
CONTENTS

| | |
|--|----------|
| 12. SURFACE WATER, FLOOD RISK AND DRAINAGE | 1 |
| 12.1 Introduction | 1 |
| 12.2 Legislation and Planning Policy Context..... | 1 |
| 12.3 Assessment Methodology and Significance Criteria..... | 10 |
| 12.4 Baseline Conditions | 20 |
| 12.5 Development Design and Impact Avoidance | 30 |
| 12.6 Likely Impacts and Effects | 36 |
| 12.7 Mitigation and Enhancement Measures | 51 |
| 12.8 Residual Effects | 51 |
| 12.9 Limitations or Difficulties | 51 |
| 12.10 Conclusions..... | 51 |
| 12.11 References | 53 |

TABLES

| | |
|--|----|
| Table 12.1: Importance of water feature or resource (modified from WebTAG Unit 3.3.11) | 11 |
| Table 12.2: Magnitude of potential impacts..... | 13 |
| Table 12.3: Classification of effects..... | 14 |
| Table 12.4: Consultation summary table | 16 |
| Table 12.5: Identified surface waterbodies..... | 21 |
| Table 12.6: Summary of receptor and importance values. | 29 |

12. SURFACE WATER, FLOOD RISK AND DRAINAGE

12.1 Introduction

- 12.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of the Proposed Development, as described in Chapter 4- Proposed Development, on surface water resources, flood risk and drainage. It identifies key water resources and sensitivities and identifies potential direct and indirect impacts on them as a result of the Proposed Development.
- 12.1.2 This chapter is supported by Figure 12.1 provided in PEI Report Volume II, and Appendix 12A (Flood Risk Assessment (FRA), including an Outline Drainage Strategy as Annex 5) provided in PEI Report Volume III.
- 12.1.3 The FRA details the existing levels of flood risk associated with the Site and the surrounding area; quantifies the volume of surface water on the Site and requiring management, identifies the impacts the Proposed Development will have upon these aspects, and suggests potential mitigation measures to reduce the impact and manage the risk.
- 12.1.4 The Outline Drainage Strategy provides guidance and information with regards to the effective and safe drainage of surface water for the Site. The final drainage design will be completed as part of the detailed design stage.
- 12.1.5 It should be noted that some of the potential impacts and effects relating to the hydrogeology underlying the Proposed Development are also addressed within Chapter 11: Ground Conditions and Hydrogeology of this PEI Report due to the considerable overlap between the two subject areas. Flood risk issues are also addressed in Chapter 15: Sustainability and Climate Change, and waterbodies (as ecological habitats) are considered in Chapter 9: Ecology.

12.2 Legislation and Planning Policy Context

European Legislation

- 12.2.1 The EU Water Framework Directive (WFD) (2000/60/EC) is the primary European Directive setting the context for the requirements of the assessment.. The purpose of the WFD is to establish a framework for the protection and improvement of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater.
- 12.2.2 The WFD requires the UK to classify the current condition of key waterbodies (giving a 'Status' or 'Potential') and to set objectives to either maintain the condition, or improve it where a waterbody is failing minimum targets. Any activities or developments that could cause deterioration within a nearby waterbody, or prevent the future ability of a waterbody to reach its target Status, must be mitigated so as to reduce the potential for harm and allow the aims of the WFD to be realised.

National Legislation

- 12.2.3 The Water Resources Act 1991 sets out the relevant regulatory controls that provide protection to waterbodies and water resources (from abstraction pressures and pollution).
- 12.2.4 Other relevant national legislation which set out requirements related to control and protection of water resources and flood risk management includes:
- The Flood and Water Management Act 2010 (FWMA);
 - The Water Act 2014 governing the control of water abstraction, discharge to water bodies, water impoundment, conservation and drought provision;
 - The Environment Act 1995, which established the Environment Agency and its statutory role in water resource protection;
 - The Environmental Protection Act 1990, which provides for integrated pollution control including Part IIA of the Environmental Protection Act, 1990 (the 'Contaminated Land' regime); and
 - The Land Drainage Act 1991 which provides for drainage management related to non-main rivers.
- 12.2.5 A number of specific regulations have been enacted to implement the statutory European and national legislation into UK law. These regulations include:
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. These Regulations are important to the assessment within this chapter as they set the WFD environment quality standards that need to be met and maintained in UK waterbodies;
 - The Anti-Pollution Works Regulations 1999;
 - The Control of Pollution (Oil Storage) (England) Regulations 2001;
 - The Environmental Damage (Prevention and Remediation) (England) (Amendment) Regulations, 2017;
 - The Water Resources Act (England and Wales) 1991;
 - The Environmental Permitting (England and Wales) (Amendment) Regulations 2018, and
 - The Water Supply (Water Quality) Regulations 2016.
- 12.2.6 The FWMA, enacted by Government in response to The Pitt Review in 2010 (Ref 12-1), designated unitary authorities, such as North Lincolnshire Council (NLC), as Lead Local Flood Authorities (LLFAs). As a LLFA, NLC has responsibilities to lead and co-ordinate local flood risk management. Local flood risk is defined as the risk of flooding from surface water runoff, groundwater and ditches and watercourses (collectively known as Ordinary Watercourses).

12.2.7 The FWMA also formalises the flood risk management roles and responsibilities for other organisations including the Environment Agency, water companies and highways authorities establishing them as Risk Management Authorities (RMAs). The responsibility to lead and co-ordinate the management of tidal and fluvial flood risk remains that of the Environment Agency.

National Planning Policy

National Policy Statements

12.2.8 The Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 12-2) Section 5.7 (Flood Risk) details that projects of 1 hectare (ha) 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 FRA.

12.2.9 The requirements for FRAs are that they should:

- 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; and
- Be supported by appropriate data and information, including historical information on previous events.

12.2.10 In determining an application for development consent, the Planning Inspectorate should be satisfied that where relevant:

- The application is supported by an appropriate FRA;
- The Sequential Test has been applied as part of site selection (see PEI Report Volume III: Appendix 12A FRA);
- 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); and
- 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.

12.2.11 Section 5.15 of NPS EN-1 details that where the project is likely to have effects on the water environment, the applicant for development consent 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.

12.2.1 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.

12.2.12 NPS EN-2 (Ref 12-3) on Fossil Fuel Electricity Generating Infrastructure (EN-2) states that where a project is likely to have effects 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 for development consent should demonstrate measures to minimise adverse impacts on water quality and resources.

National Planning Policy Framework

12.2.13 The National Planning Policy Framework (NPPF) (Ref 12-4) outlines the Government's economic, environmental and social planning policies for England. The NPPF supersedes and replaces a number of planning policy documents that are applicable to the water environment including Planning Policy Statement 25 (PPS25): Development and Flood Risk (Ref 12-5) and PPS23: Planning and Pollution Control (Ref 12-6). The NPPF is a matter which the Secretary of State is likely to consider "important and relevant" in determining the application for a Development Consent Order (DCO).

12.2.14 The NPPF sets out 12 planning principles as guidance for local councils for the creation of their local plan; the following principles are directly applicable to flood risk:

"10. Meeting the challenge of climate change, flooding and coastal change – support the transition to a low carbon future in a changing climate taking full account of (inter alia) flood risk and coastal change; and

11. Conserving and enhancing the natural environment – development should minimise pollution and other adverse effects on the local and natural environment and should plan positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure".

12.2.15 On 6th March 2014 the Planning Practice Guidance (PPG) web-based resource was launched (Ref 12-7), which includes greater emphasis on issuing more robust guidance with regards to flood risk. The purpose of the online national planning guidance is to give simplicity and clarity to the planning system. It has been confirmed the PPG will be updated in due course by the Ministry of Housing, Communities and Local Government following on the updated NPPF. If the PPG is updated prior to determination of the DCO, the the ES will incorporate all relevant changes.

12.2.16 The PPG contains guidance in relation to water supply, wastewater and water quality, and flood risk management. It also provides advice and information on how planning can and should protect water quality; ensure the delivery of adequate water and wastewater infrastructure for new development and ensure development is protected from flood risk, and does not increase flood risk elsewhere.

12.2.17 The Non-statutory Technical Standards for Sustainable Drainage Systems (Ref 12-8) was published in March 2015 and is the current guidance for the design, maintenance and operation of Sustainable Drainage Systems (SuDS). The standards set out the following:

- Peak runoff rates should be as close as is reasonably practicable to the greenfield rate, but should never exceed the pre-development runoff rate;
- The drainage system should be designed so that flooding does not occur on any part of a development site for a 1 in 30 year rainfall event, and that no flooding of a building (including basement) would occur during a 1 in 100 year rainfall event; and
- Pumping should only be used when it is not reasonably practicable to discharge by gravity.

12.2.18 The Proposed Development will also be assessed by the Environment Agency in terms of the Land Drainage Act 1991 and the Water Resources Act 1991. Consent from the Environment Agency will be required for any proposed discharges to controlled waters.

12.2.19 The East Inshore and East Offshore Marine Plans (Ref 12-9) are guidance documents for developers to ensure the sustainable development of the marine area and protection of the marine ecosystem. These plans have been published in line with the Marine Policy Statement (Ref 12-10) and NPPF.

12.2.20 The East Inshore Marine Plan area includes the coastline stretching from Flamborough Head to Felixstowe, extending out to the seaward limit of the territorial sea (approximately 12 nautical miles). It also includes:

- Any area submerged at mean high water spring tide;
- The waters of any estuary, river or channel, so far as the tide flows at mean high water spring tide; and
- Waters in any area which is closed (permanently or intermittently) by a lock or other artificial means against the regular action of the tide, but into and from which seawater is caused or permitted to flow (continuously or from time to time).

12.2.21 This includes the tidal limits for the Humber Estuary, within NLC's boundary.

12.2.22 The East Inshore Marine Plan states that: "*A clean and healthy marine environment, including healthy beaches and good water quality, are important to tourism and recreation.*" Relevant district wide policies include:

- Policy TR1: Proposals for development should demonstrate that during construction and operation, in order of preference:
 - a) They will not adversely impact tourism and recreation activities;
 - b) How, if there are adverse impacts on tourism and recreation activities, they will minimise them;
 - c) How, if the adverse impacts cannot be minimised, they will be mitigated; and
 - d) The case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts.

- Policy TR2: Proposals that require static objects in the East Inshore Marine Plan areas, should demonstrate, in order of preference:
 - a) That they will not adversely impact on recreational boating routes;
 - b) How, if there are adverse impacts on recreational boating routes, they will minimise them;
 - c) How, if the adverse impacts cannot be minimised, they will be mitigated; and
 - d) The case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts.

12.2.23 In addition, the following policy in relation to climate change is also applicable:

- Policy CC1: Proposals should take account of:
 - How they may be impacted upon by, and respond to, climate change over their lifetime;
 - How they may impact upon any climate change adaptation measures elsewhere during their lifetime; and
 - Where detrimental impacts on climate change adaptation measures are identified, evidence should be provided as to how the proposal will reduce such impacts.

12.2.24 No works are required within the Humber Estuary or to flood defences within the East Inshore Marine Plan area in proximity to the Site therefore no Deemed Marine Licence is required.

Local Planning Policy

12.2.25 The Core Strategy (Ref 12-11) was adopted by NLC in June 2011. This Core Strategy sets-out the long term spatial planning framework for development in North Lincolnshire up to 2026 by providing strategic policies and guidance to deliver the vision for the area including the scale and distribution of development, the provision of infrastructure to support it and the protection of the natural and built environment.

12.2.26 Policies within the NLC Core Strategy relevant to flood risk and surface water management include:

- Policy CS2: Delivering More Sustainable Development - A 'sequential approach' will also be applied to ensure that development is, where possible, directed to those areas that have the lowest probability of flooding, taking account the vulnerability of the type of development proposed, its contribution to creating sustainable communities and achieving the sustainable development objectives of the plan. Where development does take place in the floodplain, mitigation measures should be applied to ensure that the development is safe;
- Policy CS12: South Humber Bank Strategic Employment Site (SHBSES) - Development will be assisted by a drainage programme. The outcome will be to include surface water and sewage management solutions to accommodate development of the SHBSES without harming the natural environment.

Safeguard and improve the flood defences of the SHBSES from tidal flooding through partnership working with the Environment Agency and its Humber Flood Risk Management Strategy, North Lincolnshire and North East Lincolnshire Councils, Yorkshire Forward, landowners and industry. This will include managing the predicted effects of climate change in harmony with the development of port related activities by managing and minimising the risk of flooding;

- Policy CS18: Sustainable Resource Use and Climate Change - Requiring the use of Sustainable Urban Drainage Systems (SuDS) where practicable and supporting the necessary improvement of flood defences and surface water infrastructure required against the actions of climate change, and preventing development in high flood risk areas wherever practicable and possible; and
- Policy CS19: Flood Risk - The council will support development proposals that avoid areas of current or future flood risk, and which do not increase the risk of flooding elsewhere. This will involve a risk based sequential approach to determine the suitability of land for development that uses the principle of locating development, where possible, on land that has a lower flood risk, and relates land use to its vulnerability to flood. Development in areas of high flood risk will only be permitted where it meets the requirements of the Exception Test and, in addition, development will be required, wherever practicable, to incorporate SuDS to manage surface water drainage.

