Lighthouse Green Fuels Development Consent Order

Preliminary Environmental Information Report

Chapter 12: Water Environment and Flood Risk

Planning Inspectorate Reference: EN0110025

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1. Introduction

1.1 Overview

1.1.1 This chapter presents the Preliminary Environmental Information Report (PEIR) for the Proposed Development in relation to the water environment.

1.1.2 The 'Proposed Development site' refers to the whole site (including the Main Site, land for the connection corridors and temporary land required during construction), and the 'Main Site' refers to the location of the SAF Production Facility.

1.1.3 For the purpose of this chapter, receptors include surface water features (main rivers, ordinary watercourses, other surface water bodies such as ponds, and abstractions), groundwater waterbodies (aquifers, source protection zones (SPZ), and abstractions), and flood risk (to the Proposed Development and elsewhere associated with tidal, fluvial, surface water, and other sources). Further information on the marine environment receptors can be found in Chapter 11 (PEIR Volume 1).

1.1.4 The chapter describes the baseline conditions of the existing water environment in the study area. It considers the potential impacts of the Proposed Development from construction activities, operational and decommissioning and the effects on the quality and quantity of surface and ground waters, geomorphology and flood risk.

1.1.5 A Water Framework Directive (WFD) compliance assessment and a Nutrient Neutrality assessment will be reported within the Environmental Statement (ES) (presented as appendices) which will accompany the Development Consent Order (DCO) application.

1.1.6 A Level 2 Flood Risk Assessment (FRA) has been produced for this PEIR submission (Appendix 12A Volume 3). This will be revised and updated for the DCO application.

1.1.7 This chapter should be read in conjunction with the following chapters (PEIR Volume 1):

a. Chapter 10: Terrestrial Ecology;
b. Chapter 11: Freshwater and Marine Ecology;
c. Chapter 15: Climate Change Resilience; and
d. Chapter 21: Geology and Soils.

2. Legislation and Planning Policy Context

2.1 Overview

2.1.1 This PEIR chapter has been prepared in accordance with the relevant legislation, planning policy and guidance which underpin the assessment methodology for the Water Environment and Flood Risk and is detailed below.

Table 2-1 Summary of key Legislation and Policy

Policy/Legislation/Guidance	Summary
Policy	
The Environmental Permitting (England and Wales) (Amendment) (EU Exit) Regulations 2019 (Ref 1)	Ensures that The Environmental Permitting (England and Wales) Regulations 2016 for England and Wales continues to function in accordance with the European Union (Withdrawal) Act 2018. Permits and consents may be required for the Proposed Development during construction and operation
The Environment (Amendment etc.) (EU Exit) Regulations 2020 (Ref 2)	Makes technical amendments to environmental legislation after the UK's exit from the EU, specifically to ensure that relevant legislation remains and that it functions correctly after the UK's withdrawal from the European Union. The Act includes measures related to drainage and flood defence which have informed the design of the Proposed Development.
Environmental Protection Act 1990 (Ref 3);	This Act makes provision to control pollution arising from industrial and other processes for waste management. This is relevant to the identification and control of pollution potentially arising from construction and operation of the Proposed Development.
Environment Act 1995 (Ref 4);	Sets standards for environmental management, such as requiring national strategies for air quality and waste. It also deals with the establishment of the Environment Agency. The Act includes measures related to drainage and flood defence which have informed the design of the Proposed Development.
Environment Act 2021 (Ref 5);	The act relates to the Secretary of State's ability to manage water resources and wastewater infrastructure. It gives powers to the Secretary of State to specify what chemicals should be taken into account in assessing water quality and further controls over licenced abstractions. This assessment identifies how the Proposed Development will comply with the Environment Act.
The Environmental Permitting Regulations 2016 (Ref 6);	The amendments extended the requirement for an environmental permit to flood risk activities, in addition to polluting activities included under the previous regulations. The permitting requirements for flood risk activities allow the Environment Agency (as regulator for England) to concentrate on higher risk activities. Permits and consents

Policy/Legislation/Guidance	Summary
	may be required for the Proposed Development during construction and operation.
Water Resources Act 1991 (Ref 7);	Establishes the Environment Agency's powers and duties for the protection of water resources, flood defence, fisheries, recreation, conservation and navigation. It also sets out provisions for control of pollution of water, abstraction, working in or near watercourses and consent for the erection of temporary and permanent obstructions of watercourses. The Proposed Development is located within areas of flood risk and has the potential to result in the pollution and disruption of watercourses; therefore this Act is relevant to the assessment.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WFD) (Ref 8);	Aims to provide an integrated framework for the protection and restoration of the water environment through the delivery of actions set out in 11 River Basin Management Plans (RBMPs). This is pertinent to the protection of the River Tees.
Land Drainage Act 1991 (Ref 9);	Provides functions to drainage boards and local authorities to manage watercourses and provide consenting powers for proposed works to watercourses associated with development. The Proposed Development must consider its impact on Ordinary Watercourses and obtain necessary consents for any works affecting Ordinary Watercourses.
Water Act 2014 (Ref 10);	Amends the Water Resources Act 1991 and the Water Industry Act 1991 to make provision with respect to compensation under section 61 of the Water Resources Act 1991. This assessment identifies how the Proposed Development will comply with the Water Act.
Water Resources (Abstraction and Impounding) Regulations 2006 (Ref 11);	Contains provisions relating to the licensing of abstraction and impounding of water in England and Wales in the light of amendments made by the Water Act 2003 to the Water Resources Act 1991. The 2006 regulations have been updated by the Water Abstraction and Impounding (Exemptions) Regulations 2017. Any required abstraction and impoundment licenses relating the Proposed Development would be granted by the Environment Agency and must be thoroughly assessed for their environmental impact.
The Water Abstraction and Impounding (Exemptions) Regulations 2017 (Ref 12);	Contains circumstances where water abstractions and impounding works are exempt from licensing requirements. Dewatering or abstractions may be required as part of the construction or operation of the Proposed Development, which may be undertaken in line with the Water Abstraction and Impounding (Exemptions) Regulations 2017.
Flood Risk Regulations 2009 (Ref 13);	The regulations designate Local Lead Flood Authorities (LLFA) and impose duties on the Environment Agency and LLFAs to prepare a number of documents including: • Preliminary flood risk assessments • Flood risk and flood hazard maps • Flood risk management plans

Policy/Legislation/Guidance	Summary
	The Proposed Development has the potential to impact flood risk and therefore takes account of these documents.
The Water Supply (Water Quality) Regulations 2018 (Ref 14);	Provides the framework for drinking water quality in England in respect of public supplies provided by water companies and licensed water suppliers. There is the potential that the Proposed Development may result in impacts upon drinking water, this document is therefore relevant to the assessment.
Flood and Water Management Act 2010 (Ref 15);	Gives the Environment Agency a strategic overview of the management of flood and coastal erosion risk in England. In accordance with the Government's Response to the Pitt Review, it also gives upper tier local authorities in England responsibility for preparing and putting in place strategies for managing flood risk from groundwater, surface water and ordinary watercourses in their areas. The principles outlined in the Act must inform the design of the Proposed Development and mitigation through consideration of changes to flood risk.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (Ref 16);	These regulations are based on the 'polluter pays' principle and impose obligations on operators of economic activities requiring them to prevent, limit or remediate environmental damage. They apply to damage to protected species, natural habitats, sites of Special Scientific Interest (SSSI), water and land and implement directive 2004/35/EC, on environmental liability.
The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (Ref 17);	The WFD Directions present the updated environmental standards to be used in the second cycle of the WFD (2000/60/EC) river basin management planning process in England and Wales. The principles of the Directive have been applied to develop the assessment methodology.
The Groundwater (Water Framework Directive) (England) Direction 2016 (Ref 18);	The direction sets out instructions to the Environment Agency on obligations to protect groundwater, including requirements to monitor and set thresholds for pollutants, add new pollutants to the monitoring list and change the information reported to the European Commission. The principles relating to the prevention of risks to groundwater have informed this assessment and design of the Proposed Development.
The Conservation of Habitats and Species Regulations 2017 (Ref 19); and	Ensures the conservation of a range of rare or threatened species.
The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019) (Ref 20).	Implements EU Habitats and Birds Directives in UK law, protecting designated sites and species. Projects affecting designated sites require specific assessment
Policy	
Overarching National Policy Statement for Energy (NPS) (EN-1) 2024	Sets out the primary policy framework for assessing nationally significant energy infrastructure projects, including environmental and ecological considerations.

Policy/Legislation/Guidance	Summary
National Planning Policy Framework (NPPF) 2024	Provides national planning guidance, including strengthened policies on biodiversity net gain, climate resilience, and sustainable development, including support for renewable and low-carbon energy projects like SAF.
North East Marine Plan 2021	Guides sustainable use of marine resources in the Northeast Inshore and Offshore areas, supporting marine biodiversity and coastal development.
Stockton-on-Tees Borough Council (STBC) – Local Plan 2019	Sets out local planning policies for development, including environmental protection and biodiversity within the borough.
Redcar and Cleveland Borough Council (RCBC) Local Plan 2018	Provides the spatial planning framework for the borough, including policies for conserving natural habitats and managing coastal change, N4 Biodiversity and Geological Conservation.
Tees Valley Local Biodiversity Action Plan (LBAP) (updated) 2012	Identifies local priority habitats and species, and outlines conservation actions to support biodiversity in the Tees Valley.
Government's 25-Year Environment Plan 2018	This plan supports clean growth and innovation in low-carbon technologies, aligning with SAF's environmental benefits and its role in decarbonising aviation.
Policy	
25 Year Environment Plan (Ref 21);	Commits to improving water quality and managing resources sustainably by reducing pollution, tackling nutrient enrichment, and restoring natural river processes. Promotes catchment-based approaches, wetlands, and natural flood management to enhance biodiversity and resilience, while aiming for good ecological status under the Water Framework Directive and integrating water efficiency into development.
National Planning Policy Framework (2024) (Ref 22) - Section 14 and Annex 3 in relation to flood risk and climate change, Section 15 in relation to protection of the water environment.	The NPPF states that when determining planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific FRA. Development should only be allowed in areas at risk of flooding where, in light of this assessment (and the Sequential and Exception tests, as applicable), it can be demonstrated that: • within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location; • the development is appropriately flood resistant and resilient; • it incorporates Sustainable Drainage Systems (SuDS), unless there is clear evidence that this would be inappropriate; • any residual risk can be safely managed; and • safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

Policy/Legislation/Guidance	Summary
	Major developments should incorporate SuDS unless there is clear evidence that this would be inappropriate. The systems used should: • take account of advice from the Lead Local Flood Authority (LLFA); • have appropriate proposed minimum operational standards; • have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and • where possible, provide multifunctional benefits. The Proposed Development is located within areas of flood risk, as well as having the potential to impact water quality. This document is therefore relevant to the assessment.
The Overarching National Policy Statement (NPS) for Energy (EN-1) (2024) (Ref 23);	The NPS EN-1, Section 4.12 (Pollution control and other environmental regulatory regimes) considers discharges and emissions including indirect and direct impacts to terrestrial and freshwater onshore environments. It notes that before consenting any potentially polluting developments, it should be confirmed that the relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework. It should also be confirmed that the effects of existing sources of pollution in and around the site are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits. The NPS EN-1, Section 5.8 (Flood Risk) addresses the assessment and management of flood risk for energy infrastructure projects. It mandates that a comprehensive Flood Risk Assessment (FRA) be conducted to evaluate potential impacts under both current and future conditions. The Sequential Test must be applied to prioritize locating projects in areas with the lowest flood risk. If this is not feasible, the Exception Test may be used. Developers are required to propose mitigation measures, such as flood defences and sustainable drainage systems, to manage and reduce flood risk. Additionally, assessments must consider climate change impacts, including increased rainfall and sea level rise, to ensure long-term sustainability and resilience. Consultation with relevant authorities, including the Environment Agency, is essential to confirm compliance with national and local flood risk policies. The Proposed Development must be designed to mitigate the impact of flooding and must be completed in line with the requirements outlined in this policy.
NPS for Renewable Energy Infrastructure (EN-3) (2024) (Ref 24);	The NPS EN-3, section 2.1 (Background) outlines the Government's commitment to ensuring that by 2035, all electricity will come from low-carbon sources, while maintaining security of supply and meeting increased demand. This policy, in conjunction with EN-1, provides the

