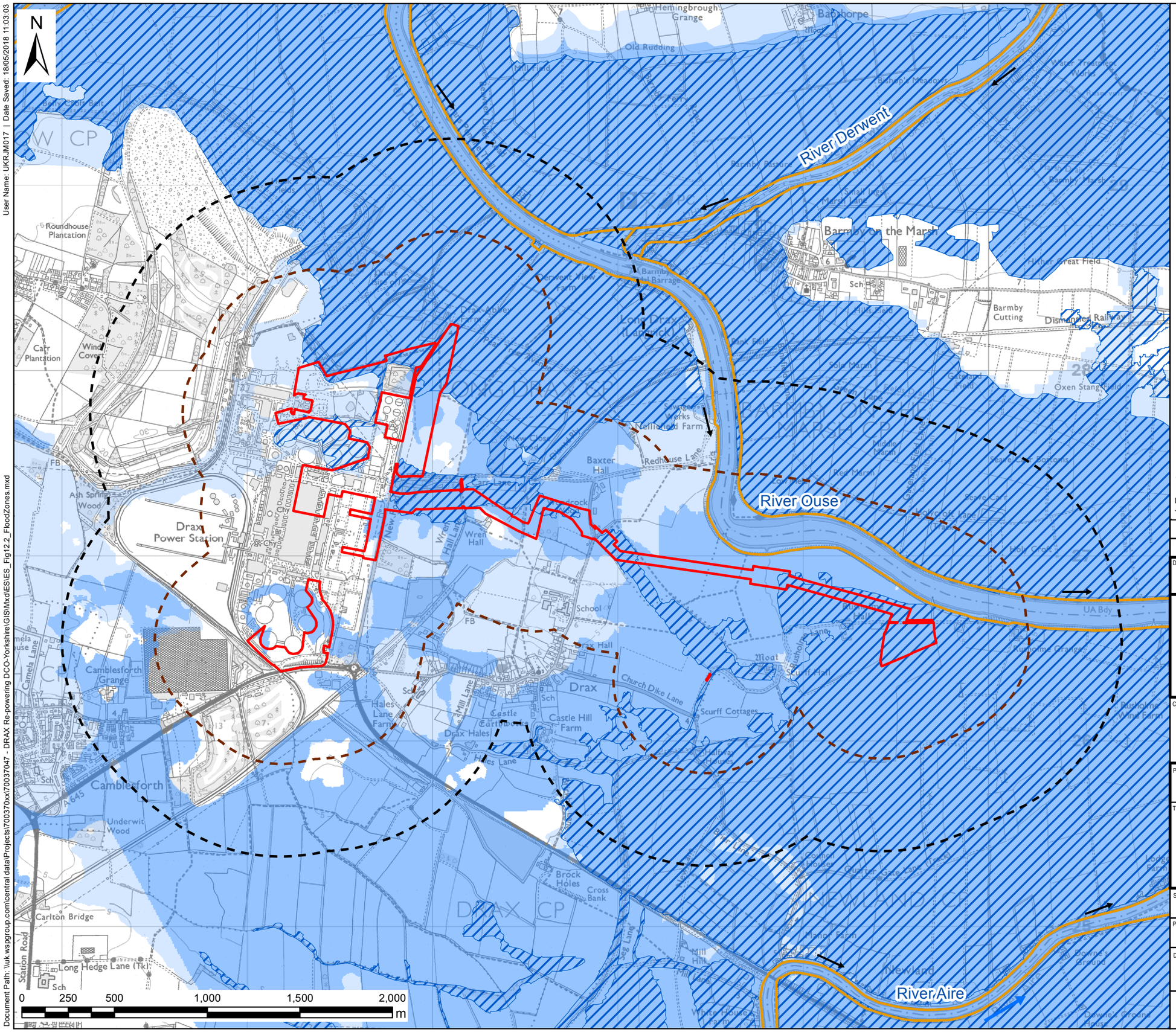

Key

- Site Boundary
- 500m Buffer
- 1km Buffer
- Flood Defences
- Areas Benefiting from Flood Defences
- Flood Zone 3
- Flood Zone 2

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

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Order

TITLE: Figure 12.2
Water Constraints Map:
Flood Zones

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N

River Ouse

River Derwent

River Aire

WA01_S
WA02_S
WA03_S
WA04_S
WA05_S
WA06_S
WA07_S
WA08_S
WA09_S
WA10_S
WA11_S
WA15_G
WA16_G
WA17_G
WA18_G
WA19_G

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DC25

LONG DRAX CP
BARMBY ON THE MARSH CP
DRAX CP
NEWLAND CP

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

Key

- Site Boundary
- 500m Buffer
- 1km Buffer
- Main Rivers
- Discharge Consent
- Surface Water Abstraction
- Groundwater Abstraction

Groundwater Source Protection Zones

- Zone I - Inner Protection Zone
- Zone II - Outer Protection Zone
- Zone III - Total Catchment

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

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Order

TITLE:
Figure 12.3
Water Constraints Map:
Groundwater Source Protection Zones,
Water Abstractions and Discharge Consents

SCALE @ A3:	CHECKED:		APPROVED:
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PROJECT No:	DESIGNED:	DRAWN:	DATE:
70037047	ES	RMcC	23/04/2018

DRAWING No: 70037047-12.3 REV: A

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