Internal Drainage Board (IDB) Byelaws

12.2.27 Internal Drainage Boards (IDBs) are responsible for managing water levels in the watercourses designated to each IDB and work in partnership with other authorities to actively manage and reduce the risk of flooding within the IDB's district. They have permissive powers under the Land Drainage Act 1991 to undertake maintenance on any watercourse within their district other than 'Main Rivers' and to supervise all matters relating to the drainage of land within their districts.

12.2.28 Permissive powers means that IDBs are permitted to undertake works on Ordinary Watercourses but the responsibility remains with the riparian owner¹ as the IDBs are not obligated to carry out works. IDBs can undertake works on watercourses outside their drainage district in order to benefit the district. IDBs may make byelaws, approved by the relevant Minister, for securing the efficient working of the drainage systems.

¹ The responsibility for managing and maintaining ordinary watercourses falls to riparian owners who typically own land on either bank and therefore are deemed to own the land to the centre of the watercourse. NELC as the LLFA, has permissive powers to manage the risk of flooding arising from the watercourses through engagement with riparian owners and enforcing maintenance responsibilities in accordance with the Land Drainage Act 1991

12.2.29 North East Lindsey (NEL) IDB operates in the area surrounding the Proposed Development Site. Any developer working in the NELIDB area should review the following byelaws (Ref 12-12):

- Byelaw 3: Control of introduction of water and increase in flow or volume of water;
- Byelaw 4: Control of sluices etc.;
- Byelaw 6: Diversion or stopping up of watercourses;
- Byelaw 7: Detrimental Substances not to be Put Into Watercourses;
- Byelaw 10: No obstructions within 7m of the edge of the watercourse;
- Byelaw 15: Banks not to be Used for Storage;
- Byelaw 16: Not to Dredge or Raise Gravel, Sand etc.;
- Byelaw 17: Fences, excavations, pipes etc.; and
- Byelaw 18: Interference with Sluices.

Other Guidance

Environment Agency/ Defra Guidance

12.2.30 The Environment Agency and/ or DEFRA guidance provide advice on statutory responsibilities and good environmental practice for the following:

- Pollution Prevention for businesses (Ref. 12-13): What businesses and organisations should do at work to avoid pollution incidents, including the permissions you need to dispose of waste;
- Report an Environmental Incident (Ref. 12-14): provides guidance on what to report and to what organisation;
- Discharges to surface water and groundwater: environmental permits (Ref. 12-15): When you need an environmental permit to discharge liquid effluent or waste water to surface water or onto the ground, and how to apply;
- Storing oil at your business or home (Ref. 12-16): provides guidance on the regulations required to be met to store oil containers at your home, business or farm;
- Oil storage regulations for businesses (Ref. 12-17): How to store oil, design standards for tanks and containers, where to locate and how to protect them, and capacity of bunds and drip trays;
- Septic tanks and treatment plants: permits and general binding rules (Ref. 12-18): guidance for homes or businesses that aren't connected to the mains sewer;

- Rules associated with work on or near water (Ref. 12-19): Check if you need permission to do work on or near a river flood defence or sea defence; and
- Manage water on land: Guidance for land managers (Ref. 12-20): How to manage water use, levels, drainage and irrigation, and avoid pollution from waste water and sheep dip.

Construction Industry Research and Information Association (CIRIA) Guidance

12.2.31 The CIRIA guidance of relevance to the Proposed Development includes:

- Guidance C532 - Control of Water Pollution from Construction Sites (Ref 12-21) brings together the Environment Agency guidance but goes into greater detail with regard to sources of water on construction sites, pollutants and pathways. In addition, it provides guidance on planning for the type and location of suitable control measures; and
- Guidance C697 - The SuDS Manual (Ref 12-22) provides best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.

12.3 Assessment Methodology and Significance Criteria

Impact Assessment and Significance Criteria

- 12.3.1 There is no standard methodology for assessing the magnitude of impacts and significance of effects of proposed developments on the water environment. Each project is evaluated according to its individual characteristics. A methodology for assessing the significance of any effect has therefore been developed for projects throughout the UK, based on relevant legislation.
- 12.3.2 The assessment criteria used in this chapter is based on the web-based DETR (Department of the Environment, Transport and the Regions) document 'Transport Analysis Guidance' (known as WebTAG) Unit 3.3.11 (Ref 12-23). This methodology provides an appraisal framework for taking the outputs of the environmental impact process and analysing the key information of relevance to the water environment. Although this guidance is intended for transport studies, it is commonly used for water resources impact assessment for other types of infrastructure, and is considered suitable for application to other development schemes in the absence of other suitable guidance.
- 12.3.3 For the purpose of this assessment, a number of modifications to the WebTAG criteria have been made to address relevant legislation (notably the WFD). These modifications are based on other more recent guidance, where appropriate, e.g. The Design Manual for Roads and Bridges (DMRB) (Ref 12-24) and professional judgement.
- 12.3.4 The WebTAG methodology takes into account the importance and magnitude of predicted impacts on the water environment. Importance is based on the value of the feature or resource (see Table 12.1), while the magnitude of a potential impact is estimated based on the degree of impact and is independent of the importance of the feature (see Table 12.2).

12.3.5 The basic approach to assessing the impacts of the Proposed Development on water receptors 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, at the scale at which it matters; and
- Substitutability requires consideration of whether water attributes are replaceable over a given time frame.

Table 12.1: Importance of Water Feature or Resource (modified from WebTAG Unit 3.3.11)

| Importance | Criteria | Examples |
|------------|--|--|
| Very high | Attribute with a high quality and rarity, regional or national scale and limited potential for substitution. | <p>Water resources: Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and $Q95 \geq 1.0m^3/s$ Source Protection Zone (SPZ) 1 within a Principal Aquifer Water abstraction: $>1,000m^3/day$</p> <p>Receptors to flood risk: essential infrastructure or highly vulnerable development*</p> |
| High | Attribute with a high quality and rarity, local scale and limited potential for substitution or attribute with a medium quality and rarity, regional or national scale and limited potential for substitution. | <p>Water resources: Watercourse having a WFD classification as shown in a RBMP, and $Q95 < 1.0m^3/s$ Principal Aquifer (not within SPZ 1) [Cyprinid or Salmonid fishery] Water abstraction: $500-1,000m^3/day$</p> <p>Receptors to flood risk: more vulnerable development*</p> |
| Medium | Attribute with a medium quality and rarity, local scale and limited potential for substitution or attribute with a low quality and rarity, regional or national scale and limited potential for substitution. | <p>Water resources: Watercourse detailed in the Digital River Network** but not having a WFD classification as shown in a RBMP; Secondary Aquifer Water abstraction: $50-499m^3/day$</p> <p>Receptors to flood risk: less vulnerable development*</p> |
| Low | Attribute with a low quality and rarity, local scale and limited potential for substitution. | <p>Water resources: Surface water sewer, agricultural drainage ditch; non-aquifer Water abstraction: $<50m^3/day$</p> <p>Receptors to flood risk: water compatible development*</p> |

| Importance | Criteria | Examples |
|------------|----------|----------|
|------------|----------|----------|

* As defined in Table 2 of the Flood Risk section of the PPG (Ref. 12-22)

** Digital River Network is a dataset that comprises river centrelines which has been digitised from OS 1:50,000 mapping. It consists of rivers; canals; surface pipes (man-made channels for transporting water such as aqueducts and leats); and miscellaneous channels (including estuary and lake centrelines and some underground channels).

- 12.3.6 Professional judgement is applied when assigning an importance category to all water features. The WFD status of a watercourse is not an overriding factor and in many instances, it may be appropriate to upgrade a watercourse which is currently at poor or moderate status to a category of higher importance, to reflect its overall value in terms of other attributes and WFD targets for the watercourse. Likewise, just because a watercourse may currently be below Good Ecological Status (GES), this does not mean that a poorer quality discharge can be emitted. All controlled waters are protected from pollution under the Water Resources Act 1991 and future WFD targets also need to be considered.
- 12.3.7 For an impact on water quality to exist, it is necessary for a pollution linkage to be identified. Specifically this requires:
- A source of pollution (for the purposes of this assessment, defined as the introduction of chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or cause damage to the natural environment or built environment);
 - A receptor that is sensitive to that pollution; and
 - A pathway by which the two are linked (i.e. completing a Source-Pathway-Receptor model).
- 12.3.8 This model identifies the potential sources or 'causes' of impact before describing their nature and quantifying them where possible, as well as identifying and evaluating the receptors (water resources) that could potentially be affected. However, the presence of a potential impact source and a potential receptor does not always infer an impact; there must also be a clear mechanism or 'pathway' via which the source can affect the receptor. For example, spillage of a contaminant on an area of hard standing within a development site would not necessarily reduce the quality of an adjacent watercourse, unless there is a pathway whereby it can travel to the watercourse (such as a surface water drain within the hard standing area).
- 12.3.9 The first stage in applying the Source-Pathway-Receptor model is to identify the causes or 'sources' of potential impact from a development. The impact sources have been identified through a review of the details of the Proposed Development, including the size and nature of the development and potential construction methodologies and timescales. This has been undertaken in the context of local conditions relative to water resources near and hydrologically connected to the Site, such as topography, geology, climatic conditions and potential sources of contamination.
- 12.3.10 The next step in the model is to undertake a review of the potential receptors, that is, the water resources themselves that have the potential to be affected. The identification of potential water resource receptors has been undertaken through the review of baseline data.

12.3.11 The last stage of the model is therefore to determine if there is a viable exposure pathway or a 'mechanism' linking the source to the receptor. The identification of sources and receptors is set out in the baseline section below and pathways are identified in the impact and effect section which highlights potential pathways that may lead to an impact on water quality.

12.3.12 Impacts may be adverse or beneficial, depending on the circumstances. Impacts are quantified where practicable and the degree or magnitude of impact is assessed on a qualitative scale, to facilitate comparison with impacts on other environmental receptors. The four-point scale used is described in Table 12.2.

Table 12.2: Magnitude of potential impacts

| Magnitude | Impact | Description |
|-----------|---|---|
| High | Adverse: loss of an attribute and/or quality and integrity of an attribute | Decrease in surface water ecological or chemical WFD status or groundwater qualitative or quantitative WFD status. Change in flood risk to receptor from low or medium to high risk. |
| | Beneficial: creation of new attribute or major improvement in quality of an attribute | Increase in productivity or size of fishery; increase in surface water ecological or chemical WFD status; increase in groundwater quantitative or qualitative WFD status. Change in flood risk to receptor from high to low. |
| Medium | Adverse: loss of part of an attribute or decrease in integrity of an attribute | Measurable decrease in surface water ecological or chemical quality, or flow; reversible change in the yield or quality of an aquifer; such that existing users are affected, but not changing any WFD status. Change in flood risk to receptor from low to medium. |
| | Beneficial: moderate improvement in quality of an attribute | Measurable increase in surface water quality or in the yield or quality of aquifer benefiting existing users but not changing any WFD status. Change in flood risk to receptor from medium to low. |
| Low | Adverse: some measurable change to the integrity of an attribute | Measurable decrease in surface water ecological or chemical quality, or flow; decrease in yield or quality of aquifer; not affecting existing users or changing any WFD status. Change in flood risk to receptor from no risk to low risk. |
| | Beneficial: measurable increase, or reduced risk of negative effect to an attribute | Measurable increase in surface water ecological or chemical quality; increase in yield or quality of aquifer not affecting existing users or changing any WFD status. Change in flood risk to receptor from low risk to no risk. |
| Very low | No change to integrity of attribute | Negligible change discharges to watercourse or changes to an aquifer which lead to no change in the attribute's integrity. |

12.3.13 In the context of the Proposed Development, short-term effects are considered to be those associated with the construction and decommissioning phases and which

cease when construction or decommissioning works are completed; long-term effects are those associated with the completed, operational Proposed Development and which last for the duration of the operational phase. Effects may also be permanent (irreversible) or temporary (reversible) and direct or indirect.

- 12.3.14 Effects on areas on the scale of the NLC (or similar scale, across local authority boundaries) are considered to be at a regional level, whilst effects that cover different parts of the country, or England as a whole, are considered being at a national level. Smaller scale effects (to the Site or neighbouring sites) are considered to be at a local level.
- 12.3.15 Potential effects are classified by considering both the importance of the feature and the magnitude of the impact, using the matrix illustrated in Table 12.3.

Table 12.3: Classification of effects

| Magnitude of impact | Sensitivity/ importance of receptor | | | |
|---------------------|-------------------------------------|------------|------------|------------|
| | Very high | High | Medium | Low |
| High | Major | Major | Moderate | Minor |
| Medium | Major | Moderate | Minor | Negligible |
| Low | Moderate | Minor | Negligible | Negligible |
| Very low | Minor | Negligible | Negligible | Negligible |

- 12.3.16 This chapter considers that major or moderate effects are significant for the purposes of the EIA Regulations, in accordance with standard EIA practice.