Policy/Legislation/Guidance	Summary
	primary framework for decisions on applications for nationally significant renewable energy schemes, and is therefore relevant to this assessment.
Cycle 3 River Basin Management Plans (RBMPs) 2022-2028 (Ref 25);	These plans provide a framework for protecting and enhancing the benefits provided by the water environment. They also inform decisions on land use planning. The Proposed Development is within Tees RBMP.
Stockton-on-Tees Borough Council (STBC) Local Plan (2019) (Ref 26);	Requires development to avoid flood-prone areas and incorporate SuDS, reducing pressure on watercourses. Protects water resources through policies on green infrastructure and climate resilience.
Stockton-on-Tees Local Flood Risk Management Strategy (2016) (Ref 27);	Surface water drainage strategies are a key consideration for major development, where the proposals must not increase the risk of surface water run-off or the risk of flooding to neighbouring sites or downstream of the development.
Stockton-on-Tees Strategic Flood Risk Assessments (2018) Level 1 (Ref 29) Level 2 (Ref 30);	The SFRA includes a Level 1 SFRA, an SFRA review, a Level 2 Stage 1 SFRA and a Level 2 Stage 2 SFRA. They provide the evidence base to support a review of the Stockon-on-Tees Borough Council local plan and have an ongoing purpose in providing guidance to developers on flood risk management. The Level 1 SFRA (Ref 29) includes guidance to developers on flood risk identification, management and mitigation, flood risk regulatory compliance (including obtaining necessary permits), and community engagement.. The Level 2 Stage 1 SFRA (Ref 30) includes further guidance to developers on site-specific flood risk identification and mitigation, Sequential and Exception Tests for flood risk assessment, and emergency planning. It also includes further guidance to developers on flood defence infrastructure, flood hazard mapping, residual risk management, and the alignment of development proposals with local and national flood risk policies.
Stockon-on-Tees Preliminary Flood Risk Assessment (Ref 28)	The PFRA is a high-level screening assessment that identifies areas where flood risk is significant (known as Flood Risk Areas). It considers the risk of flooding from local sources, namely Ordinary Watercourses, surface water and groundwater. No areas in Stockon-on-Tees were identified as meeting the national thresholds to be classed as a Flood Risk Area.
Middlesbrough Council Draft Local Plan (2024) (Ref 31Ref 31);	Strengthens requirements for SuDS and water efficiency in new developments. It also promotes water efficiency measures to minimize demand on resources and supports the integration of blue-green infrastructure, such as wetlands, swales, and green spaces, to improve water quality, enhance biodiversity, and build resilience against climate change impacts.

Policy/Legislation/Guidance	Summary
Middlesbrough Local Flood Risk Management Strategy (2016) (Ref 32Ref 32);	Outlines Middlesbrough's approach to managing flood risk from local sources. Key objectives include reducing surface water flooding and ensuring planning decisions consider flood risk.
Middlesbrough Borough Council Strategic Flood Risk Assessment (2018) Level 1 (Ref 33) Level 2 (Ref 34)	The SFRA includes a Level 1 SFRA, an SFRA review, a Level 2 Stage 1 SFRA and a Level 2 Stage 2 SFRA. They provide the evidence base to support a review of the Middlesbrough Borough Council local plan and have an ongoing purpose in providing guidance to developers on flood risk management. The Level 1 SFRA includes guidance to developers on flood risk identification, management and mitigation, flood risk regulatory compliance (including obtaining necessary permits), and community engagement. The Level 2 Stage 1 SFRA includes further guidance to developers on site-specific flood risk identification and mitigation, Sequential and Exception Tests for flood risk assessment, and emergency planning. It also includes further guidance to developers on flood defence infrastructure, flood hazard mapping, residual risk management, and the alignment of development proposals with local and national flood risk policies.
Middlesbrough Borough Council Preliminary Flood Risk Assessment (Ref 35)	The PFRA is a high-level screening assessment that identifies areas where flood risk is significant (known as Flood Risk Areas). It considers the risk of flooding from local sources, namely Ordinary Watercourses, surface water and groundwater. No areas in Middlesbrough were identified as meeting the national thresholds to be classed as a Flood Risk Area.
Redcar and Cleveland Local Plan 2018 (Ref 36);	The plan integrates flood risk management with coastal protection measures to safeguard communities and critical infrastructure from tidal and fluvial flooding. It places strong emphasis on preserving marine and estuarine environments, ensuring that development does not compromise ecological integrity or water quality. Policies encourage water-sensitive urban design, including SuDS and green infrastructure, to manage surface water, reduce runoff, and maintain healthy aquatic ecosystems. The strategy aligns with climate resilience objectives, promoting adaptive approaches to protect biodiversity and support sustainable growth along the coast.
Redcar and Cleveland Borough Council Preliminary Flood Risk Assessment (Ref 37)	The PFRA is a high-level screening assessment that identifies areas where flood risk is significant (known as Flood Risk Areas). It considers the risk of flooding from local sources, namely Ordinary Watercourses, surface water and groundwater. No areas in Redcar and Cleveland were identified as meeting the national thresholds to be classed as a Flood Risk Area.
Redcar and Cleveland Borough Council Strategic Flood Risk Assessments (2018) Level 1 (Ref 38)	The SFRA includes a Level 1 SFRA, an SFRA review, a Level 2 Stage 1 SFRA and a Level 2 Stage 2 SFRA. They provide the evidence base to support a review of the Middlesbrough Borough Council local plan and have an ongoing purpose in providing guidance to developers on flood risk management.

Policy/Legislation/Guidance	Summary
Level 2 (Ref 39)	The Level 1 SFRA includes guidance to developers on flood risk identification, management and mitigation, flood risk regulatory compliance (including obtaining necessary permits), and community engagement. The Level 2 Stage 1 SFRA includes further guidance to developers on site-specific flood risk identification and mitigation, Sequential and Exception Tests for flood risk assessment, and emergency planning. It also includes further guidance to developers on flood defence infrastructure, flood hazard mapping, residual risk management, and the alignment of development proposals with local and national flood risk policies.
Redcar and Cleveland Borough Council Local Flood Risk Management Strategy (Ref 40)	The Strategy noted a flood event (2013) was as a result of surface water run-off and sewer flooding rather than from the rivers. Work has been done with Northumbrian Water to improve the drainage system. Sustainable drainage is critical to achieving effective surface water management and the Authority is developing its policy in this area. All major planning applications now must include proposals on drainage and flood risk reduction. Surface water drainage strategies are a key consideration for major development, where the proposals must not increase the risk of surface water run-off or the risk of flooding to neighbouring sites or downstream of the development.
Guidance	
Environment Agency (EA)'s Climate Change Allowance Guidance (2022) (Ref 41);	Outlines when and how local authorities, developers, and their agents should use climate change allowances in flood risk assessments to ensure that developments are resilient to future climate change. It promotes an adaptive planning approach to managing flood risk, ensuring that all potential risks are identified and mitigated, thereby protecting communities and infrastructure. The guidance will inform design and the identification of mitigation measures to manage the impact of climate change on flood risk.
Flood Risk Assessments: Climate Change Allowances (Environment Agency, 2022b) (Ref 41);	Outlines when and how risk management authorities should use climate change allowances for flood and coastal risk projects, schemes, and strategies. It promotes an adaptive approach to managing flood risk, enabling the development of projects that can adapt to a range of future climate change scenarios. By using climate change allowances to assess and plan for future flood risk, the guidance ensures that potential risks are identified and mitigated, and that projects are designed to be resilient to future climate change impacts. The guidance will inform design and the identification of mitigation measures to manage the impact of climate change on flood risk.
EA's Approach to Groundwater Protection (2018) (Ref 42);	Provides detailed guidance on protecting groundwater from pollution and managing activities that could impact groundwater quality. It outlines the necessary environmental permits and risk assessments for activities that may affect

Policy/Legislation/Guidance	Summary
	groundwater, and provides a framework for implementing controls, overall helping to identify and mitigate potential risks to groundwater quality. Groundwater will be protected from pollution and any other activities that could impact groundwater quality in accordance with the guidance.
Guidance for Pollution Prevention (GPP) (Ref 43);	Environment Agency, SEPA, Natural Resources Wales, and Northern Ireland Environment Agency (2023).
Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (Ref 44)	Provides guidance on environmental best practices for controlling water pollution resulting from construction activities, emphasising potential pollution sources within construction sites and effective prevention methods. It also covers benefits and obligations, water pollution management, legislative frameworks, construction contracts, and water management techniques.
Planning Inspectorate Guidance: Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (2025) (Ref 45Ref 45);	It is a non-statutory advice note that summarises the requirements of the WFD Regulations in relation to nationally significant infrastructure project applications. The advice note provides a guide to the Proposed Development in informing the WFD Compliance Assessment and is being used to inform the approach.
Clearing the Waters for All (DEFRA) (2016) (Ref 46Ref 46);	This guidance provides practical advice for developers and operators to prevent water pollution during both construction and operational phases of projects. The document promotes best practice measures such as controlling site runoff, managing sediment and chemicals, and implementing robust drainage systems.
Non-Statutory Technical Standards for SuDS (2015) (Ref 47Ref 47);	This document sets out national design principles for sustainable drainage systems in England, providing a consistent framework for managing surface water runoff from new developments. It focuses on controlling runoff volume and rate to mimic natural drainage, reducing flood risk and downstream impacts. The standards also address water quality improvements through treatment stages, alongside requirements for amenity and biodiversity benefits, ensuring SuDS deliver multifunctional outcomes.
Tees Valley Authorities Sustainable Drainage Systems (SuDS) Guidance (2019) (Ref 48Ref 48);	This guidance provides detailed, region-specific advice for incorporating SuDS into new developments across the Tees Valley area. The document outlines preferred SuDS components such as swales, retention ponds, permeable paving, and green roofs, and encourages developers to adopt a hierarchical approach, prioritising infiltration where possible.
CIRIA C753 The SuDS Manual (2015) (Ref 49Ref 49);	Provides guidance on sustainable drainage design, focusing on reducing runoff, improving water quality, and delivering amenity and biodiversity benefits. It covers all stages from planning to maintenance, details performance criteria for SuDS components, and promotes a treatment train approach for resilience and pollutant removal. The manual also addresses climate adaptation, integration with green infrastructure, and regulatory compliance, making it a key reference for practitioners.