Extent of Study Area

- 12.3.17 The Site is described in Chapter 3: Site Description and encompasses the land required for the construction and operation of the Proposed Development and associated connections. The Main OCGT Power Station Site occupies a total area of approximately 2.0 ha of undeveloped land.
- 12.3.18 The Existing Pipeline Route consists of a corridor of land around an existing gas pipeline between the proposed AGI Site and an existing AGI connecting this pipeline to the NG gas network at Feeder 9. This Existing Pipeline Route is proposed to be used to supply gas fuel to the Proposed Development via the infrastructure described above.
- 12.3.19 The Applicant may seek powers of compulsory acquisition in the DCO over the Existing Pipeline Route so as to secure the ability to operate and maintain the existing gas pipeline. As this does not represent new infrastructure and no works are proposed to the pipeline, the environmental effects are expected to be minimal. Where environmental effects are identified, they are discussed in the assessment however; this assessment is predominantly focused on the Main OCGT Power Station Site, Proposed Gas Connection and Construction Laydown areas.

12.3.20 This assessment considers water bodies that are hydrologically connected with the Site and where impacts from the Proposed Development may have an effect, based on available data. The assessment considers watercourses within an area spanning from immediately upstream of the Site, to as far downstream as a potential impact may influence the quality or quantity of the watercourse.

Sources of Information/Data

12.3.21 In order to identify and characterise the surface water and groundwater receptors considered as part of this assessment, available data on surface water and groundwater quality and quantity within the vicinity of the Site have been obtained. A number of sources of information and websites have been consulted, including:

- Ordnance Survey maps;
- Multi-Agency Geographical Information for the Countryside (MAGIC) website (Ref 12-25);
- Environment Agency website (Ref 12-26);
- Humber River Basin Management Plan (RBMP) (Ref 12-27);
- Groundsure Report (see Appendix 11A (PEI Report Volume III));
- The Environment Agency was consulted and provided data on water, uses of groundwater, surface water features (potable water sources, fisheries, consented discharges etc.), groundwater quality and RBMP status and objectives;
- NLC & NELC Strategic Flood Risk Assessment (Ref 12-28);
- NLC Preliminary Flood Risk Assessment (Ref 12-29); and
- A walkover of the study area by ecologists and land contamination specialists (undertaken in September 2017) to identify, locate and describe water resource receptors. Further information is outlined in Chapter 9: Ecology and Chapter 11: Ground Conditions and Hydrogeology

12.4 Consultation

12.4.1 A summary of consultation undertaken to date relevant to this Chapter is given in Table 12.4 below.

Table 12.4: Consultation summary table

| Consultee | Date (method of consultation) | Summary of consultee comments | Summary of response/ how comments have been addressed |
|--------------------------|-------------------------------|--|---|
| Secretary of State (SoS) | Scoping Opinion (July 2018) | <ul style="list-style-type: none"> It is not clear from the Scoping Report whether a specific WFD assessment is proposed. The Proposed Development is in proximity to the River Humber which is a WFD waterbody. The Applicant's attention is drawn to the Inspectorate's Advice Note 18: The Water Framework Directive. Any significant effect to the River Humber should be assessed in the ES. Figure 5 of the Scoping Report presents the Proposed Development in the context of the Environment Agency Flood Zones. However, the figure does not include the existing underground gas pipeline connection and the existing underground gas pipeline is not referenced within the Scoping Report. Figures within the ES should depict the entirety of the Proposed Development and cross refer to such figures in the text. The ES should clearly state if and how waterbodies (including groundwater) will be monitored throughout the construction, operation, and decommissioning phases to ensure potential significant effects such as physical and chemical changes to the waterbodies will be identified. The ES should describe the locations of the waterbodies/ watercourses that will be assessed and present a justified study area that reflects the anticipated significant effects. | <p>As there are no works directly affecting the local watercourses a standalone WFD Assessment has not been completed, but a summary of Potential Impacts on WFD Status is included in Section 12.7 – Likely Impacts and Effects.</p> <p>Figures within the wider ES show the entirety of the Proposed Development. Further information with regards the location of Flood Zones and the location of the existing underground gas pipeline connection in Flood Zone 1 are provided in Section 12.5 Baseline Conditions and the FRA (Appendix 12A, PEI Report Volume III).</p> <p>Information with regards waterbodies (including groundwater) and required monitoring throughout the construction, operation, and decommissioning phases is outlined in Section 12.6 Development Design and Impact Avoidance. Further information on groundwater is outlined in Chapter 11: Ground Conditions and Hydrogeology</p> <p>Figure 12.1 DCO PEIR Volume II presents the location of the identified waterbodies/ watercourses that have been assessed. Section 12.5 Baseline Conditions sets out further information with regards to the study area.</p> |

| Consultee | Date (method of consultation) | Summary of consultee comments | Summary of response/ how comments have been addressed |
|--------------------|-------------------------------|--|--|
| Environment Agency | Scoping Opinion (July 2018) | <p>It is not clear from the Scoping Report, which section of the EIA will consider the risks to water quality. Reference is made within 6.8 to construction and decommissioning potentially impacting water quality. In Chapter 8 - Environmental Impact Assessment Scope and Process however, water quality has not been included as a technical discipline.</p> <p>The EIA must consider the risks to water quality and mitigation of these risks in detail. This could be in the form of a Water Framework Directive (WFD) assessment, and include explanation of how the proposed development could affect the relevant water bodies in the River Basin Management Plan, and how they propose to mitigate any potential impacts.</p> | <p>Risks to water quality are assessed within this chapter and, where required, mitigation for the Proposed Development for the construction, operation and decommissioning phases are outlined in Section 12.6 – Development Design and Impact Avoidance.</p> <p>As there are no works directly affecting the local watercourses a standalone WFD Assessment has not been completed, but a summary of Potential Impacts on WFD Status is included in Section 12.7 – Likely Impacts and Effects.</p> |
| | | <p>The Scoping Report states that the study area will be 5km around the site. The site is located within the Catchment of the North Beck Drain, reference GB104029067575, with the Catchment of the Skitter Beck/East Halton Beck, reference GB104029067655, being within 5km of the North/North-West of the site - however, these are not mentioned within the Scoping Report.</p> | <p>The Surface Water, Flood Risk and Drainage Chapter considers only those water bodies that are hydrologically connected with the Site and where impacts from the Proposed Development may have an effect, as identified in Table 12-5...</p> |
| Environment Agency | Scoping Opinion (July 2018) | <p>The EIA will also need to cover requirements for foul water disposal and water resources. Any abstractions or discharges during construction and operation of the site will be subject to agreements (in the form of permits and discharges consents) from the Environment Agency and it would be prudent to start considering these now</p> | <p>Foul water disposal and water resources are considered within this Chapter</p> |

| Consultee | Date (method of consultation) | Summary of consultee comments | Summary of response/ how comments have been addressed |
|--------------------|-------------------------------|---|--|
| Environment Agency | Scoping Opinion (July 2018) | <p>The Scoping Report acknowledges that the EIA will need to include a detailed flood risk assessment (FRA), which complies with the requirements of (section 5.7 of) the National Policy Statement for Energy (EN-1). This will need to take into account the potential impacts of climate change using the latest UK Climate Projections available at the time the EIA is prepared (see EN-1, paragraphs 4.8.5 – 4.8.13). In accordance with this, all critical elements should be set above an appropriate level, based on the high emissions scenario (high impact, low likelihood).</p> <p>The FRA should consider all sources of flooding, which may include tidal, fluvial, ground water, drainage systems, reservoirs, canals and ordinary watercourses. The FRA should demonstrate that the proposal will be safe for the lifetime of the development, without increasing risk elsewhere and where possible reducing flood risk overall. The FRA should also provide evidence that appropriate mitigation measures including flood resilience techniques have been incorporated into the development.</p> <p>The FRA should identify the vulnerability classification of the proposal, the expected lifetime of the development and whether not the site needs to remain operational in a flood event.</p> | <p>Flood risk from all potential sources has been assessed within the supporting FRA - Appendix 12A (ES Volume III) which also details the impact of climate change, identifies the development vulnerability and lifetime of the development and relevant mitigation.</p> |

| Consultee | Date (method of consultation) | Summary of consultee comments | Summary of response/ how comments have been addressed |
|-----------------------|-------------------------------|--|--|
| Public Health England | Scoping Opinion (July 2018) | <p>When considering a baseline (of existing water quality) and in the assessment and future monitoring of impacts these:</p> <ul style="list-style-type: none"> • Should include assessment of potential impacts on human health and not focus solely on ecological impacts; • Should identify and consider all routes by which emissions may lead to population exposure (e.g. surface watercourses; recreational waters; sewers; geological routes etc.); • Should assess the potential off-site effects of emissions to groundwater (e.g. on aquifers used for drinking water) and surface water (used for drinking water abstraction) in terms of the potential for population exposure; • Should include consideration of potential impacts on recreational users (e.g. from fishing, canoeing etc.) alongside assessment of potential exposure via drinking water. | <p>Impacts on human health (workforce and population) are assessed in detail within Chapter 11: Ground Conditions and Hydrogeology.</p> <p>Impacts on recreational users, emissions to groundwater and surface water and human health are also summarised, where required, within Section 12.7 – Likely Impacts and Effects.</p> |

12.5 Baseline Conditions

Existing Baseline

Topography

- 12.5.1 A topographic survey of the Main OCGT Power Station Site indicates the site slopes from north to south and from north west to south east, with levels ranging from approximately 5.86m (Above Ordnance Datum (AOD)) to 3.94m AOD. Localised areas of higher land (thought to be spoil stored on site with maximum ground levels of 6.3m AOD) are present within the Main OCGT Power Station Site boundary to the south and south east
- 12.5.2 Spot levels on OS mapping show ground levels at the junction of Rosper Road and Station Road, to the north of the Site, are approximately 6m AOD whilst at the junction of Rosper Road and Marsh Lane, to the south east of the Site ground levels are approximately 4m AOD.
- 12.5.3 Ground levels are shown to increase from east to west in the general area.

Drainage

- 12.5.4 As the Site is previously undeveloped there are no sewer assets within the Main OCGT Power Station Site, Gas Connection or Laydown Areas. As such, it is considered that the area drains via natural processes, overland flow and infiltration to ground.
- 12.5.5 It is likely that surface water and foul sewers, owned by Anglian Water, are present in the wider area surrounding the Site. Strategic sludge and brine mains are also located in proximity to the Site, running adjacent to Rosper Road.
- 12.5.6 Localised areas of marsh and surface water ponding are present within the Main OCGT Power Station Site boundary suggesting that drainage is impeded by ground conditions.
- 12.5.7 It is considered that surface water from the Main OCGT Power Station Site ultimately drains to the unnamed drain along the east boundary of the Main OCGT Power Station Site adjacent to Rosper Road, the drain located between the Main OCGT Power Station Site, the existing VPI CHP plant and the NELIDB drain, known as Watercourse 9A, located to the east and south of the existing VPI CHP plant.

Identified Surface Waterbodies

- 12.5.8 Table 12.5 below lists the surface waterbodies identified in the vicinity of the Site.