Policy/Legislation/Guidance	Summary
CIRIA 532 Control of Water Pollution from Construction Sites (2001) (Ref 50Ref 50);	Provides guidance on environmental best practices for controlling water pollution resulting from construction activities, emphasising potential pollution sources within construction sites and effective prevention methods. It also covers benefits and obligations, water pollution management, legislative frameworks, construction contracts, and water management techniques.
Environmental good practice on site (C692) (2015) (Ref 51Ref 51);	Provides practical guidance for managing construction sites to deliver sustainable construction and minimise environmental impacts. This guidance is designed to help site managers and environmental managers implement good environmental practices, ensure compliance with regulations and promoting sustainable construction
Groundwater control: design and practice (second edition) (C750) (2016) (Ref 52Ref 52);	Provides guidance on groundwater control for construction projects, focusing on pumping and dewatering methods used in temporary works. It covers the impact of groundwater on excavation stability, techniques for groundwater control, and associated safety, environmental, and legal considerations. The publication includes advice on site investigation requirements, design principles, and practical steps for the installation and operation of groundwater control systems, ensuring effective and safe management of groundwater during construction.
Natural England Water Quality and Nutrient Neutrality Advice (2022) (NE785) (Ref 53Ref 53);	The guidance set out by Natural England advice where a proposals that could affect water quality and lead to adverse nutrient impacts on designated Habitats Sites (Special Areas of Conservation, Special Protection Areas, and Ramsar sites). Where nutrient impacts cannot be ruled out and introduces the nutrient neutrality approach, which ensures new development does not increase nutrient loads by applying mitigation measures either on-site or off-site. As part of the ES submission a Nutrient Neutrality assessment will be undertaken.
Design Manual for Road and Bridges (DMRB) LA113 Road Drainage and the Water Environment (2019, as amended) (Ref 54Ref 54).	Provides comprehensive guidelines for assessing and managing the impacts of projects on the water environment. It offers a framework for evaluating potential impacts and implementing mitigation measures to minimise adverse effects on water quality, flood risk, and aquatic ecosystems. Specifically, it outlines procedures for assessing environmental sensitivity, the magnitude of impact, and the significance of potential effects on the water environment.

3. Assessment Methodology

3.1 Scoping Opinion

3.1.1 The following responses have been provided by Statutory Consultees Table 3-1.

Table 3-1 Scoping Opinion Responses

Key stakeholders	Consultation response	Applicant Response to Feedback
Environment Agency	Summary of the Flood Risk Assessment response: The FRA must confirm Flood Zone classification (3a or 3b), define vulnerability under NPPF Annex 3, and demonstrate compliance for essential infrastructure—ensuring it remains operational during flooding, does not reduce floodplain storage, and does not increase flood risk elsewhere. Highly vulnerable uses are generally unsuitable in Flood Zone 3. The FRA should include site layouts overlaid on flood maps, apply a sequential approach to prioritize lower-risk areas, and consider climate change impacts. It must reference key guidance (NPPF, PPG, SMP) and address technical issues such as reservoir risk, culverts, pipelines, quayside works, and watercourse crossings. Culverting should be avoided unless temporary, and pipeline crossings must prevent debris accumulation. The Environmental Statement should show floodplain interactions and access routes, while DCO documents must include pipeline and crossing details. The design life is unclear; PPG recommends assuming at least 75 years for non-residential developments to inform future flood extent assessments. The FRA must state climate change allowances and epochs. For essential infrastructure, assess higher central and upper end allowances for river flow and sea level rise, with sensitivity tests including H++. In line with EN-1, the development must remain operational during the design flood and consider the credible maximum scenario to ensure resilience.	An FRA has been produced which states the parts of the Proposed Development that are within Flood Zones. This FRA has followed the NPPF Annex 3 guidance and considers the impacts of climate change. This PEIR FRA outlines how the Proposed Development will interact with the flood risk receptors. Hydraulic modelling method statement will be prepared and agreed with the EA, prior to the work being undertaken at the ES stage. Whilst the expected design life of the Proposed Development will be at least 25 years, the FRA will consider a 75 year design life in accordance with EA climate change guidance.
	The Scoping Report proposes a qualitative assessment of potential impacts to water environment in accordance with the approach outlined in the Design Manual for Roads and	DMRB LA113 has been adapted to make it suitable for this Application. Adaptations include the

Key stakeholders	Consultation response	Applicant Response to Feedback
	Bridges (DMRB) guidance. The assessment would be based only on the review of existing data and site surveys, with no water quality sampling proposed. Considering the methodology set out within the DMRB guidance is aimed at road schemes, the ES should ensure the suitability of this methodology, align it with relevant policy and adapt it where necessary. The applicant should seek to agree the methodology with relevant consultees.	omission of HEWRAT and ensuring any increase in flood risk is seen as a significant effect. Water sampling is proposed as part of the MMO licence application, it is the intention that this data will also be used to inform the Water Environment ES.
	The Scoping Report proposes a 1km study area with potential to extend beyond to capture potential impacts to receptors beyond the 1km buffer. The Inspectorate considers that the ES should clearly define the study area based on the ZoI, the hydrology of the site and potential for significant effects. Consideration of upstream receptors should also be included where appropriate.	The ZoI for surface water receptors has been extended to 2km, due to the nature of the works proposed and the designated sites within the area.
	Waste effluent will be sent to Bran Sands Wastewater Treatment Works (WwTW) for treatment, and the ES must assess downstream environmental impacts. It should outline assumptions on the timing and risks of delivering the long sea outfall to Tees Bay and confirm agreement with Northumbrian Water. If not agreed, the ES must assess alternative discharge arrangements and their impacts. It also notes wastewater will go to an existing treatment plant with no normal discharge to the River Tees, but it is unclear where treated effluent will be released and if abnormal discharges could occur. The proposal to use NWL Bran Sands WwTW, which currently discharges to the Tees estuary via Dabholme Gut, will increase nitrogen loading. The ES must assess water quality impacts and include a nutrient neutrality mitigation scheme for the Tees Estuary Transitional Waterbody.	The PEIR has assessed both arrangements: long sea outfall will be operational before the Proposed Development is complete, long sea outfall will not be operational before the Proposed Development is complete. At the ES stage a Nutrient Neutrality and WFD assessment will be undertaken to assess the impacts the increase in nitrogen will have on the area, as well as implement mitigation.
	The assessment of the hydromorphological impacts of the proposal and associated mitigation measures should have regard to such ‘coastal squeeze’. It is recommended that Table 13.5 Summary of scope for CCR Assessment scopes IN ‘Sea level rise, storm surge effects’ from this perspective	This has been considered within the assessment.
	New quay and WFD The construction of a new quay. The proposed development involves physically modifying a waterbody designated as a Heavily Physically Modified Waterbody (HMWB). The proposal	A WFD will be undertaken as part of the ES submission. The Applicant will ensure no deterioration to the wate bodies affected and outline

Key stakeholders	Consultation response	Applicant Response to Feedback
	should be assessed to determine if the development is exempt under Article 4.7 of WFD. Appropriate Mitigation Measures must be provided. The proposals relating to construction of a new quay may result in additional physical modifications of the Tees Estuary that may have the potential to jeopardise attainment of the environmental objective of achieving Good Ecological Potential.	appropriate mitigation to ensure WFD compliance. The Tees Coastal Water Body has also been scoped into the PEIR and will be included the in the WFD assessment
	The impacts which have the potential to be significant to the water environment during the construction phase. Existing wooden open quay structures and underlying intertidal habitats may be replaced by closed structures. The list of impacts provided in this section should include permanent loss of natural and artificial intertidal habitats from the demolition of existing jetties, construction of the new quay (including possible removal of foreshore and revetment, capital dredging and piling)'. Appropriate mitigation should be put in place to address this loss.	The loss of these habitats from the existing quay has been included in the assessment.

3.2 Study Area

3.2.1 The study area will include surface water, flood risk features and designated sites within a 2km radius of the Proposed Development and is based on professional judgement, applying the 'source-pathway-receptor' pollutant linkage principle. For groundwater features (including Groundwater Dependent Terrestrial Ecosystems (GWDTEs)) the study area is a 1km radius surrounding the Proposed Development. These buffers have been selected based on professional judgement of the potential impacts posed by the Proposed Development.

3.3 Baseline methodology

3.3.1 The baseline conditions have been informed by a desk-based study. The key sources of information used to determine the baseline water environment and flood risk conditions are:

a. EA Catchment Data Explorer (Ref 55);
b. Ordnance Survey Mapping (Ref 56);
c. Department for Environment, Food and Rural Affairs (Defra) MAGiC online Mapping (Ref 57);
d. British Geological Survey (BGS) Geology of Britain Viewer (Ref 58);
e. EA Flood Map for Planning (online) (Ref 59);

f. EA Risk of Flooding from Surface Water Map (online) (Ref 60);
g. EA Risk of Flooding from Reservoirs Map (online) (Ref 61);
h. EA Recorded Flood Outlines Map (online) (Ref 62);
i. GWDTEs (EA) (Ref 63);
j. Stockton upon Tees Borough Council SFRA (Ref 29, Ref 30);
k. Redcar and Cleveland Borough Council SFRA (Ref 38, Ref 39);
l. Middlesbrough Borough Council SFRA (Ref 33, Ref 34);
m. Bathing Waters Area (Ref 72); and
n. Nutrient Neutrality Catchment (Ref 73).

3.4 Assessment Methodology

3.4.1 The assessment within the ES will follow the requirements of DMRB LA 104 (Ref 66) and DMRB LA 113 (Ref 54). Whilst this guidance is based on assessing the impacts of a road scheme, it provides a clear methodology to assessing the effects to the water environment. As such, this methodology, as adapted where necessary and using professional judgement, has been applied to the assessment of impacts of the Proposed Development on the Water Environment.

Assessment of importance

3.4.2 The sensitivity of each water environment feature within the study area has been determined according to the DMRB criteria set out in Table 3.70 of DMRB LA 113 (Ref 54) and as shown in Table 3-2.

Table 3-2 Estimating the importance of water environment receptors

Receptor Importance	Criteria	Examples	
Very High	Nationally significant receptor of high importance	Surface water	• Watercourse having a WFD classification shown in a RBMP) and Q95* ≥ 1.0 m^3/s. • Site protected / designated under EC or UK legislation (Special Area of Conservation (SAC), SPA, Site of Special Scientific Interest (SSSI), Ramsar site, salmonid water) / Species protected by UK legislation Ecology and Nature Conservation
		Groundwater	• Principal aquifer providing a regionally important resource and / or supporting a site protected under EC and UK Legislation. • Groundwater locally supports GWDTE. • Source Protection Zone (SPZ) 1.

Receptor Importance	Criteria	Examples	
		Flood risk	• Essential infrastructure or highly vulnerable development.
High	Locally significant receptor of high importance	Surface water	• Watercourse having a WFD classification shown in a RBMP and Q95 < 1.0 m^3/s. • Species protected under EC or UK legislation.
		Groundwater	• Principal aquifer providing locally important resource or supporting a river ecosystem. • Groundwater supports GWDTE. • SPZ 2.
		Flood risk	• More vulnerable development.
Medium	Of moderate quality and rarity	Surface water	• Watercourse not having a WFD classification shown in the RBMP and Q95 > 0.001 m^3/s.
		Groundwater	• Aquifer providing water for agricultural or industrial use with limited connection to surface water. • SPZ 3.
		Flood risk	• Less vulnerable development.
Low	Lower quality	Surface water	• Watercourse not having a WFD classification shown in the RBMP and Q95 ≤ 0.001 m^3/s.
		Groundwater	• Unproductive strata.
		Flood risk	• Water compatible development.

* Typically defined as the percentage of time that the flow in a river is greater than the stated probability. For example, Q95 is the flow exceeded 95% of the time and is typical of a dry summer flow.