Table 12.5: Identified surface waterbodies

| Watercourse | Location | Assessment Grouping |
|---|---|--|
| Unnamed Drainage Ditch | Running east to west through the corridor of land between the Main OCGT Power Station Site and the existing VPI CHP plant. | Local Land Drains within and adjacent to the Site. |
| Unnamed Drainage Ditch | Running parallel with and adjacent to the eastern Main OCGT Power Station Site boundary and Rosper Road. | |
| Unnamed Local Land Drain | Running parallel with and directly adjacent to the Access Area and approximately 105m to the north of the Main OCGT Power Station Site boundary. | |
| Unnamed Local Land Drain | Running from north to south approximately 138m to the west of the Main OCGT Power Station Site boundary. | |
| Series of land drains | Approximately 129m to the west of the Site | Wider Drainage Network |
| Series of land drains | Approximately 145m to the north of the Site | |
| Watercourse 9A (North East Lindsey IDB drain) | Located directly adjacent to the south-south west corner of the AGI (south drain) and to the east of the New Gas Pipeline Route adjacent and parallel to Rosper Road (north drain). | NELIDB Watercourses |
| Watercourse 9 (North East Lindsey IDB drain) | Located to the east of Rosper Road approximately 23m from the New Gas Pipeline Route to the east of the existing VPI CHP plant. | |
| Watercourse 8G (North East Lindsey IDB drain) | Crossed by the existing pipeline route south of Manor Farm in South Killingholme | |
| Humber Estuary (Humber Lower) | Approximately 1.4 km east of the Main OCGT Power Station Site. | Humber Lower |
| Water Storage Lagoon | Approximately 160m west of the Main OCGT Power Station Site. | Other Water Features |
| Settling Lagoon | Approximately 175m south west of the Main OCGT Power Station Site. | |
| Rosper Road Pools | Approximately 659m to the south east of the New Gas Pipeline Route. | Rosper Road Pools |

12.5.9 These are shown on Figure 12.1 (PEI Report Volume II) and are discussed in turn in the sections below.

Local Land Drains Adjacent to the Site

- 12.5.10 Local land drains are located within the Site and adjacent to the east, south and west Site boundaries.
- 12.5.11 The land drain located adjacent to the Construction Laydown Area to the west of the Main OCGT Power Station Site runs from west to east parallel with the access road towards Rosper Road. The drain is stopped up and has no hydrological connection to local land drains in the surrounding area. The drain receives surface water from the access road and car park surface water drainage system. Surface water is stored within the ditch and drains via infiltration and evaporation. Although the drain is not connected to the surrounding land drainage system, there is a direct hydrological connection with the Site via runoff from the access road.
- 12.5.12 To the east of the Main OCGT Power Station Site, a small land drain flows south from the vicinity of the access area road junction with Rosper Road. The ditch was found to be entirely dry at the time of the site survey and does not appear to regularly hold water. It is assumed that a confluence is formed with Watercourse 9A to the south. As the drain is located in close proximity to the access road junction with Rosper Road it is considered that there is a direct hydrological connection to the ditch, albeit this may be seasonal, via surface water runoff/ drainage.
- 12.5.13 The land drain located between the Main OCGT Power Station Site and the existing VPI CHP plant flows generally east from the Settling Lagoons, located 90m south west of the Site, towards Rosper Road and it is assumed a confluence is formed with Watercourse 9A is (located to the east and south of the site) adjacent to the highway. An outfall into the ditch from the Lindsey Oil Refinery is present to the south-western of the Main OCGT Power Station Site. It is also likely that the ditch receives greenfield runoff from the Main OCGT Power Station Site and therefore has a direct hydrological connection with the Proposed Development.
- 12.5.14 A small land drain located approximately 140m from the Main OCGT Power Station Site western boundary flows from north to south and passes beneath access road and tracks to the west of the Site via culverted sections. The drain eventually flows from east to west away from the Site. As ground levels increase in elevation from the Site towards the west it is unlikely there are any preferential drainage pathways from the Site to this ditch.
- 12.4.1 The Site has direct hydrological connectivity with the land drainage ditches to the north, east and south of the Site. Based on observations during site walkovers, these drains contain low volumes of slow-moving water and are densely vegetated. Given the local topography, it is considered that there is no direct hydrological connection from the Site to the land drainage ditch to the west. This land drainage is therefore not considered further in this assessment.

NELIDB Watercourses

- 12.5.15 Watercourse 8G, a NELIDB maintained drain, is crossed by the existing pipeline corridor south of Manor Farm, South Killingholme. The watercourse flows in a generally easterly direction discharging into the Humber Estuary south of Immingham Dock.

- 12.5.16 Watercourse 9A is formed from two small drains forming a 'v' shape. The northern drain is located to the west of Rosper Road, and flows south running parallel with the road and the eastern boundary of the Proposed Gas Connection. The southern drain is located directly adjacent to the south- south west corner of the proposed Above Ground Installation (AGI) and flows west towards Rosper Road where it meets the northern drain.
- 12.5.17 Watercourse 9 is located to the east of the existing VPI CHP plant and Rosper Road and flows south, parallel with the road. The watercourse continues to flow south towards Humber Road where it turns generally east flowing to the north of the Port of Immingham. The watercourse discharges to the Humber Estuary via sluice gates at South Killingholme Haven.
- 12.5.18 It is considered, given the proximity to the Site, that Watercourse 9A has a direct hydrological connection with the Site. The remaining NELIDB watercourses have an indirect hydrological connectivity with the Site via the land drains located to the east of the Site and within the Site boundary.

Wider Land Drainage Network

- 12.5.19 A series of land drains are located to the north and west of the Site and form part of the wider land drainage network in the area.
- 12.5.20 Based on aerial imagery, mapping available via the IDB and discussions with the client it is considered that the Site is not hydrologically connected to this wider drainage network and therefore these water features are not considered further in this assessment.

Humber Lower

- 12.5.21 The Humber Estuary is split into three waterbodies by the Environment Agency. These are the Upper Humber (Trent Falls to the Faxfleet Ness), the Middle Humber (Faxfleet Ness to Goxhill Haven), and the Lower Humber (Goxhill Haven to Spurn Point). The Site and surrounding area watercourses naturally drain and outfall to the Humber Lower waterbody, which has been considered in this assessment.
- 12.5.22 The Humber Estuary has a large tidal range (7.2 m), due to its position within the North Sea basin, producing a mean spring tidal range of 5.7 m at Spurn. The tidal range is amplified as it propagates up the Estuary; being 7.4 m at Salt End, and 6.9 m at Hessle (being 45 km inland). It is because of these large tidal ranges that the Humber is classified as a macro-tidal Estuary.
- 12.5.23 The Estuary has high suspended sediment content, derived from the eroding boulder clay cliffs along the Holderness coast, but also from riverine sediments. Within the vicinity of the Site, the Humber Estuary is not classified for bathing water quality. The nearest bathing water monitoring point is at Cleethorpes (approximately 16km southeast of the Site), which achieved 'higher' bathing water quality standards in 2012, and has consistently reached 'higher' bathing water quality since 2002 with the exception of 2007 (when 'minimum' bathing water quality was recorded).
- 12.5.24 It is considered that the Humber Lower has an indirect hydrological connectivity with the Site via the NELIDB Watercourses 8G, 9 and 9A.

Other Water Features

- 12.5.25 There are two surface water features, a water storage lagoon, and settling lagoons, located beyond the Site boundary to the west and south west.
- 12.5.26 The water storage lagoon is located within the Lindsey Oil Refinery site boundary and was inaccessible at the time of the walkover survey (September 2017). This is understood to be an attenuation pond for surface water run off from that site.
- 12.5.27 The water storage lagoon receives water from a piped drainage system that drains surface water from the built development located to the north of the Proposed Development. The piped drainage passes below ground to the west of the Site boundary, running north to south, to the water storage lagoon.
- 12.5.28 The settling lagoons are artificial structures containing stagnant water and are part of the industrial processes within the oil refinery, and as such are likely to be periodically emptied and/ or maintained. The settlement lagoons receive pass forward flow from the water storage lagoon and a further drainage connection enters the settling lagoons from the west. Water from the settling lagoons discharges directly into the land drainage ditch that runs from west to east between the Main OCGT Power Station Site and the VPI CHP plant.
- 12.5.29 There is no direct hydrological connection from the Site to either the water storage lagoon or settling lagoons therefore these features are not considered further in this assessment.

Rosper Road Pools

- 12.5.30 Rosper Road Pools, an Artificial Flood Relief Reservoir, are located to the south east of the Site, to the east of Rosper Road. This surface water feature has an indirect hydrological connectivity with the Site via Watercourse 9 and 9A.

Surface Water Quality

- 12.5.31 The classification of waterbodies is reported in the 2015 cycle of the RBMP. The Humber RBMP (Ref 12-27) assesses the pressures facing the water environment in the Humber river basin district and lists actions to address them. The Humber RBMP is in the second iteration of a series of six-year planning cycles and will be updated in 2021.
- 12.5.32 Some surface water bodies are designated as 'artificial' or 'heavily modified'. This is because they may have been created or modified for a particular use such as water supply, flood protection, navigation or urban infrastructure.
- 12.5.33 According to the Humber RBMP, artificial and heavily modified waterbodies are not able to achieve natural conditions. Instead the classification and objectives for these waterbodies, and the biology they represent, are measured against 'ecological potential' rather than status. For an artificial or heavily modified waterbody to achieve good ecological potential, the chemistry must be good. Chemical status is assessed by compliance with the environmental standards for chemicals that are listed in the Priority Substances Directive 2008/105/EC, which is a 'daughter' directive of the WFD. Chemical status is recorded as either 'good' or 'fail', in terms of whether the chemical status is compliant with environmental standards.

12.5.34 In addition, any modifications to the structural or physical nature of the waterbody that harm biology must only be those essential for its valid use. All other such modifications must have been altered or managed to reduce or remove their adverse impact, so that there is the potential for biology to be as close as possible to that of a similar natural waterbody. Often though, the biology will still be impacted and biological status of the waterbody may be less than good. The ecological status takes into account physio-chemical elements, biological elements, specific pollutants and hydromorphology. Further ecological assessments of effects for the Humber Estuary are included in Chapter 9 Ecology.

Local Land Drains adjacent to and within the Site

12.5.35 The local land drains located directly adjacent and in close proximity to the Site are not classified under the WFD and no water quality information is provided within the Humber RBMP. The Environment Agency and the NELIDB does not currently hold any water quality data for any of these local land drains.

12.5.36 Given that the surface water features are not detailed in the Digital River Network and do not have a WFD classification as shown in the RBMP (see Table 12.2), these features are considered to be water resource receptors of low importance with respect to water quality.

NELIDB Watercourses

12.5.37 The NELIDB watercourses (Watercourse 8G, 9 and 9A) are not classified under the WFD and no water quality information is provided within the Humber RBMP. The Environment Agency and the NELIDB does not currently hold any water quality data for any of the NELIDB watercourses.

12.5.38 Given that the watercourses are detailed in the Digital River Network but do not have a WFD classification as shown in a RBMP (see Table 12.2), the NELIDB watercourses and their associated tributaries are considered to be water resource receptors of medium importance with respect to water quality.

Humber Lower

12.5.39 The stretch of the Humber Estuary nearest to the Site (defined in the WFD as 'GB530402609201 – Humber Lower') is classified as a transitional water and a heavily modified watercourse due to flood protection and navigation modifications.

12.5.40 The Humber RBMP Cycle 2 (2016) classifies the Humber Lower water body as currently being at moderate ecological potential, and a fail for chemical status. As such, the current overall potential is moderate, with an objective of maintaining moderate overall potential by 2027.

12.5.41 The reasons cited for the continued failure of the water body to meet its WFD objectives include disproportionate cost and technical infeasibility.

12.5.42 A number of mitigation measures relating to port activities are already 'in place' within the Humber Lower water body, these include:

- Manage disturbance;

- Site selection (dredged material disposal), e.g. to avoid sensitive areas;
- Sediment management;
- Reduce sediment resuspension;
- Reduce impact of dredging; and
- Prepare a dredging/ disposal strategy.

12.5.43 Based on the attributes presented in Table 12.2, the Humber Lower is considered to be a water resource receptor of very high importance with respect to water quality.

Rosper Road Pools

12.5.44 The Rosper Road Pools are not classified under the WFD and no water quality information is provided within the Humber RBMP.

12.5.45 The Rosper Road Pools are detailed in the Digital River Network but do not have a WFD classification as shown in the RBMP (Table 12.2), the Pools are therefore considered to be a water resource receptor of medium importance with respect to water quality.

Surface Water Abstractions

12.5.46 Information from the Groundsure Report (included within Appendix 11A: Phase I Geoenvironmental Site Assessment (ES Volume III)) indicates there are no surface water abstractions for potable water within a 2km radius of the Site. The impact of the Proposed Development on water supply from the identified watercourses is therefore not considered further in this assessment.

Discharges to Surface Water

12.5.47 Information from the Groundsure Report indicates there are four Licensed Discharge Consent records within a 0.5km radius of the Site. Of these, all but one licence are listed as 'revoked'. The active consent for the Lindsey Oil Refinery is for sewage discharge to the local land drain to the north east of the Site.

12.5.48 Pollution incidents are classified by the Environment Agency on the degree of Environment Agency manpower deployed (i.e. large, small) and likely environmental impact with regard to air, water and land. Incidents are classified as category 1 (major), 2 (significant), 3 (minor) or 4 (insignificant).

12.5.49 There have been no Category 1 (major), one category 2 (significant) and one Category 4 (minor) incidents within 500m of the Proposed Development in the last 16 years that had the potential to affect water quality.

12.5.50 The principal pollution incident for water quality occurred in December 2004 and is noted as Oils and Fuel – Crude Oil.

12.5.51 None of the recorded incidents are considered serious enough to have affected current baseline water quality, either temporarily, or in the long-term; either due to the historical nature of the incident or the classified category. Therefore they are not taken into account when describing the baseline conditions for the Proposed Development.