Magnitude of impact

3.4.3 The approach used to assess magnitude of impacts on water environment features considers the change to the receptor, as a result of the Proposed Development. This considers the severity of impact of the Proposed Development together with the vulnerability of the receptor to change.

3.4.4 Table 3-3 summarises the potential magnitude of any construction or operation impact on the receptor. Table 3.71 of DMRB LA 113 (Ref 54) has been adapted to remove specific attributes linked to highways methodologies such as Highways England's Water Risk Assessment Tool and accidental spillage assessments, which are not relevant to the Proposed Development.

Table 3-3 Estimating the magnitude of impact on a receptor[i]

Magnitude of impact	Criteria	Examples	
Major (Large) Adverse	Results in loss of attribute and / or quality and integrity of the attribute	Surface water	• Loss of, or extensive change to, a fishery. • Loss of regionally important public water supply. • Loss of, or extensive change to, a designated nature conservation site. • Reduction in water body WFD classification.
		Groundwater	• Loss of, or extensive change to, an aquifer. • Loss of regionally important water supply. • Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies. • Reduction in water body WFD classification. • Loss or significant damage to major structures through subsidence or similar effects.
		Flood risk	• Increase in peak flood level (> 100 mm)
Moderate (Medium) Adverse	Results in effect on integrity of attribute, or loss of part of attribute	Surface water	• Partial loss in productivity of a fishery. • Degradation of regionally important public water supply or loss of major commercial / industrial / agricultural supplies. • Contribution to reduction in water body WFD classification.
		Groundwater	• Partial loss of, or change to, an aquifer. • Degradation of regionally important public water supply or loss of significant commercial / industrial / agricultural supplies. • Partial loss of the integrity of GWDTE. • Contribution to reduction in water body WFD classification. • Damage to major structures through subsidence or similar effects or loss of minor structures.

[i] IEMA magnitudes in parentheses

Magnitude of impact	Criteria	Examples	
		Flood risk	• Increase in peak flood level > 50 mm
Minor (Small) Adverse	Results in some measurable change in attributes, quality, or vulnerability	Surface water	• Minor effects on water supplies.
		Groundwater	• Minor effects on an aquifer, GWDTEs, abstractions, and structures.
		Flood risk	• Increase in peak flood level > 10 mm
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	Surface water	• The proposed project is unlikely to affect the integrity of the water environment.
		Groundwater	
		Flood risk	• Negligible change to peak flood level (≤ +/- 10 mm).
Minor (small) Beneficial	Results in some beneficial effect on attribute or a reduced risk of adverse effect occurring	Surface water	• Potential for slight reduction in pollution to a surface water body. However, the impact is insufficient to cause noticeable benefit in quality, fishery, productivity or biodiversity.
		Groundwater	• Potential for slight reduction in pollution to a groundwater body. However, the impact is insufficient to cause noticeable benefit in quality, baseflow, GWDTE. • Reduction of groundwater hazard to existing structures. • Reductions in waterlogging and groundwater flooding.
		Flood risk	• Creation of flood storage and decrease in peak flood level > 10 mm
Moderate (medium) Beneficial	Results in moderate improvement of attribute quality	Surface water	• Potential increase in the productivity of a fishery. • Contribution to improvement in water body WFD classification.
		Groundwater	• Contribution to improvement in water body WFD classification. • Improvement in groundwater Catchment Abstraction Management Strategy (CAMS) (or equivalent) classification. • Support to significant improvements in damaged GWDTE.
		Flood risk	• Creation of flood storage and decrease in peak flood level > 50 mm

Magnitude of impact	Criteria	Examples	
Major (large) Beneficial	Results in major improvement of attribute quality	Surface water	• Significant improvement to a fishery / designated nature conservation site. • Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring. • Improvement in water body WFD classification.
		Groundwater	• Removal of existing polluting discharge to an aquifer or reducing the likelihood of polluting discharges occurring. • Recharge of an aquifer. • Improvement in water body WFD classification.
		Flood risk	• Creation of flood storage and decrease in peak flood level > 100 mm
No change		No loss or alteration of characteristics, features, or elements; no observable impact in either direction.	

Significance of effect

3.4.5 For this assessment, significance of moderate and above is defined as a likely significant effect. Where the matrix suggests more than one likely outcome, for instance slight or moderate, professional judgement has been used in conjunction with Table 3-.

3.4.6 The significance of an effect is determined by considering the importance of the receptor alongside the magnitude of the impact. In accordance with Table 3.8.1 of DMRB LA 104 (Ref 66), the significance of effect upon the receptors is assessed using the matrix in Table 3-4. Effects are defined on a nine-point scale (very large beneficial, large beneficial, moderate beneficial, slight beneficial, neutral, slight adverse, moderate adverse, large adverse or very large adverse).

3.4.7 Impact magnitude and receptor sensitivity (or value) are defined within DMRB LA 104 Table 3.2N and Table 3.4N (Ref 66). They interact to facilitate a judgement of significance of effect, using professional judgement and the matrix set out in Table 3-4.

Table 3-4 Significance matrix

		Magnitude of impact				
		No change	Negligible	Minor (Small)	Moderate (Medium)	Major (Large)
Receptor Sensitivity	Very High	Neutral	Slight (minor)	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight (minor)	Slight (minor) or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight (minor)	Slight (minor)	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight (minor)	Neutral or Slight (minor)	Slight (minor)	Slight (minor) or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight (minor)	Neutral or Slight (minor)	Slight (minor)

3.5 Assumptions and limitations

3.5.1 This chapter has been prepared using publicly available information for desk-based assessment. It is assumed the information provided from public sources is correct and reflects baseline conditions.

3.5.2 In advance of detailed design, the assessment of potential effect has taken account of the 'worst case' scenarios (using Rochdale Envelope principles).

3.5.3 No site surveys have been carried out for the PEIR submission. However, a site walkover (to understand the baseline conditions) will be undertaken for the DCO application; findings from the site walkover will be included in updates to the baseline section, and the subsequent assessment.

3.5.4 An updated list of licensed surface water and groundwater abstractions as well as discharge consents has not been obtained for the PEIR. As such, the locations of these features have been omitted for this submission. Notwithstanding, the potential impacts are still assessed within the chapter, using professional judgement. It is anticipated that the surface water and groundwater abstraction data will be obtained and incorporated into the final ES chapter, in support of the DCO application.

3.5.5 An Outline Drainage Strategy for the Proposed Development is being developed. At this stage it has not been determined if a new surface water outfall will be constructed, or whether the existing outfall will be used on the

River Tees to facilitate surface water runoff. Following the Rochdale Envelope approach, this PEIR assessment has assumed that a new outfall will be constructed.

3.5.6 As a worst case, a scenario has also been considered that the Northumbrian Water Limited (NWL) Bran Sands WwTW proposed Long Sea Outfall (or other suitable facility) will not be constructed and operational before the Proposed Development is operational.

4. Baseline Conditions

4.1 Designated sites

4.1.1 The following statutory designated sites are located within the Study Area (see Figure 10.3):

a. Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), and Ramsar - which includes the wider Seal Sands area and the River Tees – running through the Proposed Development, and located immediately to the eastern extents of the Proposed Development; and

b. Teesmouth National Nature Reserve (NNR), located approximately 850m north of the Proposed Development.

4.1.2 Four nature reserves are located within the Study Area to the west and north-west of the Proposed Development. These sites are also part of the Teesmouth and Cleveland Coast SSSI, SPA, and Ramsar and are under the protection of the Royal Society for the Protection of Birds (RSPB).

4.1.3 The nature reserves that form part of RSPB Saltholme are:

a. Dorman's Pool Nature Reserve;

b. Saltholme East Pool Nature Reserve;

c. Saltholme West Pool Nature Reserve; and

d. Paddy's Pool Nature Reserve.

4.1.4 There are no Source Protection Zones and Nitrate Vulnerable Zones within the Study Area. There are no surface water and groundwater drinking water safeguard zones within the Study Area.

4.1.5 The Site is located within a Nutrient Neutrality Catchment (Teesmouth and Cleveland Coast SPA/Ramsar).

4.1.6 Approximately 4.5km downstream of the Site, Seaton Carew Beach is designated as having Excellent Bathing Waters.

4.2 Surface water

Hydrology

4.2.1 There are several surface water receptors within 2km Study Area (see Figure 12.1):

a. Several unnamed land drains, located immediately adjacent to the north, east, south and west of the Proposed Development and within the Study Area;

b. Dorman's Pool and Saltholme West Pool and several unnamed ponds, located south and west of the Proposed Development and within the Study Area;

c. The River Tees (a Main River) is located to the south and east of the Proposed Development and is crossed by the gas and wastewater connections to South Tees;
d. Saltholme Brine Reservoirs located approximately 600m west of the Proposed Development;
e. Greatham Creek (a main river) located approximately 1km north-west of the Proposed Development;
f. Dabholm Creek (an Ordinary Watercourse) is located to the east of the Proposed Development adjacent to Brand Sands Waste Water Treatment Work(WwTW);
g. Knitting Wife Beck (an Ordinary Watercourse) located approximately 300m south-west of the eastern extent of the Proposed Development (Tees Dock roundabout);
h. Mill Race (an Ordinary Watercourse) intersects the Trunk Road at the eastern extent of the Proposed Development;
i. The Fleet (an Ordinary Watercourse) located approximately 200m north of the Proposed Development;
j. Holme Fleet (a Main River) located approximately 120 south-west of the Proposed Development (through the Salthholme Nature Reserve); and
k. Ormesby and Normanby Beck (Ordinary Watercoueses) both located approximately 1.2km south-east of the Proposed Development.

Water Framework Directive catchments

4.2.2 The following WFD surface water, transitional and coastal waterbodies are located within the Study Area:

a. The 'Tees Water Body' (GB510302509900), a transitional water body, which is located immediately adjacent to the east of the Proposed Development. As of WFD River Basin Management Plan (RBMP) Cycle 3 (2022), this water body has been assessed to have 'Moderate' status;
b. The Tees Estuary (S Bank) water body (ID: GB103025072320) is located at the eastern extent of the Proposed Development. As of Cycle 3 (2022), this water body has a 'Moderate Ecological Potential' status; and
c. Marton West Beck Catchment (trib of Tidal Tees) (ID: GB103025072210) is a tributary of the Tees Water and is located upstream of the Proposed Development. As of Cycle 3 (2022), this water body has a 'Moderate Ecological Potential' status.

4.2.3 The Tees Coastal water body (ID: GB650301500005) is located approximately 3km downstream from the Proposed Development in Tees Bay.

4.2.4 These water bodes will be scoped in and assessed within the WFD assessment, at the ES stage.

4.3 Groundwater

Bedrock

4.3.1 The bedrock beneath the Main Site is the Mercia Mudstone Group. This comprises mudstone and subordinate siltstones with thick halite-bearing units in some basinal areas, widespread thin beds of gypsum/anhydrite and thin sandstones (see Figure 12.3). The Mercia Mudstone Group is classified by the EA as a Secondary B Aquifer, a lower permeability layer that may store and yield limited amounts of groundwater, primarily through thin cracks (fissures) and specific layers.

4.3.2 The Mercia Mudstone is underlain by the Sherwood Sandstone Group which comprises red, yellow and brown sandstone, pebbly in parts with subordinate mudstone and siltstone. The Sherwood Sandstone sub crops approximately 75m west of the Main Site. The Sherwood Sandstone Group is classified by the EA as a Principal Aquifer, a strategically important rock formation that provides significant groundwater supplies or base flow to rivers, lakes, and wetlands due to its high permeability and water storage capacity.