Designation and Biodiversity

- 12.5.52 The Humber Lower contains a number of sites designated at the National, European and International levels for nature conservation importance. The Estuary is a Site of Special Scientific Interest (SSSI), a Special Protection Area (SPA), a Special Area of Conservation (SAC) and a Ramsar site.
- 12.5.53 As well as these designations under the Habitats and Birds Directives, the Lower Humber is also designated under the Bathing Water Directive, Freshwater Fish Directive, Nitrates Directive, Shellfish Water Directive and the Urban Waste Water Treatment Directive (Ref 12-27).
- 12.5.54 The Humber Estuary is a designated fishery and is used by migrating freshwater species to reach upstream spawning grounds. The Estuary also has an ecological classification under the WFD and, therefore, is considered to be a water resource of very high importance with regard to biodiversity.
- 12.5.55 There are four non-statutory nature conservation designations within 1km of the Site as listed below:
- Eastfield Road Railway Embankment Local Wildlife Site (LWS), located 1km west of the Site;
 - Burkinshaw's Covert LWS, located 0.4km north of the Site;
 - Station Road Field LWS, located 0.4km north of the Site; and
 - Rosper Road Pools LWS, located 0.7km south of the Site.
- 12.5.56 Further details of the LWSs are summarised in Chapter 9: Ecology.
- 12.5.57 With the exception of the Humber Lower, all the identified watercourses/surface water features within the study area have no ecological classification under the WFD.
- 12.5.58 A site walkover undertaken as part of the preliminary ecological appraisal (as outlined in Chapter 9: Ecology) identifies the study area as having potential for great crested newts, water vole, brown hare and ground nesting birds. Given this information, the local land drains adjacent to the Site and the NELIDB watercourses are considered to be of medium importance with regard to biodiversity.
- 12.5.59 The Rosper Road Pools LWS has an indirect hydrological connection with the Proposed Development and supports many breeding, wintering and migrant birds, associated with both wetland and scrubby habitat. Water vole was recorded at the LWS in 2002, and the fauna as a whole is likely to be rich. The Rosper Road Pools (Other Water Features) is therefore considered to be a water resource of high importance with regard to biodiversity.

Recreation

- 12.5.60 The Humber Estuary has a number of recreational functions, including for sailing, bird and seal watching and a number of footpaths and bridleways exist adjacent to the banks of the Estuary. Given this information, it is considered that the Humber Lower is a water resource of high importance with regard to recreation.

- 12.5.61 There is no public access to the land drains adjacent to the Site, therefore, these water resources are considered to be of low importance with regard to recreation.
- 12.5.62 As access is possible along the NELIDB watercourses these water resources are therefore considered to be of medium importance with regard to recreation.
- 12.5.63 The Rosper Road Pools is managed for its ornithological interest and its main recreational function is for birdwatching. The Rosper Road Pools (Other Water Features) are therefore considered a water resource of high importance with regard to recreation.

Flood Risk

- 12.5.64 The importance of receptors in the context of flood risk relates to the NPPF vulnerability classification for land uses potentially affected by any changes in flood risk as a result of the Proposed Development. Potential receptors could therefore be occupiers or users of the Proposed Development itself, as well as users or occupiers of land outside of the Site boundary that could be affected by changes to flood risk resulting from the Proposed Development. The receptor importance is therefore defined independently of the sources of flood risk.
- 12.5.65 The NPPF considers the vulnerability of different forms of development to flooding and classifies proposed uses accordingly. The Proposed Development is considered as 'Essential Infrastructure' in terms of the NPPF vulnerability classification and as such it is assigned as a receptor of very high importance. The vulnerability and hence importance of receptors elsewhere has been defined where flood risk impacts have the potential to occur
- 12.5.66 An FRA has been undertaken (see Appendix 12A – Flood Risk Assessment in PEI Report Volume III) to ascertain if the Site is at risk of flooding or if the development of the Site would cause an increase in the off-site flood risk. The FRA has been prepared in accordance with NPS EN-1, NPPF and supporting PPG. A summary of the identified flood risk for the Proposed Development is as follows:
- The predominant source of flood risk on the Site is associated with tidal flooding from the Humber Estuary located approximately 1.4km to the east of the Site;
 - The Main OCGT Power Station Site, Gas Connection and Construction Laydown Areas are located entirely within Flood Zone 3a (high risk);
 - The proposed Site access areas to the north of the Main OCGT Power Station Site is located predominantly within Flood Zone 3a (high risk), however a small area of the access area, to the north west boundary, is located in Flood Zone 2 (medium risk) and Flood Zone 1 (low risk);
 - The existing gas pipeline is located in Flood Zone 3a (high risk) in the vicinity of the existing VPI CHP plant. To the west of the Proposed Development the existing gas pipeline route is located predominantly in Flood Zone 1 (low risk);
 - The temporary construction laydown area to the north west of the Main OCGT Power Station Site is located entirely within Flood Zone 1 (low risk);

- The Site is located in an area that benefits from flood defences offering a standard of protection up to, and including, a 0.5% (1 in 200 year) storm event, based on the Still Water Tidal Water Levels;
- The risk of flooding from fluvial, groundwater, surface water, artificial watercourses and drainage infrastructure sources is assessed as low; and
- There remains a low residual risk of flooding to the Site from overtopping or a breach of the flood defences and from failure or exceedance of the surface water drainage system.

12.5.67 The FRA (Appendix 12A, PEI Report Volume III) serves to demonstrate that the Proposed Development will remain safe during its lifetime and will not increase flood risk elsewhere and is, therefore, considered to be acceptable in flood risk terms.

Summary of Baseline Conditions and Importance of Existing Resource

12.5.68 Only surface watercourses in close proximity (hydraulic connectivity) to the Site and with the significant potential to be affected by the Proposed Development have been considered further within this impact assessment.

12.5.69 Table 12.6 describes the importance of the waterbodies in the vicinity of the Proposed Development.

Table 12.6: Summary of receptor and importance values.

| Receptor | Attributes | Importance |
|---|--|------------|
| Surface water | | |
| Local Land Drains within and adjacent to the Site | Water quality | Low |
| | Recreation/ other uses | Low |
| | Biodiversity | Medium |
| NELIDB Watercourses | Water quality | Medium |
| | Recreation/ other uses | Medium |
| | Biodiversity | Medium |
| Humber Lower | Water quality | Very high |
| | Recreation/ other uses | High |
| | Biodiversity | Very High |
| Rosper Road Pools | Water quality | Medium |
| | Recreation/ other uses | High |
| | Biodiversity | High |
| Flood risk | | |
| The Proposed Development Site | Flood risk receptors (Vulnerability Classification – Essential Infrastructure) | Very high |

Future Baseline

No Proposed Development (2019-2022)

12.5.70 Baseline conditions throughout 2019-2022 are not expected to be significantly different from current baseline conditions outlined above.

Surface Water Quality

- 12.5.71 In respect of water quality, the WFD is driving improvements in waterbodies, but the deadline for the Humber Lower to achieve 'good' ecological and chemical potential is 2027, and it is not anticipated that significant progress will have been made by 2022. The future 'no proposed development' baseline (2021) is therefore assessed to be similar to current baseline conditions.
- 12.5.72 No substantial changes are anticipated to all other identified waterbodies by 2022.

Flood Risk

- 12.5.73 It is unlikely that there will be any substantial change in the risk of flooding from all sources by 2022.

Construction (2021)

- 12.1.1 The topography across the Main OCGT Power Station Site is likely to be altered in the construction baseline scenario as a result of site levelling works.
- 12.5.74 Baseline conditions for water quality and flood risk in 2021 are not expected to be significantly different from the current and no proposed development baseline conditions outlined above.

Operation (2023)

- 12.5.75 The surface water drainage system will be operational prior to commissioning. Surface water flood risk at the site will reduce following the implementation of the drainage system and use of attenuation methods prior to discharging into the land drain at the south east of the Site. Further information on the outline drainage strategy for the Proposed Development is provided in Appendix 12A (Flood Risk Assessment), Annex 5 in PEI Report Volume III).
- 12.4.2 It is unlikely that there will be any substantial change in the risk of flooding from all sources by commissioning.
- 12.5.76 All other baseline conditions in 2023 are not expected to be significantly different to the baseline conditions in 2021, as outlined above.

12.6 Development Design and Impact Avoidance

- 12.6.1 The Proposed Development has the potential to impact on both the surface and groundwater resources in the vicinity of the Site through both quality and quantity changes (though quantitative changes are only considered here in relation to the any general changes to the quantity of a waterbody as a resource).
- 12.6.2 The surface and ground waterbodies as described above have been assessed for the likelihood of actual effects occurring as a result of the Proposed Development.

Impact Avoidance

12.6.3 The following impact avoidance measures have either been incorporated into the design or are standard construction or operational practices. These measures have, therefore, been taken into account during the impact assessment process.

Construction

12.6.4 For the purposes of this assessment, it is assumed that the measures set out below will be required of any contractors undertaking construction work in relation to the Proposed Development.

12.6.5 As a general measure to protect surface water from a range of potentially dangerous activities associated with construction of this type, best practice will be implemented through a Construction Environmental Management Plan (CEMP) and contractors undertaking works within the Site will comply with relevant guidance during construction, including, but not limited to, Environment Agency and Defra guidance, and IDB byelaws. A framework CEMP will be provided to accompany the Environmental Statement which includes the measures set out in this section.

12.6.6 Piling design and construction works will be completed following preparation of a piling risk assessment, completed in accordance with the Environment Agency's '*Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention*' (Ref 12-30). A piling and penetrative foundation design method statement will be submitted to and approved by the local planning authority, and if required, the Environment Agency and NELIDB, prior to relevant works commencing.

Staff Awareness/ Training

12.6.7 The contractor(s) will ensure that site personnel are fully aware of the potential impact to water resources associated with the proposed construction works and procedures to be followed in the event of an accidental pollution event occurring. This will be included in the site induction and training, with an emphasis on procedures and guidance to reduce the risk of water pollution.

Pollution Plans

12.6.8 Plans to deal with accidental pollution will be drawn up and agreed with the Environment Agency and NELIDB, prior to construction commencing and any necessary equipment (e.g. spillage kits) shall be held on site and all site personnel will be trained in their use. The Environment Agency and the NELIDB will be informed immediately in the unlikely event of a suspected pollution incident.

Storage of Materials

12.6.9 The CEMP will incorporate measures set out in Environment Agency and Defra documents listed in Section 12.2 above. Examples of such measures include:

- Placing arisings and temporary stockpiles away from drainage systems, and directing surface water away from stockpiles to prevent erosion. If areas located within Flood Zone 2 are to be utilised for the storage of construction materials, then a permit will be obtained from the EA;

- Containment measures will be implemented, including drip trays, bunding or double-skinned tanks of fuels and oils; all chemicals will be stored in accordance with their Control of Substances Hazardous to Health (COSHH) guidelines, whilst spill kits would be provided in areas of fuel/oil storage;
- An Emergency Spillage Plan will be produced, which site staff would have read and understood;
- The mixing and handling of materials will be undertaken in designated areas and away from surface water drains;
- Plant and machinery would be kept away from surface water bodies wherever possible and will have drip trays installed beneath oil tanks/engines/gearboxes and hydraulics, which will be checked and emptied regularly. Refuelling and delivery areas would be located away from surface water drains; and
- Exposed ground and stockpiles will be protected as appropriate and practicable to prevent windblown migration of potential contaminants. Water suppression will be used if there is a risk of fugitive dust emissions (see also Chapter 6: Air Quality).

Discharge/ Disposal of Site Runoff/ Material

- 12.6.10 Plans for the discharge and/or disposal of potentially contaminated water will be agreed in advance with the Environment Agency, NLC and NELIDB where appropriate, and permits obtained as required.
- 12.6.11 All foul water from any site compound (including temporary toilets) will be either tankered away to an appropriate disposal facility by a licensed waste disposal contractor or treated on site in a septic tank. Any potentially contaminated water will be tested, and if it is not of a suitable quality, agreed disposal procedures will be followed. Construction drainage details will be developed in consultation with the Environment Agency.
- 12.6.12 As will be detailed in the CEMP, if any suspected contaminated material is discovered during the works, it will be tested and dealt with appropriately. Pre-construction sediment contamination testing will be undertaken prior to works commencing. If material is considered to be contaminated, it will be disposed of to a licensed facility (also see Chapter 11: Ground Conditions and Hydrogeology).
- 12.6.13 Any waters removed from excavations by dewatering will be discharged appropriately, subject to the relevant licenses being obtained.
- 12.6.14 Foundations and services will be designed and constructed to prevent the creation of pathways for the migration of contaminants and will be constructed of materials that are suitable for the ground conditions and designed use. For example, water supply pipes will be designed in accordance with current good practice and applicable guidance to ensure pipes are protected from potential impacts associated with contamination.
- 12.6.15 No discharges from any self-contained wheel wash and localised wheel wash will be permitted to discharge into any surface water system.