4.3.3 The Proposed Development and Study Area are underlain by several bedrock aquifers.

4.3.4 The western extent of the Proposed Development and Study Area is immediately underlain by the Sherwood Sandstone Principal Aquifer[ii] (Ref 67). Most of the Proposed Development is immediately underlain by the Mercia Mudstone, a Secondary B Aquifer[iii] (Ref 68), with a groundwater vulnerability of Medium-High. This suggests that the Secondary Aquifers can support water supplies at a local rather than strategic scale and, potentially forming an important source of base flow to rivers. There is likely to be some horizontal movement of groundwater through permeable layers.

4.3.5 The majority of the Proposed Development and Study Area is immediately underlain by the Redcar Mudstone, a Secondary (undifferentiated) unproductive aquifer, with a groundwater vulnerability of Low.

4.3.6 Regional groundwater flow is likely to occur in the deep bedrock aquifer (Sherwood Sandstone Group). Groundwater flow in the deep bedrock aquifer is not generally in continuity with shallow groundwater.

4.3.7 Penarth Group and Redcar Mudstone underlie the wider Study Area to the south and east.

[ii] Layers of rock or drift deposits that have high intergranular and/or fracture permeability – meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

[iii] Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons, and weathering.

Superficial

4.3.8 The superficial deposits underlying the Proposed Development and Study Area are 'Tidal Flat Deposits – Sand, silt and clay', 'Blown Sand – Sand' and 'Glaciolacustrine Deposits, Devensian - Clay and silt' and Glacial Till (see Figure 12.2).

4.3.9 The Proposed Development and Study Area are underlain by two superficial aquifers. The western and central extent of the Proposed Development is located within a Secondary (undifferentiated) unproductive aquifer, and the eastern extent is in a Secondary A aquifer.

4.3.10 At a local scale, groundwater flow within the superficial deposits is generally toward the River Tees. However, this flow direction can vary due to local changes in topography, aquifer structure - such as the presence of clay or fine-grained sediments - rainfall patterns, and man-made features (e.g. drainage systems). The River Tees is likely to be hydraulically connected to the shallow groundwater contained within the superficial (Tidal Flat) deposits.

Groundwater Dependent Terrestrial Ecosystems

4.3.11 The following GWDTEs are located within the Study Area:

a. The Tees and Cleveland Coast Ramsar Site is primarily located to the north and west of the Proposed Development and also along the coast at Tees Bay, with smaller designated areas along the River Tees including Dabholm Gut. These areas are designated a Ramsar site based on the presence of nationally and internationally important number of bird species; and

b. The Teesmouth and Cleveland Coast SSSI is designated to the River Tees (south of the Proposed Development) and is designated for its nationally important Jurassic and Quaternary geology, saltmarsh, sand dunes, flora and fauna.

4.3.12 The SSSI and Ramsar designations include Dorman's Pool Nature Reserve to the north of the Proposed Development and Saltholme West Pool Nature Reserve to the west of the Proposed Development.

Springs

4.3.13 There are no springs within the Study Area.

Water Framework Directive catchments

4.3.14 The Study Area is located within two WFD groundwater bodies: Tees Sherwood Sandstone Water Body (GB40301G702000) in which the Proposed Development is situated to the north of the River Tees and 'Tees Mercia Mudstone & Redcar Mudstone Water Body' (GB40302G701300) to

the south of the River Tees.

4.3.15 These water bodes will be scoped in and assessed within the WFD assessment, at the ES stage.

4.4 Flood risk

Rivers and sea

4.4.1 The majority of the Main Site falls within Flood Zone 1 and is at low fluvial and tidal flood risk (Flood Zone 1), under baseline conditions (see Figure 12.5).

4.4.2 Furthermore, several sections of the Proposed Development boundary are situated within higher-risk areas classified (Flood Zones 2 and 3) under baseline conditions. These include: the initial 800 m of Seal Sands Road east of Seal Sands Roundabout; the route proposed for the SAF export pipeline leading to the Navigator North Tees Inland Terminal; the intertidal area along the River Tees; and areas along the north bank of Dabholm Gut in South Tees.

4.4.3 The EA asset management website (Ref 71) identifies the presence of several flood defence assets within the study area. One of these, Asset id 395472, intersects the Site boundary. According to the EA dataset (see A.4), this feature is natural high ground with length 5149.48 m that functions as a flood defence, providing partial protection against fluvial and tidal flooding from the River Tees.

4.4.4 The asset is located within the STBC administrative area; a private individual, company or charity maintains this flood defence however, no specific details regarding its name, operator, or ownership are currently recorded within the EA dataset. It is also noted that this defence has not been incorporated into the EA Flood Map for Planning and therefore is not accounted for in the mapped flood zone extents.

4.4.5 The baseline and defended flood extents indicate that flood depths along the southern boundary of the Proposed Development range between 2.00-4.75m. Within the Proposed Development itself, modelled flood levels under defended conditions are reported to reach 3.87mAOD during a 2% Annual Exceedance Probability (AEP) event, 3.99mAOD during a 1% AEP event, 4.11mAOD during a 0.5% AEP event, and 4.25mAOD during a 0.1% AEP event. These levels represent the residual flood risk assuming the continued effectiveness of existing flood defences.

Surface water

4.4.6 There are localised areas of low (area has a chance of flooding of between

0.1% and 1% each year) to high (area has a chance of flooding of greater than 3.3% each year) surface water flood risk across the Proposed Development site and Study Area (see Figure 12.6).

4.4.7 The EA Long-Term Flood Risk Map (see Figure 12.7) indicates that there is predominantly a low chance of surface water flooding to depths of approximately 20–30 cm along the northern boundary of the Main Site, with some minor areas exhibiting a medium chance of flooding. This is potentially associated with Seal Sands Road, and the immediately surrounding areas.

4.4.8 Overall, the Proposed Development site and surrounding area are associated with a variable but generally low risk of surface water flooding, with isolated areas of higher risk associated with low-lying ground and the Main Site access route.

Groundwater

4.4.1 The Main Site is underlain at depth by Mercia Mudstone which is of low permeability and the high permeability Sherwood Sandstone Group Principal Aquifer. The bedrock is overlain by superficial deposits including Tidal Flat deposits. The superficial deposits are also predominantly of lower permeability that may store and yield limited amounts of groundwater.

4.4.2 At a local scale, groundwater within superficial deposits and made ground generally flows toward the River Tees, which is likely hydraulically connected to shallow groundwater in the Tidal Flat deposits.

4.4.3 Both the RCBC Level 1 SFRA and PFRA state that the overall risk of groundwater flooding in Redcar and Cleveland is low. It is noted in these assessments, that the majority of the borough may be subject to very wet ground conditions as a result of winter waterlogging. STBC hold no records of groundwater flooding problems in their area.

4.4.4 The Tees CFMP Catchment Flood Management Plan states that there is little documented evidence of groundwater flooding in the Tees catchment and groundwater flooding is not known to be a major problem due to the geology of the catchment.

4.4.5 It is anticipated that any localised, emergent groundwater seepages would be managed by the new or updated drainage system. The detailed design for the Proposed Development will also need to ensure foundation design does not adversely affect (and is not adversely affected by) changes in groundwater elevation in made ground (Main Site) and underlying superficial deposits (River Tees).

Reservoir

4.4.6 The EA Reservoir Flood Map (RFM) indicates that the Main Site is not directly at risk of flooding from reservoirs. However, it lies adjacent to areas identified as being at potential risk under both normal river conditions and combined fluvial–reservoir flood scenarios.

4.4.7 Reservoir flooding is categorised as flooding from an artificial source, typically resulting from the overtopping, structural failure, or breach of a reservoir or its associated outfall structures. The likelihood of such events is considered very low, owing to stringent regulatory and inspection regimes. However, the consequences of a breach can be severe, making reservoir flooding a residual but high-impact risk.

4.4.8 The EA Reservoir Flood Map indicates that the Main Site is not directly at risk of flooding from reservoirs. However, the Main Site lies adjacent to areas identified as being at potential risk of flooding from this source; under both normal river conditions and combined fluvial–reservoir flood scenarios.

4.4.9 The residual risk of reservoir flooding at the Site is considered low due to EA monitoring and maintenance.

Other artificial water retaining structures

4.4.10 The residual risks associated with canal flooding are primarily influenced by the location and nature of any potential structural failure.

4.4.11 There are no canal systems within the Proposed Development or the surrounding area (as noted in the STBC and RCBC SFRAs). On this basis, there is no risk of canal flooding to the Proposed Development.

Sewer Flooding

4.4.12 Currently there is no data or information included in the STBC and RCBC SFRA on whether the Proposed Development and surrounding Study Area is at risk of sewer flooding. A utilities search will therefore be undertaken to help constrain assessment of sewer flood risk, as the design of the Proposed Development is progressed; with findings fed back into any accompanying flood risk assessment.

4.4.13 Overall, there is no evidence to suggest a risk of sewer flooding to the Proposed Development or surrounding area. However, a utilities search is proposed to support ongoing design and risk assessment.

Historical Flooding

4.4.14 The EA recorded flood data (between 1978-2021) indicate that historic flooding within the Site boundary has been attributed to operational failure

or breach of flood defences in the River Tees.

4.4.15 The STBC PFRA describes six significant historical flood events within the borough. None of these are within the Proposed Development or Study Area; the closest was caused by heavy rain surcharging a culvert at Port Clarence.

4.4.16 The RCBC PFRA noted there are 40 historical flood records which are attributed to flooding along ordinary watercourses including The Fleet. These incidents are due to insufficient culvert and channel capacity.

4.5 Future baseline

4.5.1 There is a scientific consensus that man-made climate change will cause higher temperatures, increases in frequency and duration of heat waves, along with changes to the hydrological regime. In the UK, this likely means that precipitation events are likely to become more variable, with more frequent and/or intense storms, resulting in increased flood risk from most if not all sources.

4.5.2 The majority of the Main Site falls within Flood Zone 1 and is at low fluvial and tidal flood risk (Flood Zone 1), under baseline conditions. However, it should be noted that the EA predict all of the land within this area may become Flood Zone 2 and/or 3 by 2070, when accounting for climate change. Further information can be found in the Flood Risk Assessment.

4.5.3 There is potential for water quality to improve and baseline WFD status to improve as the RBMPs are implemented, as these aim to achieve ‘good’ status by 2027 for WFD waterbodies. Achievement of this outcome is reflected in the future baseline.

5. Development Design and Impact Avoidance

5.1 Overview

5.1.1 This section describes the embedded and good practice mitigation for ground conditions that has been incorporated into the Proposed Development design or assumed to be in place before undertaking the assessment of likely significant effects.

5.1.2 The Proposed Development will be designed to avoid and prevent adverse environmental effects on the water environment and flood risk through the process of design development and consideration of good design principles, and to reduce the impacts if complete avoidance is not possible. This process has been, and continues to be, influenced by the ongoing assessment of potential impacts.

5.1.3 The impacts during the decommissioning of the Proposed Development are considered comparable with, or likely less than, those of the construction stage.

5.2 Construction and Decommissioning

5.2.1 This preliminary assessment has used a ‘reasonable worst case scenario’.

5.2.2 Mitigation is outlined and will be secured by way of commitments within the Outline Construction Environmental Management Plan (oCEMP) which will be included within the DCO application. The CEMP will be secured by a Requirement in the DCO. This will include any required embedded mitigation.

5.2.3 The oCEMP will include measures that are considered standard good practice to be implemented by the construction contractor. Such measures are intended to reduce the likelihood of impacts, or the magnitude of effects, if they were to occur. Examples of good practice include adherence to UK Government pollution prevention measures (Ref 44, Ref 73) set out on in the Construction Industry Research and Information Association’s (CIRIA) Guidance for Pollution Prevention. The oCEMP will include ground and surface water monitoring plans, prepared by the construction contractor. Similarly, requirements for monitoring (e.g. water quality) will be derived during the detailed design phase.

5.2.4 During construction, a temporary surface water drainage strategy will be implemented to limit any contaminated run-off from entering surface watercourses.

5.2.5 The mitigation measures listed below are also likely to be used to minimise potential impacts of the Proposed Development to the water environment. Such measures would be implemented by the construction contractor for the duration of the Construction Phase:

a. Works must be suspended during out-of-bank river flows or during intense rainstorms;
b. A water quality monitoring programme (sampling plan) prior to and during construction works must be established;
c. Water with a higher risk of contamination which requires discharge, including groundwater pumped out of pilings during concrete pouring, will be contained and treated using appropriate measures. Examples of these measures may include one or more of the following: coagulation of sediments, dewatering, and pH neutralisation prior to discharge. Such discharges will be regulated via environmental permits issued by the EA;
d. Use of heavy machinery near waterbodies must be minimised, as far as reasonably practicable (i.e. unless works are required to interface with the river environment to construct the Proposed Development). Refuelling of machinery and HGVs must take place in bunded areas with a minimum 10m buffer from surface water features and drainage assets. Additionally, stockpiles should not be located within 10m of any surface water features;
e. All entry and exit points must have wheel wash facilities in place with machinery cleaned in accordance with best practice, relevant guidance and approved Flood Risk Activity Permit (FRAP) if applicable;
f. Surface water runoff must be captured and settled out in accordance with best practice and guidance, with contaminants being removed prior to disposal;
g. Runoff must be treated at source to ensure hydrocarbon removal is carried out in accordance with guidelines and permits;
h. Drip trays must be used under machinery at risk of leaks or spillages to prevent contaminated runoff from polluting nearby surface water features. High-risk areas for spillage should be located as far from surface water features as practicable to minimise environmental impact;
i. Hazardous substances must be contained within fully bunded (and lined) impermeable areas within adequate storage capacity plus an appropriate safety margin; and
j. Concrete washout must take place in designated washout areas, and construction materials such as cement must be mixed a suitable distance from surface water features.

5.3 Operational

5.3.1 The Proposed Development will be served by a drainage system for the management of surface, foul and effluent drainage. Further detail on

drainage is provided in the Outline Drainage Strategy. It is expected that surface water will be discharged either directly via a new outfall with suitable treatment, pollution prevention measures and (if required) attenuation embedded into the design to appropriately mitigate risk to the River Tees.

5.3.2 Any reuse of an existing connection must be supported by evidence of its current discharge rate, which will form the design baseline. If the outfall discharges to a smaller watercourse, an agreed betterment allowance may apply. Post-development discharge must not exceed the agreed baseline unless approved by the LLFA. Attenuation of surface water is proposed via three retention ponds located on the Main Site.

5.3.3 Given the industrial nature of the Proposed Development and the presence of high-risk chemical and process drainage systems, it is essential that a robust pollution control strategy be implemented, including upstream treatment, emergency isolation valves, and regular monitoring.

5.3.4 The water levels within the River Tees are expected to increase to between 2-5mAOD across the three epochs (2030, 2070 and 2100). A new quay will extend into the Tees in a permanently wet area. It must be built to 5.03 mAOD to avoid future flooding. Potential impacts on the existing model will be assessed in the next stage using site-specific hydraulic modelling with climate change allowances

5.3.5 The design of the Proposed Development will account for flood risk from all sources and incorporate appropriate flood risk mitigation measures. At this stage it is not possible to provide further clarity on the likely measures that will be embedded in the design at this stage.

5.3.6 A site-specific Flood Warning and Evacuation Plan (FWEP) must be prepared for the Site (see Flood Risk Assessment for further detail). This must account for all sources of flood risk, including the effects of climate change over the lifetime of the Proposed Development. This plan must clearly identify the roles and responsibilities for staff working at the Proposed Development to ensure safe access and egress in times of flood. Flood evacuation plan including roles and responsibilities and training are within the remit of the site user and would therefore be developed separately and informed by the Proposed Development final designs.

5.3.7 Currently (as of November 2025), Bran Sands WwTW discharges treated effluent to Dabholm Gut, which subsequently discharges to the Tees Estuary. In future, Northumbrian Water Limited are proposing to construct a substantial, underground outfall comprising approximately 3km onshore and 4.5km offshore pipeline, extending northward from Bran Sands to Tees Bay. This proposed pipeline aims to divert treated effluent discharges from the Tees Estuary to the North Sea and to reduce nutrient nitrogen

concentrations within the Tees Transitional Waterbody and Tees Bay. When operational, this new sea outfall would discharge treated effluent from industries within Teesside including that from the Proposed Development.

5.3.8 The safe operation of the Proposed Development will be paramount to the protection of the water environment and subject to rigorous controls that will form part of the required Environmental Permit. This would include potential requirement for a discharge permit and/or permit for routine dredging. The management of surface water runoff from these areas will also be considered as part of the Outline Drainage Strategy and monitoring/treatment processes incorporated as required.

5.3.9 Mitigation measures during operation will include:

a. Implementation of standard industry practices to mitigate potential impacts from accidental spills or leaks;
b. The storage and handling of chemicals will be undertaken in properly surface and bunded areas;
c. Implementation of rapid spill response planning and training; and
d. Preparation of groundwater and/or surface water quality monitoring plans, if required as part of any environmental permit conditions.

6. Preliminary assessment of likely impacts and effects

6.1 Introduction

6.1.1 The preliminary assessment of likely significant effects of the Proposed Development on surface water, flood risk and groundwater receptors are presented in the following sections. Assessment is based upon current available information at the time of writing this report (November 2025) and professional judgement. At this point a precautionary view has been taken. However, these effects could reduce as the EIA progresses, due to the availability of further detail on the Proposed Development.

Construction Phase

6.1.2 Typically, most of the impacts on the Water Environment will occur during this phase as this is when the most extensive physical works changes to the landscape occur (i.e. earthworks, dewatering etc). It should be noted that many of the effects may be temporary, localised and reversible, whilst others have the potential to be more significant in terms of spatial extent, magnitude and/or duration.

6.1.3 Potential construction phase impacts are:

a. Increase in the amount and/or concentration of pollution entering the water bodies. For example, from mobilised sediment-laden runoff, spillage of fuels or other harmful substances that may enter surface water and/or groundwater receptors;
b. Impacts to the hydromorphological and ecological quality of watercourse(s) (see Chapter 8: Freshwater and Marine Ecology) associated with works within or near watercourses, including physical change to the watercourses and longer-term changes associated with sediment transport (i.e. erosion and/or deposition);
c. Potential damage, degradation or loss of habitats within designated conservation sites, from activities such as wave wash (from increased navigation) and previous contaminant release from seabed associated with piling or capital or maintenance dredging;
d. Changes to water quality within the River Tees associated with jetty demolition and quay construction works, with potential increase in turbidity and for release of pre-existing potentially contaminated materials from piling, dredging and increased wave wash (from associated works including navigation);
e. Changes to local topography land/or drainage infrastructure. Such changes may alter existing drainage patterns within catchments and provide potential pathways for pollution;
f. Changes to groundwater levels, flow pathways and/or water quality arising from construction activities. These impacts would primarily

associated with dewatering, earthworks and intrusive investigation works creating new flow paths for groundwater;

g. Impacts on receiving surface water and/or groundwater quality from the leaching of contaminants from soils into groundwater during construction (see Chapter 17: Geology and Soils (PEIR Volume 1) for further details on impacts on contaminated land and soils);

h. Increased fluvial flood risk associated with temporary works (e.g. construction laydown areas or stockpiles or the construction of the quay); and

i. Changes to surface water flow paths and/or land drainage systems that could modify drainage and increase flood risk.

6.1.4 Whilst it is likely that the above effects on water quality and quantity would be largely mitigated through the implementation of a CEMP.

Operational Phase

6.1.5 Operational is defined as the post-construction phase of the Proposed Development, including maintenance activities. The duration of the Operational phase is from commissioning until there is additional development or until the Proposed Development ceases to operate.

6.1.6 Potential operational phase impacts are:

a. Permanent impact to the hydromorphological and ecological quality of water features associated with works within or near water features;
b. Changes to water quality (including suspension of sediment bound contaminants) within the River Tees associated with operational navigation (including from wave wash disturbing sediment) and a larger area where maintenance dredging is required;
c. Permanent impacts to catchment hydrology and/or hydrogeology caused by the potential introduction of a barrier to river flow, surface water and/or groundwater connectivity;
d. Increased flood risk to the Proposed Development and to people and property elsewhere caused by the new quay, thus affecting flood flow conveyance; and
e. Potential increase to flood risk to the Proposed Development and to third-party receptors (people, property and/or infrastructure) elsewhere, due to channel capacity reduction, floodplain displacement and/or increased rates and/or volumes of surface water runoff from an increase in impermeable area.

7. Likely Impacts and Effects of the Proposed Development

7.1 Overview

7.1.1 This section details the preliminary assessment of likely impacts and effects of the Proposed Development during both the Construction and Operational Phases.

7.1.2 Potentially significant effects that may arise during the Decommissioning Phase of the Proposed Development are not expected to be more significant than those that may arise during the Construction Phase and have therefore not been assessed independently.

7.2 Construction Phase

7.2.1 An assessment of the potential significant effects to the water environment and flood risk throughout the Construction Phase is summarised in Table 7-1. The magnitude of impact and significant effects considers the impacts and effects post-embedded mitigation (without additional mitigation).