Temporary Drainage and Settlement

- 12.6.16 Temporary drainage facilities will be provided during the construction phase, where necessary, to ensure controlled discharge of surface water runoff.
- 12.6.17 It will be a contractual requirement of the contractor to ensure that runoff from the Site does not cause pollution or flooding. Measures that will be considered for implementation for temporary drainage through the construction design and/or CEMP include:
- Installation of measures such as swales, silt fences and appropriately sized settlement tanks/ponds to reduce sediment load;
 - Cut-off ditches or geotextile silt-fences, installed around excavations, exposed ground and stockpiles to prevent uncontrolled release of sediments from the Proposed Development;
 - Site access points will be regularly cleaned to prevent build-up of dust and mud;
 - A valve will be installed to isolate the settlement tank/ponds in the event of a polluted discharge;
 - Oil interceptors to be installed (notably the outflow from the settlement pond/tank) to reduce the potential risk for contamination of groundwater and surface water; and
 - All potentially polluted waters (including washdown areas, stockpiles and other areas of risk for water pollution) to have separate drainage and to be tankered away from the Site.
- 12.6.18 In addition, if monitoring demonstrates unsatisfactory levels of solids or other pollutants, measures will be implemented (e.g. changes to site drainage and settlement facilities and/or use of flocculants) to control suspended solids or other polluted discharge to watercourses.

Wastewater Generation

- 12.6.19 A septic tank is likely to be used for treatment of sanitary or domestic wastewater from offices/administration/welfare facilities. This septic tank will be emptied as required and tankered off site to a waste water treatment plant.

Flood Risk

- 12.6.20 Construction works undertaken adjacent to, beneath and within watercourses will comply with relevant guidance during construction, including Environment Agency and Defra guidance documents and the requirements of the NELIDB byelaws, particularly Byelaws 3, 6, 10 and 17.
- 12.6.21 The CEMP will incorporate measures aimed at preventing an increase in flood risk during the construction works. Examples of measures that will be implemented in the Proposed Development areas in Flood Zones 2 and 3 include:
- Topsoil and other construction materials will be stored outside of the 1 in 100 year floodplain extent. If areas located within Flood Zone 2 are to be utilised

for the storage of construction materials, then a permit will be obtained from the EA;

- Connectivity will be maintained between the floodplain and the River Humber, with no changes in ground levels within the floodplain as far as practicable; and
- The construction laydown area site office and supervisor will be notified of any potential flood occurring by use of the Floodline Warnings Direct service.

12.6.22 The Contractor will be required to produce a Flood Risk Management Action Plan/Method Statement which will provide details of the response to an impending flood and include:

- A 24 hour availability and ability to mobilise staff in the event of a flood warning;
- The removal of all plant, machinery and material capable of being mobilised in a flood for the duration of any holiday close down period;
- Details of the evacuation and site closedown procedures; and
- Arrangements for removing any potentially hazardous material and anything capable of becoming entrained in floodwaters, from the temporary works areas.

Operation

12.6.23 The operational phase of the Proposed Development will require storage, transport, handling and use of minor volumes of potentially polluting substances (e.g. diesel). Throughout its lifetime, the Proposed Development will be regulated by the EA through an Environmental Permit, which will include conditions relating to handling, storage and use of diesel and other chemicals, including emergency procedures in line with the use of Best Available Techniques (BAT). These measures will be in place to prevent pollution during plant operation in accordance with the permit.

12.6.24 A number of the impact avoidance measures employed during the construction phase will remain for the operation phases of the development (where relevant), and will be through the site operator's Environmental Management System (EMS), for example:

- Plans to deal with accidental pollution and any necessary equipment (e.g. spillage kits) will be held on site and all site personnel will be trained in their use, for example the plan will incorporate details on how to appropriately deal with accidental spillages to ensure they are not drained to any surface water system;
- Containment measures will be implemented, including bunding or double-skinned tanks for fuels and oils; all chemicals will be stored in accordance with their COSHH guidelines; and
- Interceptors will be incorporated into the drainage system to prevent material entering the surface water drainage system or local waterbodies.

Contaminated Fire Water

12.6.25 In the event of a fire, the surface water drainage system will be closed to prevent contaminated water being released through surface water drains. Fire water will be contained on Site and either disposed off-site in accordance with waste management legislation (if contaminated) or treated and discharged to surface water in accordance with the Environmental Permit, if the water quality is acceptable for surface water discharge (and subject to agreement with the Environment Agency and/or the NELIDB). This strategy will prevent pollution of surface and groundwater waterbodies.

Site Drainage

12.6.26 An Outline Drainage Strategy has been produced (see Appendix 12A (Flood Risk Assessment, Annex 5 in PEI Report Volume III)).

12.6.27 The description below represents the strategy for what is proposed to be included as a minimum and will incorporate features such as:

- Surface water is proposed to discharge the south east of the Main OCGT Power Station Site into to the land drain located between the Main OCGT Power Station Site and the existing VPI CHP plant;
- Surface water discharged from the Proposed Development will be restricted to the greenfield runoff rate, via attenuation methods (with an estimated storage volume in the range of 1635 m³ and 2207 m³ for a 1 in 100 year event with a 40% allowance for climate change) and appropriate flow control device located within the Site boundary;
- Other SuDS techniques such as swales, permeable paving and soakaways, to attenuate flow from the Site and maximise infiltration (where appropriate), may be considered at the detailed design stage; and
- Silt traps and interceptors will be installed where appropriate.

12.6.28 The details set out in the Outline Drainage Strategy (Appendix 12A (Flood Risk Assessment, Annex 5 in PEI Report Volume III)) represents an outline design and will be developed through detailed design and in response to requirements identified through the detailed design process.

12.6.29 Where surface water drainage to the land drain is proposed during operation of the Proposed Development (Appendix 12A (Flood Risk Assessment, Annex 5 in PEI Report Volume III)) the NELIDB will be consulted regarding consenting requirements.

12.6.30 Foul water generated by the Proposed Development Site (from washrooms etc.) will be collected and treated on site to an acceptable water quality before being discharged to the surrounding land drains/ watercourses. The NELIDB will be consulted regarding consenting requirements.

Flood Risk

12.6.31 The Applicant will subscribe to the Environment Agency's Flood Alert Service in the area via FloodLine Direct.

12.6.32 As a precaution, flood resilience measures will be incorporated into the Proposed Development to minimise the amount of damage and reduce the recovery time in the unlikely event of the Site becoming inundated. During construction the opportunity will be taken to adopt flood resilient design techniques for the terrestrial elements of the Proposed Development. The following resilience measures have been identified as possible options for inclusion at this site, subject to final design:

- If technically feasible, critical equipment will be raised above the expected 0.5% climate change scenario flood depth of 5.79m AOD (for the year 2062);
- Flood sensitive equipment will be raised a minimum of 600 mm above ground/floor level;
- Adequate containment of storage areas to ensure material does not wash away and cause pollution;
- Flood proofing including the use of flood resistant building materials, use of water resistant coatings, use of galvanised and stainless steel fixings and raising electrical sockets and switches;
- Inclusion into the existing Power Station's emergency response procedures including the recommendation of at least one Flood Warden for the Proposed Development;
- Implementation of a Surface Water Management Strategy; and
- Oil interceptors are likely to be Class 1 Full Retention systems.

12.6.33 Further details are included within the FRA presented as Appendix 12A (PEI Report Volume III).

Decommissioning

12.6.34 A detailed Decommissioning Environmental Management Plan will be prepared to identify required measures to prevent pollution during this phase of the development, based on the detailed decommissioning plan.

12.6.35 The impact avoidance measures for decommissioning will be similar to those identified above for construction.

12.7 Likely Impacts and Effects

Construction

12.7.1 The surface watercourses described above (land drains within and adjacent to the Site, NELIDB Watercourses, Humber Lower and the Rosper Road Pools) have been assessed for the likelihood of actual effects occurring as a result of the construction phase of the Proposed Development (taking into account the mitigation measures as detailed in Section 12.5).

Contaminated Runoff Surface Water Entering Watercourses and Spillage of Pollutants

12.7.2 During construction, there is an elevated risk of leakage or accidental spillage of construction materials and potential pollutants used on Site, migrating to nearby

surface watercourses. Washout facilities (washing of tools, plant and equipment), storage and use of various liquids and soluble solids, unstable exposed soils, excavated materials, stored aggregates, contaminated road surfaces, and fuel storage and handling all have the potential to result in pollution of water resources. Inappropriate disposal of waste materials associated with the construction phase also has the potential to enter surface water.

12.7.3 The Humber Lower is turbid in this area, as such, baseline sediment concentrations are high in the watercourse, and localised impacts are likely to be trivial and of short duration.

12.7.4 With the measures set out in Section 12.5 (including the implementation of a CEMP), the likelihood of such an event occurring is low. Taking this into account, and based on the information available to date, the anticipated potential effects on different water attributes are described below.

Local Land Drains Adjacent to the Site

12.7.5 Potential contamination impacts and effects on the local land drains adjacent to the Site are assessed below:

- Water quality and WFD status (low importance):
 - Possible short- term, but highly localised and temporary change in water quality, assuming a very worst-case scenario. The potential impact is evaluated to be of medium magnitude with limited levels of dilution for pollutants in these watercourses, and whilst effects might be experienced in the localised area, no effect on the quality of the watercourse would be experienced with the implementation of the impact avoidance measures;
 - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Recreation (low importance):
 - There exists the potential for a short-term, localised temporary visual impact on recreational activity for PRow users etc., but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario;
 - The resulting effect would be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Biodiversity (medium importance):
 - There is the possibility of a short- term, highly localised effect on water quality that could potentially have a temporary and localised ecological impact, however the impact and effect would be constrained to the area immediately adjacent to the Site (newts, invertebrates etc. being affected from the changes to water quality) and the impact is evaluated to be of medium magnitude due to limited levels of dilution; and
 - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

NELIDB Watercourses

12.7.6 Potential contamination impacts and effects on the NELIDB Watercourses are assessed below:

- Water quality and WFD status (medium importance):
 - Given the distance from the Site and indirect nature of the impact, a possible short-term, but highly localised and temporary change in water quality, assuming a very worst-case scenario. The potential impact is evaluated to be of low magnitude as these more established watercourses provide greater dilution for pollutants, and whilst effects might be experienced in the localised area, no effect on the quality of the watercourse would be experienced with the implementation of the impact avoidance measures;
 - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Recreation (medium importance):
 - There exists the potential for a short-term, localised temporary visual impact on recreational activity such for PRoW users etc., but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario;
 - The resulting effect would be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Biodiversity (medium importance):
 - There is the possibility of a short-term, highly localised effect on water quality that could potentially have a temporary and localised ecological impact, however the impact and effect would be constrained to the area immediately downstream of the Site (newts, invertebrates etc. being affected from the changes to water quality) and the impact is evaluated to be of low magnitude due to the indirect nature of the impact and levels of dilution in the watercourse; and
 - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

Humber Lower

12.7.7 Potential contamination impacts and effects on Humber Lower are assessed below:

- Water quality and WFD status (very high importance):
 - Given the distance from the Site and indirect nature of the impact, a possibility of a short-term, highly localised and temporary change in water quality, assuming a worst-case scenario (this conclusion is reached having consideration to the dilution potential of the estuary and its current quality). The potential impact is evaluated to be of very low magnitude as this larger waterbody provides very high level of dilution for pollutants, and whilst effects might be experienced in the localised area, no effect on the

quality of the river and WFD status would be experienced with the implementation of the impact avoidance measures described in Section 12.5 above; and

- The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Recreation (high importance):
 - There is the possibility of a short-term, localised temporary impact on recreational activity PRow users, fishing etc., in the unlikely event of a pollution incident, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario; and
 - The resulting effect would be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Biodiversity (very high importance):
 - There is the possibility of a highly localised effect on water quality that could potentially have a short-term, temporary and localised ecological impact, however the impact and effect would be constrained to a localised area (species of International and National Value etc. being affected from the changes to water quality) and would not affect the structure or function of the Lower Humber at this location or more widely. The impact is evaluated to be of very low magnitude due to high level of dilution;
 - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented); and
 - The predicted effect on river habitats of International and National Value are therefore not significant.

Rosper Road Pools

12.7.8 Potential contamination impacts and effects on the Rosper Road Pools are assessed below:

- Water quality (medium importance):
 - Given the distance from the Site and indirect nature of the impact, a possible highly localised and temporary change in water quality, assuming a very worst-case scenario, impact of very low magnitude as this water body provides a high level of dilution for pollutants;
 - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Recreation (high importance):
 - There exists the potential for a localised temporary visual impact on recreational activity, such as users of the LWS an impact of very low magnitude as a worst-case scenario;

- The resulting significance of this effect would be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Biodiversity (high importance):
 - Possible localised and temporary ecological impact resulting from the effect on water quality, impact of very low magnitude;
 - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented); and
 - The predicted effects on water habitats of Local Value (Rosper Road Pools LWS) are therefore not significant.