Table 7-1 Summary of construction and decommissioning effects

Potential effect	Receptor	Receptor sensitivity	Embedded mitigation measures	Magnitude of impact	Significance of effect
Changes to water quality within the River Tees associated with jetty demolition and quay construction works, with potential increase in turbidity and release of pre-existing potentially contaminated materials from piling, dredging and increased wave wash (from associated works including navigation).	River Tees Tees WFD Water Body Tees Coastal WFD Water Body Designated sites	Very High	Construction works will involve decommissioning and removal of the existing jetties, new quay construction, and dredging for the berthing pocket and access channel. The removal and dispersal of potentially contaminated sediment within the Tees Estuary is anticipated to change the baseline conditions. However, all dredged material will be disposed of at designated and licensed offshore disposal sites, such as Tees Bay A and C, under a Deemed Marine Licence within the DCO. Appropriate mitigation will be required and is to be determined at the ES stage.	Moderate	Moderate Adverse (Significant) (temporary) (Precautionary pending mitigation determined at the ES stage)
Potential damage, degradation or loss of habitats within designated conservation sites, from activities as a result of increased navigation and previous contaminant release from seabed associated with piling or capital dredging.					
Degradation of surface water quality, as work within/near to	River Tees Tees WFD Water Body	Very High	Best practice construction mitigation measures and temporary construction	Negligible	Minor adverse (not significant) (temporary)

Potential effect	Receptor	Receptor sensitivity	Embedded mitigation measures	Magnitude of impact	Significance of effect
watercourses has the potential to discharge sediment-laden runoff into watercourses. In addition, there is risk of accidental spillage of pollutants (e.g. fuel leakage from the storage of plant).	Tees Coastal WFD Water Body Designated sites		drainage to trap and remove pollutants before reaching the receiving environment, as outlined in the oCEMP.		
	Ordinary watercourses	High			Minor adverse (not significant) (temporary)
	Holme Fleet	High			Minor adverse (not significant) (temporary)
	Drains	Low			Minor adverse (not significant) (temporary)
	Ponds	Very High			Minor adverse (not significant) (temporary)
Impacts to the groundwater quantity (level and flow), as a result of a significant amount of piling required to build the quay and the Main Site	Mercia Mudstone (Secondary B aquifer)	Low	At the time of writing pile depths are not known and therefore appropriate mitigation cannot be recommended at this stage. It is recommended that ground Investigations should be undertaken (at post consent) to establish the depth of groundwater and thus appropriate mitigation can be determined after this.	Moderate	Minor adverse (significant) (temporary)

Potential effect	Receptor	Receptor sensitivity	Embedded mitigation measures	Magnitude of impact	Significance of effect
Impacts to groundwater quantity (level and flow) and quality from dewatering activities.	Superficial Deposits (Secondary undifferentiated aquifer)	Low	At the time of writing, there is uncertainty of potential contamination below ground and therefore appropriate mitigation cannot be recommended at this stage. Completion of ground investigation and risk assessment prior to construction with remediation strategies developed as appropriate to deal with any contamination risks. oCEMP Unexpected contamination discovery strategy Piling Risk Assessment Incident Response Plan, including spill kit training / contamination toolbox talks	Small	Minor adverse (not significant) (temporary)
	Mercia Mudstone (Secondary B aquifer)	Low			Minor adverse (not significant) (temporary)
	Sherwood Sandstone (Principal aquifer)	Very High		Negligible	Minor adverse (not significant) (temporary)
Potential indirect impact to groundwater quality;	GWDTE – The Tees and Cleveland Coast Ramsar/SSSI sites including Dorman's Pool and Saltholme Nature Reserves.	High			Minor adverse (not significant) (temporary)
Potential reduction in water level (locally) within Principal and Secondary aquifers due to potential dewatering					Minor adverse (not significant) (temporary)
Increased flood risk from temporary construction works within/adjacent to the floodplain.	Flood risk receptors: People, property and the infrastructure in	Very High -High	The majority of the Proposed Development is not located within Flood Zones 2 and 3, expect for the works located within the River Tees (see below). Best practice	Negligible	Minor adverse (not significant)

Potential effect	Receptor	Receptor sensitivity	Embedded mitigation measures	Magnitude of impact	Significance of effect
Changes to surface water flow paths and land drainage systems could modify drainage and increase flood risk.	the Proposed Development and surrounding area	Very High -High	construction mitigation measures outlined in the oCEMP will be implemented.	Negligible	Minor adverse (not significant) (temporary)
Potential damage, obstruction or modification of existing flood defence infrastructure, as well as potential changes in flood extents and/or depths.	Flood risk receptors: Proposed Development and people, property and the infrastructure in the Proposed Development and surrounding area	Very High	Existing flood defence infrastructure will be retained during construction of the Proposed Development will no expected change to form or function. Works within 16m of flood defences will be subject to a FRAP. Consideration will also be given to maintenance access requirements during construction.	Negligible	Minor adverse (not significant) (temporary)
Reduction in channel capacity (flood risk) due to piling in the River Tees.	Flood risk receptors: Proposed Development and people, property and the infrastructure in the Proposed Development and surrounding area	Very High	Works within 16m of flood defences will be subject to a FRAP. Consideration will also be given to maintenance access requirements during construction.	Small	Moderate Adverse (significant) (temporary) (Precautionary in advance of hydraulic modelling to be included in ES)

Potential effect	Receptor	Receptor sensitivity	Embedded mitigation measures	Magnitude of impact	Significance of effect
Potential for increase in flood risk as the construction activities required for the quay (dredging) will result in the movement of a significant amount of sediment	Flood risk receptors: Proposed Development and people, property and the infrastructure in the Proposed Development and surrounding area	Very High		Small (Precautionary in advance of hydraulic modelling)	Moderate Adverse (Significant) (Precautionary in advance of hydraulic modelling to be included in ES)
Potential damage, obstruction or modification of existing flood defence to construct the quay.	Flood risk receptors: Proposed Development	Very High		Small	Moderate Adverse (Significant) (Precautionary in advance of hydraulic modelling to be included in ES)
Increased flood risk from decommissioning works in the Main Site within/adjacent to the floodplain.	Flood risk receptors: People, property and the infrastructure in the Proposed Development and surrounding area	Very High -High (Main Site only, quay decommisioning not included in application)	At the time of decommissioning, the Main Site may be within a flood zone, primarily due to climate change. It is advised that hydraulic modelling should be undertaken to understand the impacts this will have. Once this has been undertaken appropriate mitigation can then be determined.	Small	Moderate Adverse (Significant) (temporary)

Potential effect	Receptor	Receptor sensitivity	Embedded mitigation measures	Magnitude of impact	Significance of effect
Impacts to the groundwater quantity (level and flow), as a result of piling required to build the quay	Sherwood Sandstone (Principal aquifer)	Very High	At the time of writing pile depths are not known. It is recommended Ground Investigations should be undertaken to establish the depth of groundwater and thus appropriate mitigation can be determined after this.	Small	Negligible (Not significant)

7.3 Operational Phase

7.3.1 A preliminary assessment of the potentially significant effects to the water environment and flood risk through the Operational Phase is summarised in Table 7-2.

Table 7-2 Summary of operational effects

Potential effect	Receptor	Receptor sensitivity	Embedded mitigation measures	Magnitude of impact	Significance of effect
Changes to water quality (including suspension of sediment bound contaminants) within the River Tees associated with operational navigation (resulting from wave wash disturbing sediment) and dredging maintenance.	River Tees Tees WFD Water Body Tees Coastal WFD Water Body Designated sites	Very High	Development is an area already subject to maintenance dredging and river traffic. Any additional mmitigation for maintenance dredging will be outlined in a management plan to be agreed with the Marine Management Organisation. In addition, appropriate mitigation will be determined at the ES stage.	Negligible	Minor Adverse (Not significant)
Potential changes in hydrodynamics on the River Tees as a result in an increase in artificial banks (as mitigation to accommodate the new quay). This will influence hydrodynamics, with potential to increase erosion up and/or downstream			An assessment of impacts on hydrodynamics/ sediment will be undertaken at the ES stage. As part of the WFD, appropriate mitigation will be outlined to offset the increase in artificial banks. This will be confirmed at the next stage.	Small	Moderate Adverse (Significant) (Precautionary subject to hydrodynamic modelling at the ES stage)

Discharge of foul and effluent water that could cause deterioration of the receiving waterbody.	River Tees Tees WFD Water Body Tees Coastal WFD Water Body Designated sites	Very High	All wastewater streams produced by the facility will be piped to the Bran Sands WwTW (or other suitable facility) via a new outfall. This will be a managed discharge in accordance with existing environmental permits, with no direct discharge made to the River Tees or other water bodies proposed. Treated water from Bran Sands will be discharged by NWL's proposed long sea outfall to Tees Bay. Foul water will either be discharged via an available sewerage connection or removed for off-site treatment by road tankers.	No change	Neutral
			However, at that this stage, this has not been confirmed. The alternative is that the effluent treated at Bran Sands WwTW will be discharged to the River Tees via NWL's	Small	Moderate Adverse (Significant) (without nutrient nitrogen mitigation strategy e.g. off-setting)

			permitted outfall to Dabholm Gut until the new long sea outfall is constructed. Appropriate mitigation will be determined at the next stage via the Nutrient Neutrality assessment. Mitigation will be via compensation or off-setting.		
			The potential new surface water outfall to the River Tees will attenuate surface water discharge. Surface water will be tested and discharged inline with Environmental Permit. Contaminated water will be further processed or transported for off-site treatment.	Negligible	Minor Adverse (Not Significant)
Degradation of surface water quality as a result of accidental spillage of pollutants (e.g. fuel leakage from the storage of plant).	River Tees Tees Water Body WFD	Very High	An appropriate surface water drainage system will be implemented that will incorporate appropriate pollution control and maintenance measures	Negligible	Minor adverse (not significant)
	Ordinary watercourses	High			Minor adverse (not significant)
	Holme Fleet	High			Minor adverse (not significant)

	Drains	Low	to mitigate the risk of pollution during operation. The operation of the Proposed Development will also include appropriate preventative measures, monitoring and control of environmental risks through the environmental permit.		Neutral
	Ponds	Very High			Minor adverse (not significant)
Impacts to groundwater quantity (level and flow), as a result of a significant amount of piling required to build the quay	Mercia Mudstone (Secondary B aquifer)	Low	At the time of writing pile depths are not known. It is recommended Ground Investigations should be undertaken to establish the depth of groundwater and thus appropriate mitigation can be determined after this.	Small	Minor adverse (not significant)
Impacts to groundwater quality as a result of a significant amount of piling (quay and the Main Site)	Superficial Deposits (Secondary undifferentiated aquifer)	Low	An appropriate surface water drainage system will be implemented that will incorporate appropriate pollution control and maintenance measures to mitigate the risk of pollution during	Negligible	Neutral
	Mercia Mudstone (Secondary B aquifer)	Low			Neutral

	Sherwood Sandstone (Principal aquifer)	Very High	operation. It is anticipated there will be no infiltration to ground, however this will be confirmed at ES stage.		Minor adverse (not significant)
Potential indirect impact to groundwater quantity (level and flow) and quality;	GWDTE – The Tees and Cleveland Coast Ramsar/SSSI sites including Dorman's Pool and Saltholme Nature Reserves.	High			Minor adverse (not significant)
Increased flood risk from changes to flood flow conveyance and storage to third party receptors.	Flood risk receptors: People, property and the infrastructure in the Proposed Development and surrounding area	Very High -High	The Proposed Development may result in changes to flood flow conveyance and storage that could increase flood risk elsewhere. It is advised that hydraulic modelling should be undertaken to understand the impacts this will have. Once this has been undertaken appropriate mitigation can then be determined.	Small	Moderate Adverse (Significant) (Precautionary subject to hydraulic modelling at the ES stage.)
Increased flood risk from increased rates	Flood risk receptors:	Very High -High	An appropriate surface water drainage system	Negligible	Minor adverse (not significant)

and volumes of surface water runoff from an increase in impermeable area.	People, property and the infrastructure in the Proposed Development and surrounding area		will be implemented to mitigate the risk of flooding associated with surface water runoff during Operational Phase. Flood resilience measures will be defined during the ES stage, including confirmation of finished floor levels for all buildings in line with the flood risk assessment. The design may also incorporate SuDS, permeable surfaces, and landscape interventions to manage surface water and improve resilience, informed by hydrological modelling and Proposed Development topography.		
Potential for increase in flood risk as the quay will require routine maintenance dredging. This will result in the movement of a significant amount of	Flood risk receptors: Proposed Development and people, property and the	Very High	River Tees including the proposed quay area is routinely subject to maintenance dredging by the Harbour Authority. The Proposed Development	Small	Moderate Adverse (Significant) (Precautionary subject to hydraulic modelling at the ES stage.)

sediment. Dredging typically alters hydrodynamics (river flow and water levels) upstream and/or downstream, with potential to change flood risk.	infrastructure in the Proposed Development and surrounding area		is committed to development of appropriate mitigation, but further detailed analysis is required before a more robust assessment can be made.		
Potential for an increased flood risk on third party land from increased rates and volumes of fluvial runoff from an increase in impermeable area.	Flood risk receptors: People, property and the infrastructure in the Proposed Development and surrounding area	Very High -High	It is advised that hydraulic modelling should be undertaken to understand the impacts this will have. Once this has been undertaken appropriate mitigation can then be determined.	Small	Moderate Adverse (Significant) (Precautionary subject to hydraulic modelling at the ES stage)

8. Mitigation and Enhancement Measures

8.1 Overview

8.1.1 This section sets out the preliminary mitigation and enhancement measures relevant to the water environment and flood risk.

8.1.2 The details of the required mitigation beyond the embedded design commitments are yet to be determined. However, it is expected that further mitigation identified as necessary will be incorporated into the design of the Proposed Development and commitment made as part of the ES.

8.2 Construction Phase

8.2.1 As outlined in Section 6, the appointed contractor will prepare a final CEMP in accordance with a Requirement to the DCO. The CEMP will contain measures to protect both surface and groundwater quality, and mitigate against increases in flood risk. The need for additional mitigation measures during construction will be determined through ongoing consultation with the relevant risk management authorities (e.g. the EA, Natural England and the Marine Management Organisation (MMO)) and reported in the ES.

8.2.2 Examples of potential additional mitigation measures include:

a. Water quality monitoring before and during construction activities that have the potential to affect water quality in receiving water bodies;
b. Constructing the quay in a phased manner, to minimise the spatial extent of the working area (requiring less sheet piling to be in situ at any one time); and/or
c. Adoption of suitable piling techniques and works methodology. Continuous Flight Auger piling will mainly be used on the Main Site. For the quaty it is anticipated that driven piles would be driven into the ground by percussive hammers. The method will be finalised following additional assessment of the ground conditions i.e., completion of intrusive ground investigation to obtain site-specific geotechnical and geo-environmental data to inform detailed design and through consultation with relevant stakeholders.

8.3 Operational Phase

8.3.1 At the time of writing (November 2025) no additional mitigation is proposed for the water environment and flood risk assessment.

8.3.2 The quay development may modify flood levels as part of the Proposed Development (with potential to impact the design flood levels). Hydraulic and hydrodynamic modelling will demonstrate the impacts of the quay on third party flood risk receptors and environmental receptors (sediment

transport) and whether they are significant. The findings from this exercise will determine the appropriate mitigation required.

8.3.3 However, the requirement for additional mitigation will be considered and confirmed as part of the ES as the design develops. Adopting a precautionary approach, it is acknowledged that, dependent on the final design parameters for the Proposed Development, at this stage there is the potential for significant adverse effects.

8.3.4 In addition, opportunities to provide enhancement to the water environment and flood risk will be explored as part of the design development.

8.4 Monitoring

8.4.1 A water quality monitoring sampling plan will be undertaken as part of the MMO licence agreements. It should be undertaken prior to and during construction works.

8.4.2 Requirements for operational water monitoring will be confirmed as part of the ES as the design develops and will be included in the Environmental Permit. The need for monitoring will be derived through ongoing consultation with the EA and reported in the ES. Operational monitoring requirements will be specified in the Environmental Permit.

9. Summary of Significant Effects

9.1 Introduction

9.1.1 Summaries of the potential significant effects associated with the construction (and decommissioning) and operation of the Proposed Development are presented in Table 9-1.

Table 9-1 Summary of significant effects

Potential Impact	Receptor	Importance	Magnitude of Impacts	Likely Significant Effects	Proposed Mitigation	Residual Effects
Construction and decommissioning						
Jetty demolition and quay works may increase turbidity, release contaminants, and harm habitats in designated sites due to dredging and navigation.	River Tees Tees WFD Water Body Tees Coastal WFD Water Body Designated sites	Very High	Medium	Major Adverse (Significant) (temporary)	The removal and dispersal of contaminated sediment within the Tees Estuary is anticipated to change the baseline conditions. However, all dredged material will be disposed of at designated and licensed offshore disposal sites, such as Tees Bay A and C, under a Deemed Marine Licence within the DCO. Appropriate	Large Adverse (Significant) (temporary) (Precautionary pending mitigation determined at the ES stage)

Potential Impact	Receptor	Importance	Magnitude of Impacts	Likely Significant Effects	Proposed Mitigation	Residual Effects
					mitigation will be required and is to be determined at the ES stage.	
Reduction in channel capacity (flood risk) due to piling in the River Tees.	Flood risk receptors: Proposed Development and people, property and the infrastructure in the Proposed Development and surrounding area	Very High -High	Small	Moderate Adverse	At this stage appropriate mitigation cannot be determined. Hydraulic modelling will be undertaken for both baseline and Proposed Development to understand the impacts of the quay. The scope of which is to be agreed with the EA. It is anticipated that hydraulic modelling may be required. In	Moderate Adverse (Significant) (temporary) (Precautionary in advance of hydraulic modelling to be included in ES)
Potential for increase in flood risk as the construction activities required for the quay (dredging) will result in the movement of a significant amount of sediment	Flood risk receptors: Proposed Development and people, property and	Very High	Small	Moderate Adverse		Moderate Adverse (Significant) (temporary) (Precautionary in advance of hydraulic modelling to be included in ES)

Potential Impact	Receptor	Importance	Magnitude of Impacts	Likely Significant Effects	Proposed Mitigation	Residual Effects
	the infrastructure in the Proposed Development and surrounding area				addition consultation should be undertaken with the EA and the MMO.	
Potential damage, obstruction or modification of existing flood defence infrastructure to construct the quay.	Flood risk receptors: Proposed Development	Very High	Medium	Moderate Adverse		Moderate Adverse (Significant) (temporary) (Precautionary in advance of hydraulic modelling to be included in ES)
Increased flood risk from the decommissioning works in the Main Site within/adjacent to the floodplain.	Flood risk receptors: People, property and the infrastructure in the Proposed Development and surrounding area (Main	Very High -High	Small	Moderate Adverse	At the time of decommissioning, the Main Site may be within a flood zone, primarily due to climate change. It is advised that hydraulic modelling should be undertaken to understand the	Moderate Adverse (Significant) (temporary) (Precautionary in advance of hydraulic modelling to be included in ES)

Potential Impact	Receptor	Importance	Magnitude of Impacts	Likely Significant Effects	Proposed Mitigation	Residual Effects
	Site only)				impacts this will have. Once this has been undertaken appropriate mitigation can then be determined.	
Operation						
Potential changes in hydrodynamics in the River Tees as a result on an increase in artificial banks (to accommodate the new quay).	River Tees Tees WFD Water Body Tees Coastal WFD Water Body Designated sites	Very High	Small	Moderate Adverse (Significant)	As part of the WFD assessment, appropriate mitigation will be outlined to offset the increase in artificial banks. This will be confirmed at the next stage.	Moderate Adverse (Significant) (Precautionary subject to hydrodynamic modelling at the ES stage (Precautionary subject to hydraulic modelling at the ES stage.))
Discharge of treated effluent containing nutrient nitrogen from Bran Sands WwTW to Dabholm Gut is long sea					Appropriate mitigation will be determined at the next stage via the	

Potential Impact	Receptor	Importance	Magnitude of Impacts	Likely Significant Effects	Proposed Mitigation	Residual Effects
outfall has not yet been constructed.					Nutrient Neutrality assessment	
Potential for increase in flood risk as the quay will require routine maintenance dredging. This will result in the movement of a significant amount of sediment. Dredging typically alters hydrodynamics (river flow and water levels) upstream and/or downstream, with potential to change flood risk.	Flood risk receptors: Proposed Development and people, property and the infrastructure in the Proposed Development and surrounding area	Very High-High	Small	Moderate Adverse	At this stage appropriate mitigation cannot be determined. However, it is likely that the Proposed Development will need to be raised as a result of the quay. Hydraulic modelling will be undertaken for both baseline and Proposed Development to understand the impacts of the quay. The scope of which is to be agreed with the EA. It is	Moderate Adverse (significant) (Precautionary subject to hydrodynamic/hydraulic modelling at the ES stage.)
Increased flood risk from increased rates and volumes of fluvial runoff from an increase in impermeable area.	Flood risk receptors: People, property and the infrastructure in the Proposed					

Potential Impact	Receptor	Importance	Magnitude of Impacts	Likely Significant Effects	Proposed Mitigation	Residual Effects
	Development and surrounding area				anticipated that hydrodynamic modelling may be required. In addition consultation should be undertaken with the EA and the MMO	
Potential damage, obstruction or modification of existing flood defence infrastructure.	Flood risk receptors: Proposed Development					
Increased flood risk from changes to flood flow conveyance and storage.	Flood risk receptors: People, property and the infrastructure in the Proposed Development and surrounding area					

References

Ref 1 HM Government (2019) The Environmental Permitting (England and Wales) (Amendment) (EU Exit) Regulations 2019. Available online: https://www.legislation.gov.uk/uksi/2019/39/contents/made

Ref 2 HM Government (2020) The Environment (Amendment etc.) (EU Exit) (Amendment) (England and Wales) Regulations 2020. Available online: https://www.legislation.gov.uk/uksi/2020/603/introduction/made

Ref 3 HM Government (1990) Environmental Protection Act 1990. Available online: https://www.legislation.gov.uk/ukpga/1990/43/contents

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Ref 5 HM Government (2021) Environment Act 2021. Available online: Shttps://www.legislation.gov.uk/ukpga/2021/30/introduction/enacted

Ref 6 HM Government (2016) The Environmental Permitting Regulations 2016. Available online: https://www.legislation.gov.uk/uksi/2016/1154/contents/made

Ref 7 HM Government (1991) Water Resources Act 1991. Available online: https://www.legislation.gov.uk/ukpga/1991/57/contents

Ref 8 HM Government (2017) The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available online: https://www.legislation.gov.uk/uksi/2017/407/contents/made

Ref 9 HM Government (1991) Land Drainage Act 1991. Available online: https://www.legislation.gov.uk/ukpga/1991/59/contents

Ref 10 HM Government (2014) Water Act 2014. Available online: https://www.legislation.gov.uk/ukpga/2014/21/contents/enacted

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Ref 12 HM Government (2017) The Water Abstraction and Impounding (Exemptions) Regulations 2017. Available online: https://www.legislation.gov.uk/uksi/2017/1044/contents/made

Ref 13 HM Government (2009) Flood Risk Regulations 2009. Available online: https://www.legislation.gov.uk/uksi/2009/3042/contents/made

Ref 14 HM Government (2018) The Water Supply (Water Quality) Regulations 2018. Available online: https://www.legislation.gov.uk/wsi/2018/647/contents/made

Ref 15 HM Government (2010) Flood and Water Management Act 2010. Available online: https://www.legislation.gov.uk/ukpga/2010/29/contents

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Ref 67 Designated by the EA, a Principal Aquifer refers to a regionally extensive aquifer or aquifer system that has the potential to be used as a source of potable (drinkable) water. It is a layer of rock or drift deposits that has high permeability and water storage capacity.

Ref 68 Designated by the EA, a Secondary Aquifer refers to an aquifer where groundwater moves through secondary openings and interstices that developed after the rocks were formed. These aquifers typically provide modest amounts of water, and their structure limits their use, although they remain important for rivers, wetlands, and private water supplies in rural areas.

Ref 69 Defined as having a low probability of flooding – less than 0.1% annual probability of river or sea flooding.

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