Surface Water – Suspended Sediments in Site Runoff/Re-suspension of Sediments in Watercourses

- 12.7.9 The movement and storage of construction and waste materials to and from the Site, and from other construction activities, has the potential to give rise to suspended solids that could become entrained in surface water run-off from the Site following rainfall. This creates a potential risk of increased sediment loads being discharged into the nearby surface water. High sediment input has the potential to affect waterbodies by increasing turbidity, reducing dissolved oxygen (DO) levels and reducing light penetration. There could also be toxic effects caused by inorganic and organic compounds associated with re-suspended sediment. Indirect effects could include impacts on invertebrates and fish communities, and destruction of feeding areas, refuges and both breeding and spawning grounds.
- 12.7.10 Water in the Humber Lower is turbid with suspended sediment and in proximity to the proposed works currently has mitigation measures set under the WFD with regards to the strategic management of sediment, a reduction in the impact of dredging, sediment re-suspension and manage disturbance.
- 12.7.11 With the measures set out in Section 12.5, including the implementation of a CEMP, the likelihood of this occurring would be very low. Taking this into account, the following effects on different attributes are described below.

Local Land Drains Adjacent to the Site

- 12.7.12 Potential impacts and effects on the local land drains adjacent to the Site from suspended sediments are assessed below:
- Water quality and WFD status (low importance):
 - Possible short-term, localised and temporary changes in water quality, the potential impact is evaluated to be of medium magnitude given the limited levels of dilution in the watercourse for suspended sediments, no effect on water quality would be experienced;
 - The resulting effect would be negligible (not significant);
 - Recreation (low importance):
 - There exists the potential for a short-term, localised visual temporary impact on recreational activity, such as users of the PRow, but given the

localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario;

- The resulting effect would be negligible (not significant).
- Biodiversity (medium importance):
 - It is possible that the local land drains could experience a short-term, localised and temporary impact with the potential to affect ecology (newts, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of low magnitude in the localised area immediately adjacent to the Site; and
 - The resulting effect would be negligible (not significant).

NELIDB Watercourses

12.7.13 Potential impacts and effects on the NELIDB Watercourses from suspended sediments are assessed below:

- Water quality and WFD status (medium importance):
 - Possible short-term, localised and temporary changes in water quality, the potential impact is evaluated to be of very low magnitude due to the indirect nature of the impact and greater levels of dilution in the watercourse for suspended sediments compared to the land drains, no effect on water quality would be experienced;
 - The significance of this effect is therefore considered to be negligible (not significant) (but unlikely to occur);
- Recreation (medium importance):
 - There exists the potential for a short-term, localised visual temporary impact on recreational activity, such as users of the PRoW, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario;
 - The resulting effect would be negligible (not significant);
- Biodiversity (medium importance):
 - It is possible that the NELIDB watercourses could experience a short-term localised and temporary impact with the potential to affect ecology (newts, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of low magnitude in the localised area in proximity to the Site; and
 - The significance of this effect is therefore considered to be negligible (not significant) (but unlikely to occur).

Humber Lower

12.7.14 Potential impacts and effects on Humber Lower from suspended sediments are assessed below:

- Water quality and WFD status (very high importance):
 - Possible short-term, localised and temporary changes in water quality, the potential impact is evaluated to be of very low magnitude given the

distance from the Site and high levels of dilution in the estuary for suspended sediments, no effect on water quality and WFD status would be experienced;

- The significance of this effect is therefore considered to be minor adverse (not significant), but unlikely to occur based on the impact avoidance measures to be implemented;
- Recreation (high importance):
 - There exists the potential for a short-term, localised temporary impact on recreational activity such as users of PRoW, fishing etc., but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario;
 - The significance of this effect is therefore considered to be negligible adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Biodiversity (very high importance):
 - It is possible that the Humber Lower could experience a short-term, localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). However the impact and effect would be constrained to the area in proximity to the Site (species of International and National Value etc. being affected from the changes to water quality) and would not affect the structure or function of the Lower Humber at this location or more widely. The impact is evaluated to be of very low magnitude due to high level of dilution in the estuary;
 - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented); and
 - The predicted effect on river habitats of International and National Value are therefore not significant.

Rosper Road Pools

12.7.15 Potential impacts and effects on the Rosper Road Pools from suspended sediments are assessed below:

- Water quality (medium importance):
 - Given the distance from the Site and indirect nature of the impact and the level of dilution provided within the waterbody for suspended sediments, a possible highly localised, short-term and temporary change in water quality, assuming a very worst-case scenario, impact of very low magnitude;
 - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Recreation (high importance):

- There exists the potential for a short-term, localised visual temporary impact on recreational activity, such as users of PRoW, an impact of very low magnitude as a worst-case scenario;
- The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented);
- Biodiversity (high importance):
 - Given the distance from the Site and indirect nature of the impact, a possible localised, short-term and temporary ecological impact resulting from the effect on water quality, impact of low magnitude;
 - The significance of this effect is therefore considered to be minor (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented); and
 - The predicted effects on water habitats of Local Value (Rosper Road Pools LWS) are therefore not significant.

Disturbance of Contaminated Materials

12.7.16 Contaminated material exposed or disturbed during the construction works has the potential to affect surface water, groundwater and human health (as discussed in Chapter 12: Ground Conditions and Hydrogeology). As described, there is not a significant risk of impact from contaminated material on surface water, ground water or human (on-site workforce, off-site workforce and local population) receptors after the implementation of defined impact avoidance measures. Therefore, the significance of this effect is assessed as negligible. Details are provided in Chapter 11: Ground Conditions and Hydrogeology, which should be referred to for further information.

Operation

12.7.17 Once the Proposed Development is open and operational, it is considered that the majority of the identified watercourses assessed during the construction phase would not be affected by the Proposed Development.

12.7.18 The Proposed Development would utilise the land drainage ditch located between the Main OCGT Power Station Site and the existing VPI CHP plant in terms of surface water drainage, via a new drainage connection, subject to agreement from NELIDB.

Surface Water – Leakage from the Drainage System

12.7.19 A high level conceptual drainage strategy has been developed for the Proposed Development, as detailed in Appendix 12A (Flood Risk Assessment, Annex 5 in PEI Report Volume III).

12.7.20 Minimal contaminated wastewater is anticipated to be generated from the Proposed Development during operation. Any uncontaminated surface water would be discharged directly to the land drainage ditch via attenuation storage. Surface water would drain from the Site at a restricted greenfield rate, with excess runoff above this rate stored in an underground attenuation tank and oversized pipes or above

ground attenuation pond located within the Site boundary. Whilst pollution prevention features would be included in the design as set-out in Section 12.5, there always remains the potential for leakage from the system to occur (albeit the risk is very low).

12.7.21 The effects of any accidental pollution from site containment systems on different attributes of the identified watercourses are detailed below.

Local Land Drains Adjacent to the Site

12.7.22 Potential impacts and effects on the local land drains adjacent to the Site from any leakage from the drainage system are assessed below:

- Water quality and WFD status (low importance):
 - If a leak occurred in the site containment system, considering the importance of the attribute, the potential impact would be short-term, localised, temporary and of low magnitude due to the low levels of dilution provided within these smaller watercourses;
 - The resulting effect would be negligible (not significant);
- Recreation (low importance):
 - There exists the potential for a localised temporary visual impact on recreational activity, such as users of PRoW, but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario;
 - The resulting effect would be negligible (not significant).
- Biodiversity (medium importance):
 - It is possible that the local land drains could experience a short-term, localised and temporary impact with the potential to affect ecology (newts, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of low magnitude in the localised area immediately adjacent to the Site; and
 - The resulting effect would be negligible (not significant).

NELIDB Watercourses

12.7.23 Potential impacts and effects on the NELIDB watercourses from any leakage from the drainage system are assessed below:

- Water quality and WFD status (medium importance):
 - If a leak occurred in the site containment system, considering the importance of the attribute, the potential impact would be short-term, localised, temporary and of very low magnitude considering the high levels of dilution provided in these watercourses;
 - The significance of this effect is therefore considered to be negligible (not significant);
- Recreation (medium importance):

- There exists the potential for a short-term, localised temporary visual impact on recreational activity, such as users of PRoW, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario;
- The resulting effect would be negligible (not significant);
- Biodiversity (medium importance):
 - It is possible that NELIDB watercourses could experience a short-term, localised and temporary impact with the potential to affect ecology (invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the area local to the Site; and
 - The resulting effect would be negligible (not significant).

Humber Lower

12.7.24 Potential impacts and effects on the Humber Lower from any leakage from the drainage system are assessed below:

- Water quality and WFD status (very high importance):
 - If a leak occurred in the site containment system, considering the importance of the attribute, the potential impact on the watercourse would be short-term, localised, temporary and of very low magnitude considering the very high levels of dilution provided in this large waterbody;
 - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be minor adverse (not significant).
- Recreation (high importance):
 - There exists the potential for a short-term localised temporary impact on recreational activity, such as users of PRoW, fishing etc., but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
 - The resulting effect on recreation would be negligible (not significant).
- Biodiversity (very high importance):
 - It is possible that the Humber Lower could experience a short-term, localised and temporary impact with the potential to affect ecology (species of International and National Value etc. being affected from the changes to water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude.
 - No effect on biodiversity and WFD status would be experienced, the significance of this effect is therefore considered to be minor adverse (not significant).
 - The predicted effect on river habitats of International and National Value are therefore not significant.

Rosper Road Pools

12.7.25 Potential impacts and effects on the Rosper Road Pools from any leakage from the drainage system are assessed below:

- Water quality and WFD status (medium importance):
 - If a leak occurred in the site containment system, considering the importance of the attribute and the high level of pollution provided in the waterbodies, the potential impact would be short-term, localised, temporary and of very low magnitude;
 - No effect on water quality would be experienced, the significance of this effect is therefore considered to be negligible (not significant);
- Recreation (high importance):
 - There exists the potential for a short-term, localised temporary visual impact on recreational activity, such as users of the LWS, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario;
 - No effect on recreation would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Biodiversity (high importance):
 - It is possible that the other water features could experience a short-term, localised and temporary impact with the potential to affect ecology (birds etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area;
 - No effect on biodiversity would be experienced, the significance of this effect is therefore considered to be negligible (not significant); and
 - The predicted effect on water habitats of Local Value (Rosper Road Pools LWS) is therefore not significant.

Surface Water – Contamination of Site Runoff

12.7.26 The impacts associated with contamination of surface water (with sediments, fuels etc.) are considered to be the same as those assessed in relation to leakage from the drainage system, as any potentially polluting substances would be stored inside buildings as set out below. Implementation of the measures as described in Section 12.5 would ensure the risk of contamination of site runoff would be low.

12.7.27 Pollution from runoff of contaminated surface water from the Proposed Development entering a watercourse would cause little change to the Humber Lower given the indirect nature of the impact and due to the level of dilution in the waterbody.

Land Drains adjacent to the Site

12.7.28 Potential impacts and effects on the local land drains adjacent to the Site from runoff of contaminated surface water are assessed below:

- Water quality and WFD status (low importance):
 - Any contaminated run off is likely to infiltrate into the surface layers or pond on the surface, allowing clean up, prior to reaching the watercourses. If, however, a spillage of pollutant did reach the local land drains within and adjacent to the Site, the potential impact would be short-term, localised and temporary, and evaluated to be of low magnitude considering the level of dilution provided within these smaller watercourses;
 - No effect on water quality would be experienced, the significance of this effect is therefore considered to be negligible (not significant) (but is unlikely to occur based on impact avoidance measures to be implemented);
- Recreation (low importance):
 - There exists the potential for a short-term, localised temporary visual impact on recreational activity, such as users of the PRoW, but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario;
 - The resulting effect would be negligible (not significant);
- Biodiversity (medium importance):
 - It is possible that the local land drains within and adjacent to the Site could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of low magnitude in the localised area; and
 - The significance of this effect is therefore considered to be negligible (not significant).

NELIDB Watercourses

12.7.29 Potential impacts and effects on the NELIDB watercourses from runoff of contaminated surface water are assessed below:

- Water quality and WFD status (medium importance):
 - Any contaminated run off is likely to infiltrate into the surface layers or pond on the surface, allowing clean up, prior to reaching the watercourse. The surface drainage system would be designed with attenuation features that have the potential to capture any contaminated runoff for treatment. If, however, a spillage of pollutant did reach the NELIDB watercourses, considering the importance of the attribute and the level of dilution provided within these watercourses the potential impact would be short-term, localised, temporary and of very low magnitude as a worst-case scenario (but is unlikely to occur based on impact avoidance measures to be implemented);
 - The significance of this effect is therefore considered to be negligible (not significant);

- Recreation (medium importance):
 - There exists the potential for a short-term, localised temporary visual impact on recreational activity, such as users of the PRoW, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario;
 - The resulting effect would be negligible (not significant);
- Biodiversity (medium importance):
 - It is possible that the NELIDB watercourses could experience a short-term, localised and temporary impact with the potential to affect ecology (invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area; and
 - The resulting effect would be negligible (not significant).

Humber Lower

12.7.30 Potential impacts and effects on the Humber Lower from runoff of contaminated surface water are assessed below:

- Water quality and WFD status (very high importance):
 - Any contaminated run off is likely to infiltrate into the surface layers or pond on the surface, allowing clean up, prior to reaching the Humber Lower. The surface drainage system would be designed with attenuation features that have the potential to capture any contaminated runoff for treatment. If, however, a spillage of pollutant did reach the Humber Lower, considering the importance of the attribute and the very high levels of dilution in this waterbody, the potential impact would be short-term, localised, temporary and of very low magnitude (but is unlikely to occur based on impact avoidance measures to be implemented);
 - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be minor adverse (not significant);
- Recreation (high importance):
 - There exists the potential for a short-term, localised temporary impact on recreational activity, such as users of PRoW, fishing etc., but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario;
 - The resulting effect on recreation would be negligible (not significant);
- Biodiversity (very high importance):
 - It is possible that Humber Lower could experience a short-term, localised and temporary impact with the potential to affect ecology (species of International and National Value etc. being affected from the changes to water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site;

- No effect on biodiversity and WFD status would be experienced, the significance of this effect is therefore considered to be minor adverse (not significant); and
- The predicted effect on river habitats of International and National Value are therefore not significant.

Rosper Road Pools

12.7.31 Potential impacts and effects on the Rosper Road Pools from runoff of contaminated surface water are assessed below:

- Water quality and WFD status (medium importance):
 - Any contaminated run off is likely to infiltrate into the surface layers or pond on the Site surface, allowing clean up, prior to reaching the other water features. The surface drainage system would be designed with attenuation features that have the potential to capture any contaminated runoff for treatment. If, however, a spillage of pollutant did reach the water features, considering the importance of the attribute and the level of dilution provided within this waterbody, the potential impact would be short-term, localised, temporary and of very low magnitude (but is unlikely to occur based on impact avoidance measures to be implemented);
 - No effect on water quality would be experienced, the significance of this effect is therefore considered to be negligible (not significant);
- Recreation (high importance):
 - There exists the potential for a short-term, localised temporary visual impact on recreational activity, such as users of the LWS, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario;
 - The resulting effect on recreation would be negligible (not significant);
- Biodiversity (high importance):
 - It is possible that the surface water features could experience a short-term, localised and temporary impact with the potential to affect ecology (birds etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area;
 - No effect on biodiversity would be experienced, the significance of this effect is therefore considered to be negligible (not significant); and
 - The predicted effect on water habitats of Local Value (Rosper Road Pools LWS) is therefore not significant.

Drainage and Flow to Surface Waters

12.7.32 Surface water discharge would be restricted to greenfield runoff rates and discharge to the local land drain located directly adjacent to the southern Site boundary, via a new surface water system on the Main OCGT Power Station Site, subject to confirmation with the NELIDB. Therefore effects on the land drain would be negligible (not significant).

12.7.33 Although the detailed drainage design would not be completed until the detailed design stage, drainage systems would be designed so as not to increase flood risk. These measures allow the design criterion of no flooding during a 1 in a 100 year (1.0% AEP) plus climate change storm to be achieved.

Flood Risk

12.7.34 The FRA for the Proposed Development, included within Appendix 12A (PEI Report Volume III), concludes that development of the Site would not increase the risk of flooding from fluvial, tidal, groundwater or overland flow sources.

12.7.35 A high level drainage strategy has been developed for the Site and is presented in Appendix 12A (Flood Risk Assessment, Annex 5 in PEI Report Volume III). As detailed in the drainage strategy and summarised in Section 12.5 above, surface water discharged from the Proposed Development would be restricted to a greenfield runoff rate via an attenuation tank and an appropriate flow control device.

12.7.36 Surface water from the attenuation tank would outfall, via new drainage infrastructure, into the land drain located between the Main OCGT Power Station Site and the existing VPI CHP plant, subject to agreement with NELIDB.

12.7.37 For outline design purposes the 1% AEP, critical storm rainfall event with a 40% climate change allowance has been used to size surface water drainage for the Proposed Development. This ensures that ponding of the Site due to exceedance of drainage network flow capacity is unlikely to occur during the design life of development.

12.7.38 The Site would be assessed as part of the detailed drainage design to consider the risk posed by any flooding up to and beyond the 1% (1 in 100 year) flood event. Any flooding would be diverted away from critical infrastructure or access routes and retained on the Site wherever possible.

12.7.39 Other SuDS techniques such as swales, permeable paving and soakaways may be considered at the detailed design stage.

Decommissioning

12.7.40 Decommissioning of the Proposed Development would be undertaken in accordance with the Environmental Permit. This would include decommissioning of all potentially polluting plant and equipment so that it does not pose an unacceptable risk of contamination.

12.7.41 It is assumed that all underground infrastructures would remain in-situ; however, all connection and access points would be sealed or grouted to ensure disconnection.

12.7.42 On this basis, decommissioning impacts are expected to be limited to watercourses in close proximity to the Site and would be the same as construction impacts, as discussed above.

Summary of Potential Impacts on WFD Status

12.7.43 The WFD status of the Humber Lower has been considered for each of the potential impacts described as part of this assessment.

- 12.7.44 Given the nature of the impacts (notably that they are indirect, largely of temporary nature and/or unlikely to affect the WFD elements), and assuming the measures included in Section 12.5 would be effectively implemented, there would be no effect on WFD status and objectives.
- 12.7.45 Mitigation measures already in place on the Lower Humber include the strategic management of sediment, management of disturbance, reducing impact of dredging and reducing sediment re-suspension.
- 12.7.46 Proposed WFD mitigation measures as included within the Humber RBMP include the preservation of marginal aquatic habitat, banks and the riparian zone, managed realignment of flood defence, and the removal of hard bank reinforcement / revetment, or replacement with soft engineering solution.
- 12.7.47 The Proposed Development is unlikely to impact upon the ability of these mitigation measures to be implemented and for the current mitigation measures to remain. The effect on the WFD status of the Humber Lower is therefore likely to be negligible (not significant).

12.8 Mitigation and Enhancement Measures

- 12.8.1 A number of legislative and best practice measures which will be followed during the construction, opening and operation and decommissioning of the Proposed Development are detailed in the Development Design and Impact Avoidance section. The design and impact avoidance measures have been taken into account in the assessment and no additional mitigation requirements have been identified.

12.9 Residual Effects

- 12.9.1 As no mitigation measures additional to those above have been identified, the residual effects remain as described above. It is acknowledged that even with the implementation of impact avoidance measures, there is still a very limited potential for some residual risk to the water environment associated with the construction and operation of the Proposed Development, for example, through a breach of tidal flood defences, design exceedance or blockage of the drainage system.

12.10 Limitations or Difficulties

- 12.10.1 The analyses and conclusions presented in this chapter are based on the data available at the time of publication of this document. Specifically the assessment has drawn on information contained within baseline surveys carried out in relation to the Proposed Development, and readily available baseline information. As the Proposed Development is refined following consultation on this PEI Report, the assessment presented in the ES will be revised as necessary.

12.11 Conclusions

- 12.11.1 This chapter assesses potential impacts from the Proposed Development on the quality and quantity of surface waterbodies, and the effects of these potential changes on key receptors (or attributes). Water features that could potentially be affected include local land drains (located adjacent to the Site boundary), NELIDB

watercourses (Watercourse 8G, 9 and 9A), the Humber Lower (Humber Estuary) and the Rosper Road Pools.

- 12.11.2 The standard impact avoidance measures proposed will reduce the risk of many impacts occurring during the construction, operational and decommissioning phases. These include implementation of Environment Agency and Defra guidance, construction staff awareness and training, implementation of pollution plans and the appropriate discharge/ disposal of site runoff.
- 12.11.3 The assessment has identified the 'worst case scenario', such as significant pollution events, which have a low probability of occurrence due to the procedures and measures that will be put in place.
- 12.11.4 Adverse residual effects on the key receptors have been assessed as minor adverse to negligible adverse and therefore not significant.
- 12.11.5 The FRA (Appendix 12A (PEI Report Volume III)) concludes that development of the Site would not increase the risk of flooding from tidal, fluvial, groundwater, overland flow, drainage infrastructure or artificial watercourse sources.
- 12.11.6 As no mitigation measures additional to those described above have been identified, the residual effects remain as described. It is acknowledged that even with the implementation of impact avoidance measures, there is still a very limited potential for some residual risk to the water environment associated with the construction, operation and decommissioning of the Proposed Development.

12.12 References

- Ref 12-1 Cabinet Office (2008) The Pitt Review. Learning Lessons from the 2007 Floods
- Ref 12-2 Department for Energy and Climate Change (2011) Overarching National Policy Statement for Energy EN-1. The Stationary Office, London
- Ref 12-3 Department for Energy and Climate Change (2011b) National Policy Statement for Fossil Fuel Generating Infrastructure: EN-2. The Stationary Office, London.
- Ref 12-4 Ministry of Housing, Communities and Local Government (2018) National Planning Policy Framework
- Ref 12-5 Department of Communities and Local Government (2009) Planning Policy Statement 25: Development and Flood Risk Practice Guide (PPS 25),
- Ref 12-6 Department for Communities and Local Government (2004) Planning Policy Statement 23: Planning and Pollution Control (PPS 23),
- Ref 12-7 Department for Communities and Local Government (2014) Planning Practice Guidance,.
- Ref 12-8 Department for Environment, Food and Rural Affairs, (Defra) (2015). 'Non-statutory technical standards for sustainable drainage systems'.
- Ref 12-9 Marine Management Organisation (2014) East Inshore and East Offshore Marine Plans. [Available at: <https://www.gov.uk/government/publications/uk-marine-policy-statement> accessed September 2018]
- Ref 12-10 Department for Environment, Food and Rural Affairs (DEFRA) (2011) UK Marine Policy Statement
- Ref 12-11 North Lincolnshire Council (2011) North Lincolnshire Local Development Framework Core Strategy.
- Ref 12-12 North East Lindsey Internal Drainage Board. Byelaws. [Available at: <http://northeastlindsey-idb.org.uk/wp-content/uploads/2017/06/NORTH-EAST-LINDSEY.pdf> accessed September 2018]
- Ref 12-13 Department for Environment, Food and Rural Affairs and Environment Agency, (2016); Pollution prevention for businesses [Available at <https://www.gov.uk/guidance/pollution-prevention-for-businesses> accessed October 2018].
- Ref 12-14 Gov.uk, Report an Environmental Incident [Available at: <https://www.gov.uk/report-an-environmental-incident> accessed October 2018].
- Ref 12-15 Department for Environment, Food and Rural Affairs and Environment Agency (2016); Discharges to surface water and groundwater: environmental permits [Available at: <https://www.gov.uk/guidance/discharges-to-surface-water-and-groundwater-environmental-permits> accessed October 2018].
- Ref 12-16 Gov.uk, Storing oil at your business or home [Available at: <https://www.gov.uk/oil-storage-regulations-and-safety> accessed October 2018].
- Ref 12-17 Department for Environment, Food and Rural Affairs and Environment Agency (2015), Oil storage regulations for businesses [Available at: <https://www.gov.uk/guidance/storing-oil-at-a-home-or-business> Accessed October 2018].

- Ref 12-18 Gov.uk, Septic tanks and treatment plants: permits and general binding rules [Available at: <https://www.gov.uk/permits-you-need-for-septic-tanks> accessed October 2018].
- Ref 12-19 Gov.uk, Check if you need permission to do work on a river, flood defence or sea defence [Available at: <https://www.gov.uk/permission-work-on-river-flood-sea-defence> accessed October 2018].
- Ref 12-20 Environment Agency (2015); Manage water on land: guidance for land managers [Available at: <https://www.gov.uk/guidance/manage-water-on-land-guidance-for-land-managers> accessed October 2018].
- Ref 12-21 Construction Industry Research and Information Association (2001) Control of water pollution from construction Sites: Guidance for consultants and constructors (C532)
- Ref 12-22 Construction Industry Research and Information Association (2007) The SuDS Manual (C697)
- Ref 12-23 Department for Transport (2003) Transport Analysis Guidance [Available at <http://www.webtag.org.uk/> accessed September 2018]
- Ref 12-24 Highways Agency (2007) Design Manual for Roads and Bridges
- Ref 12-25 Multi-Agency Geographical Information for the Countryside (MAGIC) (2018) MAGIC website [Available at: <http://www.magic.gov.uk/> accessed August 2018]
- Ref 12-26 Environment Agency (2018) Environment Agency Interactive Maps. [Available at: <http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=e> Accessed August 2018]
- Ref 12-27 Environment Agency (2009) River Basin Management Plan: Humber River Basin District
- Ref 12-28 North Lincolnshire Council and North East Lincolnshire Council (2011). Strategic Flood Risk Assessment. [Available at: <https://www.nelincs.gov.uk/wp-content/uploads/2016/06/2011-Strategic-Flood-Risk-Assessment.compressed.pdf> accessed September 2018]
- Ref 12-29 North East Lincolnshire Council (2011). Preliminary Flood Risk Assessment. [Available at: <http://webarchive.nationalarchives.gov.uk/20140328094437/http://www.environment-agency.gov.uk/research/planning/135526.aspx#14> accessed September 2018]
- Ref 12-30 Environment Agency (2001) *Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention*