H2Teesside Project

Planning Inspectorate Reference: EN070009/APP/5.12.2

Land within the boroughs of Redcar and Cleveland and Stockton-on-Tees, Teesside and within the borough of Hartlepool, County Durham

Document Reference: 5.12.2: Construction Environmental Management Plan

Appendix B: Outline Water Management Plan

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

Applicant: H2 Teesside Ltd

Date: March 2024

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1.0 INTRODUCTION

1.1 Overview

1.1.1 This Outline Water Management Plan (Outline WMP) sets out the water management principles and procedures to be applied throughout the construction period of the H2Teeside Carbon, Capture and Storage (CCS) enabled Hydrogen Production and Storage Facility (referred to herein as the 'Proposed Development') to prevent pollution and physical damage to water features due to construction works, including Permitted Preliminary Works where there is a potential of water pollution. This is in keeping with the requirements of Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2).

1.1.2 As an 'outline' management plan it describes the broad principles and mitigation measures that are to be implemented during the construction works to ensure that adverse impacts on water features can be avoided, minimised, or reduced, and supports the outcome of the impact assessment reported in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2). Some aspects of this plan remain high level, with the full detail to be provided in the Final WMP to be prepared post Development Consent Order (DCO) consent by the Engineering, Procurement and Construction (EPC) Contractor(s) in line with any conditions and requirements of the given consent. The production of the Final WMP is secured pursuant to a Requirement of the Draft DCO (EN070009/APP/4.1).

1.1.3 Please note that this Outline WMP does not deal with the management of the volume of surface water from the construction site, which is something that will be determined by the EPC Contractor(s) at a later stage and during the works themselves in response to changing weather conditions.

1.1.4 This chapter is supported by information presented in the following chapters (ES Volume I, EN070009/APP/6.2), Figures (ES Volume II, EN070009/APP/6.3) and Appendices (ES Volume III, EN070009/APP/6.4):

- Chapter 4: Proposed Development (ES Volume I, EN070009/APP/6.2);
- Chapter 5: Construction Programme and Management (ES Volume I, EN070009/APP/6.2);
- Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2);
- Figure 9-1: Surface Water Features and their Attributes (ES Volume II, EN070009/APP/6.3); and
- Appendix 9A: Flood Risk Assessment (ES Volume III, EN070009/APP/6.4).

2.0 PROJECT DESCRIPTION

2.1 Introduction

2.1.1 The Proposed Development comprises the construction, operation (including maintenance where relevant) and decommissioning of an up to 1.2-Gigawatt Thermal (GWth) Lower Heating Value (LHV) Carbon, Capture and Storage (CCS) enabled Hydrogen Production Facility (the 'Hydrogen Production Facility') located in Teesside, along with the pipeline infrastructure required to supply hydrogen (H2) to offtakers (customers) and the necessary utility connections. Carbon captured by the Proposed Development will be transported by pipeline to the separately consented Northern Endurance Partnership infrastructure on the adjacent Net Zero Teesside site for high-pressure compression and offshore transport and underground storage.

2.1.2 A detailed description of the required works for the Proposed Development is provided in Chapter 4: Proposed Development (ES Volume I, EN070009/APP/6.2).

2.1.3 The main elements of the Proposed Development include the following:

- Hydrogen Production Facility;
- CO_2 Export Corridor;
- Natural Gas Supply Connection;
- Hydrogen Pipeline Corridor;
- Electrical Connection Corridor;
- Water Connections;
- Other Gases Connections;
- Hydrogen Storage; and
- Material Storage.

2.1.4 The components of the Proposed Development, including the Main Site and the Connection Corridors are provided detail in Chapter 4: Proposed Development (ES Volume I, EN070009/APP/6.2) and shown in Figures 4-1 to 4-8 (ES Volume II, EN070009/APP/6.3).

3.0 INDICATIVE CONSTRUCTION PROGRAMME

3.1.1 Construction is anticipated to commence shortly after the DCO is granted (projected to be by Q3 2025) and after the Final Investment Decision (FID). Details of the Construction Programme are in Chapter 5: Construction Programme and Management Development (ES Volume I, EN070009/APP/6.2).

4.0 POTENTIAL IMPACTS ON THE WATER ENVIRONMENT

4.1 Introduction

4.1.1 The Proposed Development has the potential to cause adverse impacts to the water environment during construction. These impacts were considered in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2). The following sections describe the potential effects of the Proposed Development and provide the context for the mitigation measures referred to later in this Outline WMP. During the construction phase the following adverse impacts may occur:

4.2 Mobilisation of Fine Sediment Affecting Water Quality Through Runoff or Scour

4.2.1 Construction activities such as earthworks, excavations, site preparation, levelling and grading operations result in the disturbance of soils. Exposed soil is more vulnerable to erosion during rainfall events due to loosening and removal of vegetation to bind it, compaction, and increased runoff rates.

4.2.2 Surface runoff from such areas can contain excessive quantities of fine sediment, which may eventually be transported to watercourses where it can result in adverse impacts on water quality, flora and fauna. Construction works within, along the banks and across watercourses can also be a direct source of fine sediment mobilisation. In addition, dewaters from excavations may also contain suspended solids. When excessive levels of fine sediment enter a watercourse, it may smother macrophytes, invertebrates and substrate important for fish and invertebrates (particularly fish spawning gravels).

4.2.3 Dewatering activities may also generate excessive quantities of fine sediment within the abstracted water. If the abstracted water is not treated and discharged to watercourses properly, it can result in adverse impacts on water quality, flora and fauna.

4.3 Release of Oils and / or other Chemicals Affecting Water Quality

4.3.1 Contamination of surface waters and soil could result from leakage and spills of fuels, oils, chemicals, and concrete during construction affecting watercourses indirectly via site runoff or directly where works are close to and within a water feature. Contamination may reduce water quality and impact aquatic fauna and flora.

4.4 Increased Runoff from an Increase in Compacted and Hardstanding Areas

4.4.1 Any construction works that impede on the floodplain have the potential to increase the rate and volume of runoff and increase risk of blockages in watercourses that could lead to flow being impeded, and a potential rise in flood risk. Earthworks may also alter flow pathways and the compaction of the ground and vegetation clearance would also increase the rate and volume of runoff.

4.5 Impacts to Hydromorphology of Watercourses

4.5.1 Where open-cut watercourse crossing are required, there would be largely unavoidable short term, temporary adverse impacts on watercourse morphology and loss of riparian habitats, as well as temporary interruption of the hydrological and sediment regimes. These impacts can be minimised through appropriate working practices.

5.0 PURPOSE OF THE OUTLINE WATER MANAGEMENT PLAN

5.1.1 The Outline WMP is designed to be read alongside the relevant environmental legislation, the DCO, the commitments set out in the ES and the Framework Construction Environmental Management Plan (CEMP) (EN070009/APP/5.12), and any conditions of environmental permits, land drainage consents and other licences (where not disapplied by the DCO) are complied with. It shall be the responsibility of the Applicant to ensure that the Proposed Development is executed in a manner that demonstrates its commitment to the care and protection of the aquatic environment.

5.1.2 The Outline WMP does not provide site specific details of how the EPC Contractor will manage construction site runoff, chemical spillage risk or ensure that water features are not physically damaged, as the level of risk will constantly be changing and there are many ways in which these risks can be addressed. Instead, the Outline WMP creates the framework within which the EPC Contractor(s) and all sub-contractors shall operate on Site for the duration of the works.

5.1.3 The final WMP will be prepared post DCO consent by the EPC Contractor(s) in response to any requirements of the approved DCO.

5.1.4 Construction method statements prepared by the EPC Contractor(s) will be submitted to the Environment Agency (EA) and/or Lead Local Flood Authority (LLFA) as part of applications for temporary works environmental permits/ water related consents, or approvals pursuant to DCO protective provisions). The treatment trains and pollution prevention measures will be in keeping with the objectives, requirements and mitigation measures set out in this plan, including how clean and dirty water will be kept separate, how fine sediment will be trapped and removed from construction run-off, and how spillage risk will be carefully managed.

5.1.5 The EPC Contractor(s) will implement this plan and in doing so will need to ensure that:

- The Final WMP is implemented in accordance with the DCO and Framework CEMP (EN070009/APP/5.12).
- Construction Method Statements are prepared in line with the minimum requirements set out in the final WMP and submit these to the EA for approval; and
- The Final WMP is reviewed regularly and under each of the specific circumstances set out later in this plan.

6.0 DOCUMENT CONTROL

6.1.1 Any revisions to this plan will be agreed and approved by the Project Manager and recorded in the Change Register. The final WMP will be a 'live' document, which will be kept under continuous review by the EPC. This is to consider any additional environmental information obtained during the detailed design and construction phases, changes in legislation, policy and good practice, and any lessons learned on the Proposed Development. It will also allow for the inclusion of any further conditions and amendments that arise from the granting of any temporary works environmental permits, a review of environmental monitoring results or the legitimate concerns of Third Parties.

7.0 RESPONSIBILITIES

7.1.1 The following responsibility apply:

- All personnel and sub-contractors working on the project will perform their duties in accordance with the requirements of the final WMP;
- The Environmental Manager (or other similar title) will report regularly to the Project Manager on the status and effectiveness of its implementation;
- The Environmental Manager and Environmental Clerk of Works (or other similar titles) or other suitably qualified person will be responsible for implementing the 'during works' Water Quality Monitoring Plan described in Section 1.14; and
- Both the Environmental Manager and Environmental Clerk of Works will have powers to stop or request a change to the method statement of any works they consider are not compliant with the final WMP or are causing or are likely to cause pollution.

8.0 TRAINING

8.1.1 The Site's Environmental Manager will provide training to all personnel on Site including subcontractors on water pollution prevention measures. This will include works that have a higher risk of leading to a pollution incident, such as silt/ fuel/ oil storage, refuelling, cement and concrete works, working in watercourses, managing silt in runoff, pumping and over pumping, washing down plant and machinery, and spillage control on Site and emergency procedures. In addition:

- Site notice boards will display incident and emergency procedures details and protocols. These will be updated as and when circumstances dictate;
- Site inductions and toolbox talks will be carried out to highlight emergency and incident procedures to all staff working on Site;
- Flood/ evacuation drills to be carried out;
- Detailed spill drill training will be delivered to all necessary Site personnel with designated spill stations placed at high risk areas;
- Dangerous goods by Road (ADR) training for the transportation of fuel if required;
- Weekly environmental inspections will be carried out on Site by a suitably qualified person on site (e.g., Environmental Clerk of Works, Project Manager or Environmental Manager) to ensure all facilities are being maintained and activities are compliant with company procedures; and
- The latest pollution prevention guidance (e.g., GPP, PPG, CIRIA guidance) will always be followed through incorporation into the EPC Contractor's Site procedures.

9.0 RELATIONSHIP WITH OTHER PLANS

9.1.1 A Framework CEMP (EN070009/APP/5.12) has been developed to support the DCO Application and sets out the key measures to be employed by the EPC Contractor(s) during the Proposed Development construction phase. The Framework CEMP (EN070009/APP/5.12) covers all aspects of construction works and potential environmental effects during that phase of the project. The Framework CEMP would be reviewed, revised, and updated to the Final CEMP(s) once the project progresses towards construction to ensure all potential impacts and effects are summarised and minimised by proposed mitigation as far as practicable in keeping with good practice at that point in time and compliance with the ES.

9.1.2 The Framework CEMP (EN070009/APP/5.12) describes the principles of what would be delivered and the broad approaches that may be adopted by the EPC Contractor to deliver the required protection of the water environment. The Outline WMP compliments the Framework CEMP (EN070009/APP/5.12) and will provide information on how the risks to the water environment from potential pollution and the risk of physical damage would be managed. This Outline WMP will be developed further at the post-consent stage, taking into account technical input from the EPC Contractor.

9.1.3 In addition, the final WMP will also be supported and complemented by the Emergency Response Plan (ERP). The ERP sets out the controls that the EPC Contractor(s) and their sub-contractors will implement to minimise the risk to the health and safety of the workers and environment due to an emergency and to manage and report environmental incidents, including pollution. This will be developed by the EPC Contractor(s).

10.0 REVIEWING THE WATER MANAGEMENT PLAN

10.1.1 As stated in Section 1.6 (under 'Document Control'), the WMP will remain a 'live' document that is continuously kept under review throughout the period of the construction work. The plan will be reviewed and/or updated as part of the regular review of the Final CEMP(s) as described in Section 2.4 of the Framework CEMP (EN070009/APP/5.12).

11.0 KEY RECEPTORS

11.1.1 A list of identified receptors, as well as their importance (in Environmental Impact Assessment terms) is presented in Table B-1. Refer to Figure 9-1 Surface Water Features and their Attributes (ES Volume II, EN070009/APP/6.3) for location details, and Chapter 9 Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2) for further details regarding how these importance classifications were derived.

Table B-1: Identified Sensitive Receptors

WATER FEATURE	IMPORTANCE	
	SURFACE WATER QUALITY	HYDROMORPHOLOGY
Tees Coastal Water Body (GB650301500005)	The Tees Coastal waterbody is considered a Very High importance receptor on the basis of being WFD designated and including sites protected/designated under EU (e.g. Teesmouth and Cleveland Coast Special Protection Area, bathing waters) and UK legislation (Teesmouth and Cleveland Coast SSSI).	Low importance as a WFD Heavily Modified Waterbody, dominated in this area by breakwaters.
Tees Transitional Waterbody (GB510302509900)	The Tees Estuary is considered a Very High importance receptor for water quality on the basis of its scale, being WFD designated and supporting and range of internationally, nationally and locally protected nature conservation sites (Teesmouth and Cleveland Coast SSSI). This is despite significant modifications to the channel and flow regime, and the presence of contamination within fine sediments. It is also important for the dilution and dispersion of treated/untreated sewerage/trade/process wastewater, which at the same	The Tees Estuary is considered of Medium importance for the assessment, taking into account interventions that are underway in the catchment. Its current status is of lower importance but due to significant modifications of the channel, particularly along the banks, and flow and tidal conditions being influenced by the Tees Barrage and breakwaters. Nonetheless, the Environment Agency and partners are delivering a number of projects (e.g. Tees Tideland Programme) designed to mitigate the

WATER FEATURE	IMPORTANCE	
	SURFACE WATER QUALITY	HYDROMORPHOLOGY
	time influence water quality and present a risk of chemical spillages. Water is also abstracted from the estuary for industrial use (e.g. cooling water supply). The channel is also important for navigation and commercial activities (which also require maintenance dredging).	ongoing ecological impact of historical physical modifications on the Tees estuary and tributaries. The current Programme is scheduled to be completed by the commissioning date of the proposed development, and thus it is considered to raise the importance classification to medium to reflect the ongoing improvements within the catchment.
The Fleet (Tees Estuary South Bank) (GB1030250723320)	The Fleet (freshwater reach) is considered a High importance receptor for water quality on the basis of being WFD designated (as Tees Estuary S Bank), and having an estimated Q95 <1.0 m^3/s. Although the upper reaches flow through the Teesmouth and Cleveland Coast SPA/SSSI sites, these are upstream of the Proposed Development. It is also possible that fine sediments are contaminated and that these may be leaching into the water depending on the prevailing conditions.	The Fleet is considered a Low importance receptor for morphology on the basis of being substantially modified by past land use, having an artificial cross section and being culverting over significant lengths.
Main's Dike	Main's Dike is considered a Medium importance receptor for water quality on the basis of not being designated under the WFD in its own right, its size and scale, and with estimated Q95 >0.001 m^3/s. It is also possible that fine sediments are contaminated and that these may be leaching	It is considered a Low importance receptor for morphology on the basis of being largely artificial in character as a straightened channel and deficient in bedforms.

WATER FEATURE	IMPORTANCE	
	SURFACE WATER QUALITY	HYDROMORPHOLOGY
	into the water depending on the prevailing conditions.	
Mill Race	The Mill Race is considered a Medium importance receptor for water quality on the basis of its relatively small size and scale, not being designated under the WFD as its own waterbody and having an estimated It is also possible that fine sediments are contaminated and that these may be leaching into the water depending on the prevailing conditions. Q95 >0.001 m^3/s.	The Mill Race is considered a Low importance receptor for morphology on the basis of being largely artificial in character with deficiency of bedforms, with significant stretches of culvert.
Dabholm Gut	Dabholm Gut is connected to and designated as part of the Tees transitional waterbody. As such, it is considered a Very High importance receptor for water quality as per the Tees Estuary above.	Low importance due to being an artificial channelised watercourse, over-widened in places and with artificial banks.
Lackenby Channel	Lackenby Channel is considered a Medium importance receptor for water quality on the basis of not being designated under the WFD as its own waterbody, its relatively small size and scale, and an estimated Q95 >0.001 m^3/s. Unlike Dabholm Gut, its final reach is believed to be culverted beneath PD Teesport and thus it does not have an open connection to the Tees Estuary.	Low importance due to being an artificial, straight, channelised watercourse with artificial banks.
Kettle Beck	Kettle Beck is considered a Medium importance receptor for water quality on the basis of not having a WFD classification, but is estimated	Low importance receptor on the basis of being largely artificial in character (i.e. straight ditch course with steep banks) with deficiency

WATER FEATURE	IMPORTANCE	
	SURFACE WATER QUALITY	HYDROMORPHOLOGY
	to have a Q95 >0.001 m^3/s. It is also possible that fine sediments are contaminated and that these may be leaching into the water depending on the prevailing conditions.	of bedforms, and significant stretches of culvert.
Kinkerdale Beck	Kinkerdale Beck is considered a Medium importance receptor for water quality on the basis of not having a WFD classification but is estimated to have a Q95 >0.001 m^3/s. It is also possible that fine sediments are contaminated and that these may be leaching into the water depending on the prevailing conditions.	Low importance on the basis of being largely artificial in character (i.e. straight ditch course with steep banks) with deficiency of bedforms, and significant stretches of culvert.
Knitting Wife Beck	Knitting Wife Beck is considered a Medium importance receptor for water quality on the basis of not having a WFD classification but is estimated to have a Q95 >0.001 m^3/s. It is also possible that fine sediments are contaminated and that these may be leaching into the water depending on the prevailing conditions.	Low importance receptor on the basis of being largely artificial in character (i.e. ditch course with steep banks) with deficiency of bedforms and significant stretches of culvert.
Ash Gill	Ash Gill is considered a Medium importance receptor for water quality on the basis of not having a WFD classification, but is estimated to have a Q95 >0.001 m^3/s. It is also possible that fine sediments are contaminated and that these may be leaching into the water depending on the prevailing conditions.	Low importance receptor on the basis of being largely artificial in character (i.e. ditch course with steep banks) with deficiency of bedforms, and significant stretches of culvert.

WATER FEATURE	IMPORTANCE	
	SURFACE WATER QUALITY	HYDROMORPHOLOGY
Castle Gill	Castle Gill is considered a Medium importance receptor for water quality on the basis of not having a WFD classification, but is estimated to have a Q95 >0.001 m^3/s. It is also possible that fine sediments are contaminated and that these may be leaching into the water depending on the prevailing conditions.	Low importance receptor for morphology on the basis of being largely artificial in character (i.e. ditch course with steep banks) with deficiency of bedforms, and stretches of culvert.
Holme Fleet	Holme Fleet is considered a High importance for water quality on the basis of flowing through the Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI), although it does not have a specific WFD classification.	Whilst not visited on site, aerial imagery suggests that morphologically Holme Fleet is a High importance receptor as it exhibits diverse geomorphic forms and bank side vegetation, but deviates from natural conditions due to various floodplain and catchment pressures.
Belasis Beck	Belasis Beck is considered a High importance for water quality on the basis of flowing through the Teesmouth and Cleveland Coast SSSI, although it does not have a specific WFD classification.	High importance receptor as it exhibits a variety geomorphic forms and bank side vegetation, but deviates from natural conditions due to various floodplain and catchment pressures.
Greatham Creek	The tidal lower reaches of Greatham Creek are designated under the Tees transitional waterbody. As such, it is considered a Very High importance receptor for water quality as per the Tees Estuary above.	Greatham Creek is considered a High importance receptor, since it displays a natural form upstream of the A178 road crossing, although modifications to the channel and adjacent land are evident downstream of the road crossing.
Mucky Fleet	Mucky Fleet and Swallow Fleet within Cowpen Marsh are	High importance since they display a natural form,

WATER FEATURE	IMPORTANCE	
	SURFACE WATER QUALITY	HYDROMORPHOLOGY
	considered Very High importance for water quality on the basis of flowing through the Teesmouth and Cleveland Coast SSSI, although they do not have specific WFD classifications.	although historic modifications to connected drainage channels are likely to have altered the function of these watercourses.
Lake at Charlton's Pond Nature Reserve	The pond is considered High Importance for water quality due to having a local designation as a nature reserve.	The pond is considered to be of Low importance for morphology as an artificial waterbody originally constructed for clay extraction for the adjoining brickworks.
Waterbodies within Coatham Marsh, Saltholme Nature Reserve and Bran Sands	These are considered Very High importance receptors for water quality as they are within the Teesmouth and Cleveland Coast SSSI and several fall under the Teesmouth and Cleveland Coast SPA designation, thereby supporting bird populations and classed as Very High Importance.	Waterbodies at Coatham Marsh, Saltholme Nature Reserve and Bran Sands are considered High Importance for morphology as they have a natural form and bank side vegetation but deviate from natural conditions due to various floodplain and catchment pressures.
Pond 14 (open water pond, see Figure 9-1) within Coatham Dunes – all other ponds in Coatham Dunes identified by mapping have now succeeded to fully vegetated wetlands and are not open water ponds requiring assessment.	Pond 14 is considered a Very High importance receptor for water quality as it is within the Teesmouth and Cleveland Coast SSSI and the Teesmouth and Cleveland Coast SPA designations. The Coatham Sands waterbodies and dune slacks provide habitat for bird populations, particularly redshank (Tringa totanus), who move inland to open water at high tide. Site survey has indicated that Pond 14 is the only waterbody remaining in the Coatham Sands dunes	Pond 14 is considered of Low Importance for morphology due to its artificial nature, having been formed from slag deposits from the adjacent former steelworks. All other waterbodies within Coatham Sands are fully vegetated wetlands and so are not considered to be ponds requiring assessment.

WATER FEATURE	IMPORTANCE	
	SURFACE WATER QUALITY	HYDROMORPHOLOGY
	complex that has not succeeded to a fully vegetated wetland state, and therefore has particular importance as the sole area of open water habitat within the dunes.	
Numerous industrial ponds and artificial waterbodies across the area including Lazenby Reservoirs, Salthouse Brine Reservoirs and Ponds at Billingham Technology Park	As industrial, artificial waterbodies lacking any protected species (as far as is currently known) or designations, these are considered Low Importance waterbodies for water quality and morphology.	
Mercia Mudstone Group/ Redcar Mudstone Group	This is considered a Medium importance receptor. It is present beneath the Main Site, Water Connection Corridor, Electrical Corridor and parts of the Hydrogen Pipeline Corridor. Mercia Mudstone is a Secondary B aquifer and supports several abstractions for industry. Redcar Mudstone Group is Secondary (undifferentiated) aquifer. The bedrock is overlain by tidal flat deposits, blown sand, glaciolacustrine deposits, marine deposits and till (superficial deposits are secondary A aquifer in the case of blown sand and otherwise Secondary (undifferentiated) aquifer).	
Sherwood Sandstone Group	This is considered a Very High importance receptor. It is present beneath the Hydrogen Pipeline Corridor to the west of the Study Area, and is Principal Aquifer, supporting numerous abstractions. It is overlain in the Study Area by tidal flat deposits, glaciolacustrine deposits, and till which are generally Secondary (undifferentiated) aquifer.	

12.0 BASELINE WATER QUALITY DATA

12.1.1 Baseline information for surface water quality within the Study Area is discussed in Section 9.4 of Chapter 9 Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2) of the Environmental Statement. Table B-2 and Table B-3 provide summaries of the Mean Average Tees Estuary Water Quality Data Based on Monitoring at Multiple Sites Between 2009 - 2022 (Environment Agency, 2023) and the Water Quality Data for Water Bodies within the Study Area Based on Monitoring Between the Range of 2000-2023 (Environment Agency, 2023)

Table B-2: Summary of Mean Average Tees Estuary Water Quality Data Based on Monitoring at Multiple Sites Between 2009 - 2022 (Environment Agency, 2023)

PARAMETER	WFD THRESHOLD (FOR GOOD)	TEES MOUTH NGR NZ 55200 28400	DABHOLM GUT CONFLUENCE, NGR NZ 54822 24858	TEESPORT, NGR NZ 54400 23700	REDCAR JETTY, NGR NZ 54500 25700	SMITHS DOCK, NGR NZ 52800 22100
Temperature of Water (ºC)	-	10.42	10.79	9.640	10.58	10.33
Ammoniacal Nitrogen, Filtered as N (mg/l)	21	0.114	0.688	0.480	0.277	0.380
Nitrate, Filtered as N (mg/l)	-	0.396	2.841	1.490	1.111	1.088
Nitrite, Filtered as N (mg/l)	-	0.009	0.117	0.014	0.016	0.014
Orthophosphate, Filtered as P (mg/l)	-	0.049	0.335	0.099	0.097	0.106
Oxygen, Dissolved, % Saturation	-	100.22	93.41	93.29	95.95	94.40
Arsenic, Dissolved (ug/l)	25	1.417	1.650	1.367	1.450	1.200
Chromium, Dissolved (ug/l)	-	0.500	2.073	0.433	0.500	0.518
Copper, Dissolved (ug/l)	3.76*	0.566	1.170	0.805	0.828	0.878
Lead, Dissolved (ug/l)	1.3	0.149	0.520	0.436	0.265	0.465
Nickel, Dissolved (ug/l)	8.6	0.575	1.463	0.765	0.867	0.835
Zinc, Dissolved (ug/l)	6.8**	2.167	6.120	4.320	3.188	3.492
Tributyl tin as Cation (ug/l)	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002

PARAMETER	WFD THRESHOLD (FOR GOOD)	TEES MOUTH NGR NZ 55200 28400	DABHOLM GUT CONFLUENCE, NGR NZ 54822 24858	TEESPORT, NGR NZ 54400 23700	REDCAR JETTY, NGR NZ 54500 25700	SMITHS DOCK, NGR NZ 52800 22100
Lindane	-	-	-	-	0.000	-
para-DDT	0.01	-	-	-	0.001	-
Chloroform:- {Trichloromethane}	-	-	0.626	0.105	-	-
Hexachlorobenzene	0.05	-	-	-	0.000	-
Hexachlorobutadiene	0.6	-	-	-	0.000	-

Table B-3: Summary of Water Quality Data for Water Bodies within the Study Area Based on Monitoring Between the Range of 2000-2023 (Environment Agency, 2023)

MONITORING STATION	DURATION OF SAMPLING	TYPE OF WATER SAMPLED	PARAMETERS TESTED	GENERAL QUALITY COMMENTS
Coastal/Estuarine				
Wilton Complex Main Effluent Composite NGR: NZ 56100 24100	2019-2022	Effluent	Sanitary pollutants (e.g., Biochemical Oxygen Demand (BOD)), metals and organics (e.g., chloroform).	Numerous pollutants are present in this effluent. An extremely high BOD indicates that sanitary wastewater contains high concentration of organic material. As for copper and zinc, they exceed the WFD EQS. While chloroform exceeds the EQS in the Dangerous Substance Directive.
Brans Sands NGR: NZ 55700 26600	2000-2019	Estuarine water	Physico-chemical parameters (e.g., pH, temp, dissolved oxygen); Nutrients and sanitary products (e.g. nitrate, ammoniacal nitrogen, orthophosphate).	Slightly alkaline and well oxygenated. Concentration of nitrates was relatively low, although orthophosphate elevated. Copper and zinc were not measured at this site. *Escherichia coli* and *Intestinal enterococci* have been measured once (2014) and were below limits of detection.
Dabholm Gut 100 m upstream from the Tees confluence NGR:NZ 55500 24500	2019-2023	Estuarine water	Trace metals (copper and zinc).	Average concentrations of zinc and cooper are below the WFD Standards for estuarine water. It should be noted that only ten samples were taken at this site.

MONITORING STATION	DURATION OF SAMPLING	TYPE OF WATER SAMPLED	PARAMETERS TESTED	GENERAL QUALITY COMMENTS
Greatham Creek 100 m from outfall (adjacent to Able UK) NGR: NZ 52490 26490	2009-2019	Estuarine water	Physico-chemical parameters (e.g. pH, temp, dissolved oxygen); Nutrients and sanitary products (e.g. nitrate, ammoniacal nitrogen, orthophosphate); Trace metals.	Slightly alkaline and well oxygenated. Concentration of nitrates and phosphate were low. Numerous metals were measured at this site, all falling below EQS.
Billingham Beck 50 m upstream of River Tees confluence NGR: NZ 47470 20507	2019-2021	Estuarine Water	Physico-chemical parameters (e.g., pH, temp, dissolved oxygen); Nutrients and sanitary products (e.g. nitrate, ammoniacal nitrogen orthophosphate); Trace metals.	Circum-neutral and well oxygenated. Concentration of nitrates and phosphate are slightly elevated. Dissolved copper concentrations are below but close to the WFD Standard of 3.76 µg/l. However, the standard applies to bioavailable copper, and there is insufficient data to determine bioavailability. The mean concentration of zinc is just below the WFD Standard of 6.8 µg/l (plus ambient)
Freshwater				
Billingham Beck at Billingham Bottoms NGR: NZ 45495 22393	2019-2023	River	Physico-chemical parameters (e.g. pH, temp, dissolved oxygen); Nutrients and sanitary products (e.g. nitrate, Ammoniacal nitrogen, Orthophosphate)	Circum-neutral and well oxygenated. Concentration of nitrates and phosphate are considerably lower than the downstream sampling site close to the Tees confluence.

12.1.2 The Environment Agency's Bathing Water Quality website (Environment Agency, 2023c) notes that the Redcar Coatham bathing water is subject to short term pollution caused when heavy rainfall or high tides wash faecal material to the sea from livestock, sewage and urban drainage via rivers and streams, with water quality typically returning to normal after a few days.

12.1.3 The southern extent of the Seaton Carew North Gare Bathing Water is also within the 2 km of the Proposed Development Site and has a classification of Excellent for 2023.

13.0 WATER MANAGEMENT PLAN

13.1 Introduction

13.1.1 To avoid, minimise and reduce potential adverse effects on the water environment, the mitigation measures described in this section will be implemented on Site during construction, in accordance with the residual effects predicted in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2) of the Environmental Statement. As part of the approach to mitigation, a programme of water quality monitoring will also be undertaken throughout the entire construction phase of the authorised development.

13.2 Purpose of Water Quality Monitoring

13.2.1 The Framework CEMP (EN070009/APP/5.12) requires that water quality monitoring should be undertaken pre-, during and post-construction on *all* water features.

13.2.2 Monitoring is proposed to ensure that mitigation measures operate as intended and construction works are being undertaken in accordance with any permit and licence conditions. Monitoring also allows environmental problems to be identified and responded to as early as possible. Finally, monitoring will also help the EPC Contractor(s) to identify and implement environmental improvements, which will contribute to the overall environmental performance of the Project.

13.3 Water Quality Monitoring Plan (WQMP)

13.3.1 A Water Quality Monitoring Plan (WQMP) will be produced. Its purpose is to gather data on the quality of emissions during construction works, ensuring that any discharges do not contain contaminants in concentrations that might cause pollution to any receiving water body.

13.3.2 Water quality monitoring will be carried out even if the relevant Water Activity Permits (discharge consents) have not been granted before construction monitoring begins. If additional analysis is required by the EA/LLFA as per permit or protective provisions approval conditions, the WQMP will be updated in accordance with the new requirements.

13.3.3 Water quality monitoring will include a phase of pre-construction monitoring. This will give an up to date picture of baseline water quality and provide a reference against which construction phase monitoring can be compared. This would require a minimum of six months of monitoring; however, the monitoring would be extended to 12 months where possible and subject to land access being available. Water quality varies seasonally and in response to flow variability, so the longer the baseline to better understand the existing fluctuations in water quality. Monitoring would then be continued for the duration of the construction period and for a period post construction.

13.3.4 Water quality monitoring will consist of a combination of:

- Visual/ olfactory inspections looking for evidence of pollution;

- In situ monitoring using a hand-held water quality meter (to include turbidity, temperature, dissolved oxygen, pH and conductivity); and
- Water sample collection for laboratory analysis as required or in response to signs of pollution (e.g., as part of an investigation).

13.3.5 The WQMP will include routine sampling for laboratory analysis. Routine monitoring may be required associated with higher risk activities (e.g., open cut pipeline activities) and around sensitive watercourses. The routine monitoring locations and the timings of the monitoring will be defined during the detailed design of the Proposed Development and when the final WMP is prepared post-DCO consent.

13.3.6 Visual/ olfactory inspections of relevant construction works at all watercourses will be undertaken daily by an Environmental Clerk of Works or supervisor adequately trained in water quality monitoring during the construction period where there are works within the vicinity of said watercourses.

13.3.7 The EPC Contractor(s) will undertake a programme of daily inspections, weekly environmental inspections and monthly environmental audits to record performance and identify any corrective actions required. The Environmental Manager will carry out appropriate environmental inspections and monitoring of every aspect of the contractor's environmental performance in the form of monthly audits. Different components of the Site and works will be monitored at different frequencies. The following will be carried out by the EPC Contractor(s) at a minimum:

- A weekly site inspection will be carried out by the SHE Manager/Advisor and/or ECoW to identify any breaches and/or environmental incidents and identify suitable corrective measures. A report will be written for each inspection documenting the findings and any corrective measures suggested to be implemented;
- Monthly environmental audits will be undertaken by the SHE Manager or designated auditor. The audit will evaluate compliance with environmental legislation, requirements of the Framework CEMP, good practice and any other scheme-specific requirements. A report will be written for each audit documenting the findings and any corrective measures suggested to be implemented;
- Daily visual inspections of all water features that may be directly or indirectly affected by the works that are being undertaken at that time (including where there are areas of exposed ground or stockpiles etc. close by or draining to a water body), plus regular in-situ water quality monitoring of the same watercourse (to include turbidity, temperature, dissolved oxygen, pH and conductivity). Where required under the requirements of any permits/ licences, additional parameters can be added;
- Daily inspections will be undertaken of plant using hydraulic oils;

- Cementitious washout – subject to specific risk assessment method statement; and
- Vandalism - Visual inspection/ Shift Reports.

13.3.8 Daily monitoring at upstream and downstream control points of the relevant construction works will be carried out to determine whether the works and associated activities are causing a pollution and/ or compliant with the relevant permits (or whether the quality change is from another third-party source, from upstream, or natural variation in quality). Sampling for laboratory analysis need only be collected from the downstream location as the results from these will be compared with the pre-construction monitoring baseline (i.e. should at any time it be identified that there is another factor present between the baseline and downstream during construction monitoring points that may significantly influence water quality, the EPC Contractor(s) may decide to collect samples from both locations so that any change in water quality can be correctly attributed to the right source).

13.3.9 Monitoring will be risk-based and site/ activity specific to target higher-risk activities which could result in a significant pollution incident. The timescale and frequency of monitoring at each water feature will reflect this and be outlined in the EPC Contractor's site-specific method statements but will be no less than what is prescribed in this plan for works that have the potential to result in water pollution of water bodies.

13.3.10 Monitoring during the works will commence in advance of any works starting and will continue throughout the works and could continue up to for three months post-completion of the construction phase were deemed necessary or unless otherwise agreed with relevant statutory consultees (i.e., the EA). Water quality data gathered during the works can also be compared to water quality data gathered before works commence to highlight if there have been any material changes.

13.4 Water Quality Sampling and Analysis (Laboratory)

13.4.1 Routine water samples for laboratory analysis will be undertaken by accredited laboratories under United Kingdom Accreditation Service (UKAS). It is not expected that all watercourses will be monitored but those considered most sensitive or indicative of larger catchment areas affected by the works. The programme of sampling and laboratory analysis will be linked to the programme to reflect the transitory nature of the works, to ensure that sampling is only carried out when relevant (noting that it will need to cover the pre-works baseline phase, during construction phase and potentially post-completion phase).

13.4.2 Water samples will be collected by suitably trained staff in accordance with British Standards (BS) Institution ISO 5667, particularly the following parts:

- BS EN ISO 5667-3: 2018 Water quality. Sampling. Preservation and handling of water samples;
- BS EN ISO 5667-4: 2016 Water quality. Sampling. Guidance on sampling from lakes, natural and man-made;

- BS EN ISO 5667-6: 2020 Water quality. Sampling. Guidance on sampling of rivers and streams; and
- BS EN ISO 5667-14: 2016 Water quality. Sampling. Guidance on quality assurance and quality control of environmental water sampling and handling.

13.5 Sampling Protocol

13.5.1 When sampling water features especially surface waters, it is vital to obtain a representative sample of the water feature and avoid any cross-contamination. Therefore, the following sampling protocol will need to be adhered to:

- Weather and flow conditions on the day of the sampling and the proceeding few days will be noted with site photographs and videos collected;
- Samples from the watercourses will be collected from suitable and safe bank location;
- Samples from the watercourses will preferentially be collected using an extendable sampling pole or sample bucket to ensure water it is collected from the open water and away from any close bank influences;
- Water quality samples should be collected upstream of any sediment disturbance caused by the in-situ monitoring;
- Sample water would be decanted on the bank into sterilised sample bottles (containing any required preservative) provided by the appointed laboratory;
- Where required by the laboratory, any samples requiring filtration (e.g., dissolved metals) will be filtered on site using 0.45 µm filters;
- Dissolved oxygen, water temperature, turbidity, pH and conductivity will be measured in situ using a fully calibrated handheld water quality meter. The use of hand-held water quality meters will be in accordance with the manufacturer's instructions;
- All sampling and working around water will be undertaken in accordance with the appropriate health and safety requirements;
- Samples are to be analysed at a UKAS accredited laboratory;
- Sampling should be scheduled in advance to minimise any sample expiry or delays in commencing time-dependent analysis. For instance, samples shall not be collected on Fridays due to weekend laboratory closures or reduced staffing. ;
- Suitable sampling gloves and any other relevant PPE as determined by Health and Safety Risk assessment (including life jackets) should be worn;
- All works on site will need to comply with appropriate biosecurity requirements.

13.5.2 The use of hand-held water quality meters will be in accordance with the manufacturer's instructions.

13.5.3 The results including all site information and observations, in-situ water quality data, and laboratory analysis of samples should be collected on a master spreadsheet in MS Excel.

13.5.4 Photographs and videos should be saved for each monitoring visit and labelled by site and view.

13.6 Visual/ Olfactory Monitoring

13.6.1 These inspections represent the first screen for water pollution (and in the case of any dewatering, of any potential changes in water quantity). These will consider signs of pollution such as:

- Turbid water or fine sediment deposition (compared to baseline);
- Unnatural oily sheens (i.e. iridescence) and water decolourisation;
- Chemical smells (i.e., odours);
- Fungus growth;
- Surface scum/foaming or litter;
- Stained sediment or flora; and
- Evidence of adverse impacts on aquatic organisms including fish mortality etc.

13.7 In-Situ Monitoring

13.7.1 Certain water quality parameters like dissolved oxygen need to be recorded in-situ in the field using handheld water quality meters. At the same time, there are other parameters (i.e., pH, conductivity and turbidity) that can be analysed in the field, and it is beneficial to record these parameters in situ. A multi-parameter water quality meter can be purchased to do this.

13.7.2 Unlike laboratory analysis, in-situ monitoring provides instantaneous results and thus helps to screen water for evidence of pollution during construction. It helps to quantify visual observations and allow conditions to immediately be compared with baseline data ranges.

13.7.3 In-situ monitoring will be undertaken as part of pre-construction baseline water quality monitoring, during construction, and during post-construction monitoring. During construction, in situ water quality monitoring will be undertaken daily alongside visual and olfactory monitoring.

13.7.4 In-situ monitoring can also assist when pollution is suspected (or as part of investigations) and used on an ad hoc basis to check the quality of construction site runoff (using indicator physico-chemical parameters), which may be required depending on the outcome of temporary works environmental permit applications.

13.7.5 The Environmental Clerk of Works and / or Environmental Manager will be responsible for carrying out the in-situ water quality monitoring and ensuring that the sensors / probes are used correctly and stored and calibrated in accordance with the manufacturer's instructions. Monitoring (and the interpretation of data)

may be sub-contracted to a suitably qualified person or company or delegated to other members of the site team who have received appropriate training.

13.8 Monitoring Period and Frequency

13.8.1 Visual / Olfactory inspections and in situ monitoring of relevant watercourses will be undertaken daily by the Environmental Clerk of Works and / or Environmental Manager during the construction period or more regularly when specific works are being undertaken to watercourses or during wet weather when there is a greater risk of water pollution occurring.

13.8.2 Routine water samples for laboratory analysis will be collected, from locations to be confirmed, for the following periods as a minimum:

- monthly throughout the construction programme and (if necessary following consultation with the LPA/EA/LLFA) for a minimum of 3 months post completion (to start from when the EPC Contractor(s) hands the site over to the operator);
- It may be possible for monitoring of some watercourses to be started later or stopped earlier following completion of meaningful and relevant works within that water body catchment (i.e., where it is agreed with statutory consultees that there is no longer any risk of water pollution occurring from construction works); and
- When relevant works (i.e., that could result in discharges to local watercourses) have been completed it may be possible to reduce the frequency of sampling. This will be confirmed through undertaking a risk assessment and in accordance with the EA and the local planning authority.

13.8.3 In addition to the in-situ testing outlined in Section 5.6, water samples taken from natural water features will be tested at an accredited laboratory for the parameters listed in Table B-4 as a minimum.

Table B-4: Sampling Parameters to be used for Pre-Construction, Construction and Post-Construction Water Quality Monitoring Excluding In-situ measurements from Probes

PARAMETER	UNITS	LIMIT OF DETECTION	ACCREDITATION
Conductivity @ 20C	µS/cm	10	UKAS
pH	pH Units	0.05	UKAS
Alkalinity to pH 4.5 as CaC03	mg/l	5	UKAS
Dissolved Organic Carbon	mg/l	0.2	UKAS
Turbidity	FTU	1	UKAS
Total Suspended Solids @ 105C	mg/l	3	UKAS

PARAMETER	UNITS	LIMIT OF DETECTION	ACCREDITATION
Total and dissolved metals	mg/l and µg/l	Various	UKAS
Chemical oxygen demand (COD)	mg/l	10	UKAS
Biochemical oxygen demand (BOD) 5 Day ATU	mg/l	1	UKAS
Speciated Polycyclic Aromatic Hydrocarbons (US EPA 16)	µg/l	0.01	UKAS
Extractable / volatile aliphatic & aromatic hydrocarbons (speciated)	mg/l	Various	UKAS
Total Petroleum Hydrocarbons (TPH)	µg/l	100	UKAS
Nitrate	mg/l	0.02	UKAS
Nitrite	mg/l	0.2	UKAS
Orthophosphate (as P)	mg/l	0.03	UKAS
Total phosphorus	ug/l	0.7	UKAS
Total Organic Carbon (TOC)	mg/l	2	UKAS

14.0 POLLUTION PREVENTION

14.1 Introduction

14.1.1 This section describes the water management principles and pollution control techniques that will be implemented throughout the construction of the authorised development.

14.1.2 During construction, and as described in Section 1.14, it is proposed to undertake water quality monitoring to ensure that mitigation measures are operating as planned and preventing pollution. Despite these measures, there remains a residual risk that water pollution occurs, and so monitoring provides assurance that should this happen, it can be quickly identified, and appropriate action taken in line with the Emergency Response Plan (ERP), which will be developed by the EPC Contractor(s).

14.1.3 Although regular site visits to all water features that may be affected should be continued (as in the pre-construction monitoring), it is proposed that daily observations by the EPC Contractor(s) will be carried out while works that may cause impact are ongoing, together with any ad hoc sampling as required or in response to signs of pollution (e.g., as part of an investigation). This will enable the EPC Contractor(s) to identify if the construction works are impacting the receiving watercourses so they can act accordingly.

14.1.4 Anyone on Site should have received appropriate incident training and be familiar with the ERP.

15.0 GOOD PRACTICE GUIDANCE

15.1.1 All construction works for the Proposed Development will be undertaken in accordance with good practice techniques to avoid any pollution of water bodies directly or indirectly and will be delivered through the Final CEMP(s) and supporting management plans. Relevant good practice guidance is outlined in Table B-5. As detailed in Chapter 9 Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2), mitigation measures will be implemented during the construction phase and based upon those detailed in the NetRegs Guidance for Pollution Prevention (GPP) documents and the Environment Agency's Pollution Prevention Guidelines (PPG), which aim to prevent water resource pollution.

15.1.2 Despite being withdrawn in 2015, PPG still provide useful information and for some topics there are no corresponding GPP yet. Although they provide useful advice on the management of construction to avoid, minimise and reduce environmental impacts, they should not be relied upon to provide accurate details of the current legal and regulatory requirements and processes. They are referred to in this document alongside other current guidance, and in the context of the Proposed Development and future site-specific mitigation measures by the EPC Contractor(s).

15.1.3 It is also worth noting that although the GPP have been produced by the Northern Irish, Scottish and Welsh environment agencies only, their core principles of good practice can be applied across the UK.

Table B-5: Summary of Relevant Pollution Prevention Guidance Documents

GUIDANCE TITLE	DOCUMENT ID (WHERE PROVIDED)	DOCUMENT YEAR (WHERE PROVIDED)
GPP 1 Understanding your environmental responsibilities – good environmental practices (GPP 1, 2021).	GPP 1	2021
GPP 2 Guidance on Pollution Prevention Above ground oil storage (GPP 2, 2021).	GPP 2	2021
GPP 3 Use and design of oil separators in surface water drainage systems (GPP 3, 2022).	GPP 3	2022
GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (GPP 4, 2017)	GPP 4	2017
GPP 5 Works and maintenance in or near water for construction or maintenance works near, in, or over water (GPP 5, 2018).	GPP 5	2018
GPP 6 Working at Construction and Demolition Sites (GPP 6, 2023).	GPP 6	2023

GUIDANCE TITLE	DOCUMENT ID (WHERE PROVIDED)	DOCUMENT YEAR (WHERE PROVIDED)
GPP 8 Safe storage and disposal of used oils (GPP 8, 2021).	GPP 8	2017
GPP 13 Vehicle washing and cleaning (GPP 13, 2021).	GPP 13	2017
GPP 19 Vehicles: Service and Repair (GPP 19, 2021).	GPP 19	2017
GPP 20 Dewatering underground ducts and chambers (GPP, 2018)	GPP 20	2018
GPP 21 Pollution Incident Response Plans (GPP 21, 2021).	GPP 21	2021
GPP 22 Dealing with Spills (GPP 22, 2018).	GPP 22	2018
GPP 26 Safe storage - drums and intermediate bulk containers (GPP 26, 2021).	GPP 26	2019
PPG 7 Safe storage – the safe operation of refuelling facilities (PPG 7, 2011)	PPG 7	Not applicable
PPG 15 Pollution Prevention Guidance (PGG) 15 General Guide to the Prevention of Pollution	PPG 15	Not applicable
PPG 18 Control of Spillages and Fire Fighting Runoff (PPG 18, 2000)	PPG 18	2000
British Standard - Code of Practice for Earth Works (BS, 2009)	BS6031:2009	2009
British Standard - Code of practice for surface water management for development Sites (BS, 2013)	BS8582:2013	2013
CIRIA C532 Control of water pollution from construction sites – Guidance for consultants and contractors (CIRIA, 2001)	C532	2001
CIRIA C609 Sustainable Drainage Systems, hydraulic, structural and water quality advice (CIRIA, 2004a)	C609	2004
CIRIA C624 Development and flood risk – Guidance for the construction industry (CIRIA, 2004b)	C624	2004
CIRIA C648 Control of pollution from linear construction sites – Technical Guidance (CIRIA, 2006)	C648	2006

GUIDANCE TITLE	DOCUMENT ID (WHERE PROVIDED)	DOCUMENT YEAR (WHERE PROVIDED)
CIRIA C736F Containment systems for prevention of pollution	C736	2014
CIRIA C811 Environmental good practice on site guide, 5th Edition (CIRIA, 2015a)	C811	2023
CIRIA C753 The SuDS Manual 2nd Edition (CIRIA, 2015b)	C753	2015
Pollution Prevention Pays in England and Wales	Not applicable	2013
Regulatory Position Statement: Temporary Water Discharges from Excavations	Not applicable	2015 (updated April 2020)
Code of Practice for using plant protection products for England and Wales	Not applicable	2006

16.0 MANAGEMENT OF CONSTRUCTION SITE RUNOFF RISKS

16.1.1 The management of construction site runoff and spillages to water bodies will be carefully managed across the whole Proposed Development to avoid adverse environmental impacts by preventing pollution. There may also be other environmental impacts to take into account in the approach at any one time (e.g., ecological interests in watercourses or the risk of excessive dust generation from exposed earth stockpiles).

16.1.2 Potential adverse impacts may be acute (i.e., very high concentrations of a polluting substance persisting for a short time measured in hours) or chronic (lower concentrations of a polluting substance but still above background and persisting over longer periods of time such as days, weeks and even months etc.).

16.1.3 In Table B-6 measures have been set out that provide an appropriate level of protection and risk management, although it would be for the EPC Contractor to decide how best to manage construction site runoff and which different measures or approaches may be most suitable in different locations and activities across the Site (for example, the measures to manage works in the channel would be different to works that are close to but only adjacent to the channel).

16.1.4 It is important to note that the effectiveness of measures implemented to treat fine sediment in runoff will also reduce with use unless they are maintained (e.g., trapped silt removed). It is therefore important that the EPC Contractor(s) continually monitors the measures they put in place to manage fine sediment in runoff and that they have a pallet of options to select from (Annex A).

16.1.5 Furthermore, the construction works are not a static operation and will need to evolve and adapt to changing circumstances during the preliminary and main construction phases. These might include changes to the nature of the works being undertaken or the prevailing weather conditions.

16.1.6 Allowing excessive fine sediments, chemicals, fuel, other oils and cementitious products or potentially polluting substances to enter the water environment without permission from the Environment Agency would be in breach of the Water Resources Act 1991 (as amended) (HM Government, 1991c) and the Environmental Permitting (England and Wales) Regulations 2016 (HM Government, 2016).

16.1.7 Mitigation requirements related to the management of construction runoff, construction site spillage risk and working above or adjacent to water are detailed in Table B-6. The management of flood risk is included in Appendix 9A: Flood Risk Assessment (ES Volume III, EN070009/APP/6.4).

Table B-6: Summary of Potential Mitigation Measures During Construction Works

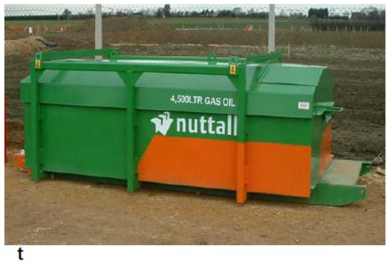
POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
Site Runoff	
Excessive fine sediment in runoff, either in suspension or deposited directly, can adversely impact the environment and water uses and these are described below: <u>Fish/ Aquatic Fauna</u> Physiological and behaviour effects on fish and other aquatic fauna; Direct mortality (although complex); Reduced reproduction and growth through the degradation of spawning habitat/ redds and smothering of eggs and yolk-sac fry; Gill irritation / trauma / altered blood physiology; Impeded fish movement, altered foraging behaviour and reduced territory; and Lead to trophic effects on fish through changes in invertebrate communities in response to high and persistent sediment loads and effects on food sources. <u>Macrophytes and Invertebrates</u> Smother macrophytes, invertebrates and substrate important for fish/ invertebrates (particularly fish spawning gravels);	Topsoil stripping should be undertaken outside of the winter period (October to March inclusive) where practical during which wetter weather is more likely. Topsoil and subsoil will not be stored directly adjacent to the watercourse but will be stored a minimum of 20 m from the watercourse, with additional mitigation such as silt fences installed if there is a risk of sediment entering the watercourse. No topsoil or subsoil will be stored within a fluvial or surface water flood zone (flood zone 2 and 3) unless supported by a risk assessment (i.e., consideration of weather forecast and duration of storage) and additional mitigation (i.e., drainage bypass channel for overland flow). Where site constraints mean that it is not possible to maintain a 20metre buffer from a water body, additional mitigation measures will be implemented to provide an adequate barrier between the potential source of contaminated runoff and the receptor. Smaller stockpiles could be created, reducing the pile height.
	Short term periods of wet weather will be avoided when undertaking earth moving works, if possible, to minimise the risk of generating runoff contaminated with fine particulates. If there is forecast more than 15 millimetres (mm) of rain over 24hr period then topsoil stripping should cease until the soil is dry or 24 hours has passed, whichever is the sooner or otherwise additional action taken to dry out the working area. This is to avoid working in waterlogged conditions. Where unavoidable, the adequacy of standard mitigation measures should be continuously reviewed.
	Vegetation clearance and topsoil strip should be limited as much as practicable. Where possible, vegetation clearance across the Proposed Development will be phased to minimise the areas of exposed ground and reduce the potential risk for runoff.

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
Reduce water clarity and increase turbidity, exerting a negative effect upon primary production; and Lowered oxygen levels by reducing the potential for plants to photosynthesize and exerting a Sediment Oxygen Demand; and have aesthetic effects that discourage or prevent local recreational uses of watercourses or require the temporary, partial or full postponement of water sports events held on the lake. <u>Water Supply</u> Reduce quality and aesthetics of water abstracted for Private Water Supplies, as well as reduce the performance of any treatment processes (e.g., UV filters), making it unsuitable as a potable supply. <u>Flood management</u> There is a risk the sediment washed from the works could enter and become deposited in the open channels, decreasing channel capacity and increasing flood risk.	The EPC Contractor(s) will prepare a temporary works drainage strategy prior to construction works, to be presented as part of the detailed WMP. This will set out appropriate measures to manage runoff rates and be prepared in accordance with the pollution prevention measures set out in this Outline WMP. The temporary works drainage strategy will define the installation of pre-construction drainage measures to intercept runoff and ensure that discharge and runoff rates are controlled in quality and volume, in turn causing no degradation to water quality. This may include specific measures to be used in high-risk areas (for example construction along or across steep gradients and water course crossings). A phased approach may be taken to the development of the temporary works drainage strategy to reflect the phasing of the construction programme. Depending on ground conditions and weather conditions a geotextile membrane and stone surface and/or bog-mats may be used in selected areas. The geotextile will need to be regularly monitored and any excessive build-up of fine sediment will need to be removed. Please refer to Annex A for examples of measures that can be used (including Installation of cut off trenches/ catchment drains, drain covers, sand/pea gravel bags, earth bunds and lagoons, geotextile silt fences/matting, straw bales, or proprietary treatment (e.g., lamella clarifiers) etc.). In addition: • Turfs removed are to be retained for lining haul road drainage; • Early provision of permanent drainage works (e.g., swales); • ‘Dirty’ site water/ ‘clean’ site water to be kept separate; and • Operate a permit to pump system. The location and condition of existing land drainage will be established, and a record compiled. Work will be undertaken by competent personnel / contractors. Subject to landowner/occupier agreement, existing drains should be restored, or new drains

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
	established to help prevent damage to soil structure, maintain work areas in a dry condition and to enable current drainage systems to continue to operate through the construction period. Where open-cut crossings are required, the hydrology of the watercourse being crossed needs to be determined in order to assess the range of flows likely during the temporary works.
	Watercourse crossing locations will be micro-sited to make the crossing as close to perpendicular to the watercourse as reasonably practicable, ensuring the crossing is as short as possible and for open cut / temporary access crossings reducing the risk of localised scour at the structures. They will also be designed to maintain downstream flows and to allow continued and unobstructed passage for aquatic organisms and mammals (e.g., otter and water vole) using river corridors.
	The effectiveness of fine sediment control measures must be continually monitored, managed and adapted to the Site-specific needs at any given time (e.g., build-up of silt in temporary construction SuDS or against fabric silt fences, or the decomposition of straw bales).
	Appropriately sized runoff storage areas for the settlement of excessive fine particulates in runoff will be provided. The EPC Contractor(s) will need to monitor the build-up of fine sediment in temporary construction SuDS and either remove sediment or provide replacement measures when the storage areas become ineffective.
	Mud deposits will be controlled at entry and exits to the Site using wheel washing facilities and/ or road sweepers operating during earthworks or other times as considered necessary. The wash down of construction vehicles and equipment should take place in designated washdown areas within construction compounds. Waste wash water should be prevented from passing untreated into watercourses or groundwater. Appropriate measures will include use of sediment traps.

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
	Tools and heavy plant to be washed down and cleaned in designated areas on Site only. At all wash down locations, the wash down water will be collected for treatment before discharge to surface water drainage under appropriate consent and/ or agreement with Environment Agency and/ or Northumbrian Water Limited, or otherwise removed from Site for appropriate disposal at a licenced waste facility.
	Debris and other material will be prevented from entering temporary surface water drainage, through maintenance of a clean and tidy Site, provision of clearly labelled waste receptacles, grid covers and the presence of Site security fencing.
	Any material imported to site, such as for supporting foundations, will be natural quarried stone or, if recycled, the material will undergo chemical testing. The suite of contaminants and site use criteria will be agreed with regulatory authorities, in order to demonstrate that the material is suitable for use on site and does not pose a risk to construction workers or the environment.
	Works will be stopped immediately and reviewed if silt plumes are identified within the watercourse/ water body as a result of operations involved with the works.
	Soil stockpiles will be no nearer than 20 m from any watercourse and will be either covered, fenced or seeded with grass to prevent wind whipping or runoff from them becoming contaminated with excess fine sediment. Earthworks and exposed areas / soil stockpile should be re-vegetated as soon as practicable to stabilise the surface.
Spillage Risk	
Chemicals such as fuels, oils and cementitious products can have a severe impact on water quality, fish and aquatic wildlife as well as humans.	Spill kits will be available on the Proposed Development Site in watertight containers at key locations (such as at compounds, especially next to oil storage or refuelling locations) and locations where there is a risk to a water feature) and carried on all mobile plant. The Emergency Preparedness and Response Plan will identify these key locations. The SHE Manager/ Advisor is responsible for ensuring that spill kits are

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
These substances may affect several organism functions like respiration, feeding, and thermo-regulation. At the same time, the entire ecosystem can change temporarily because of the chemical components and elements that are toxic to the environment. These substances may also affect impact abstraction for agriculture and / or private / public water supplies making them unsuitable for use/ consumption. As such measures to control the storage, use and disposal of these substances would need to be put in place prior to and during construction. Chemicals stored on Site could range from Line marking spray paint, shutter oil, blackjack, paint, sealants, cement etc. All such materials will be stored in suitable COSHH stores within the Site compounds well away from sensitive areas and a minimum of 10 m from controlled waters/ downstream drains. Fuel will be stored in a bunded tank (preferably with integral bunding) such as the one below.	checked at least weekly and kept fully stocked and in good repair. Appropriate training will be given to all construction workers in their use.
	Storage of fuel / chemicals will be in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001 & Guidance for Pollution Prevention (GPP) 8: Safe storage and disposal of used oils. Environment Agency guidance on oil storage regulations for business and preventing groundwater pollution from underground fuel storage tanks will be complied with. Within the construction compounds specific areas will be designated for the storage of chemicals, waste oils and fuel and refuelling activities and will be placed on secondary containment e.g., double walled tanks or bunded areas with a capacity of 110% of the maximum stored volume.
	Surface water drains on local roads or within compound areas will be identified and where there is a risk that fine particulates or spillages could enter them, they will be protected (e.g., covers or sand bags). Alternative road drainage measures may be required. Sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
	Storage and Handling: Oil/ diesel storage (including fixed tanks, IBCs, mobile bowsers and generators) will be placed at least 20 m from any watercourse (including drains) and 50 m from any borehole/ well (nominal minimum 50 m provided around all licensed abstractions). Drip trays will be checked and emptied daily and will retain at least 10% of the volume being handled. Daily inspections will be undertaken of plant using hydraulic oils. Storage containers will be correctly labelled. Storage areas will be kept secure to prevent acts of vandalism which may result in leaks/ spills. Appropriate measures will be implemented to ensure that any spillage cannot drain to a nearby water body directly or indirectly.

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
  t **4,500ltr integrally bunded tank, compliant with OFS T200 standard** Water from wheel washing areas can contain oil and diesel, as well as high levels of silt, therefore it is important that water from wheel washing facilities and wash down areas is contained and not allowed to soak into surrounding ground or runoff into surface water bodies.	Where practicable, plant to be filled with biodegradable oil, in line with the plant manufacturer's instruction, to reduce the potential for pollution to watercourses in the event of a hydraulic oil pipe failure.
	Refuelling on the pipeline spread will be undertaken using plant nappies and be at least 20 m away from watercourses and vehicles and plant will not be left unattended during refuelling. All plant will have thorough plant examination certificates. Trained and designated refuelling personnel will be appointed for the Project. Refuelling will be observed by a banksman, and with a drip tray or plant nappy placed under the refuelling connections. Vehicles and plant will not be left unattended during refuelling. Refuelling will be undertaken in line with Project specific procedures.
	All chemicals are to be stored in lockable containers which are double bunded. A designated COSHH co-ordinator will be appointed for the project. A COSHH risk assessment register will be completed before any COSHH is used on Site.
	Only construction equipment and vehicles free of oil/ fuel leaks which could cause material contamination will be permitted on Site. Drip trays will be placed below static mechanical plant. Any plant, machinery or vehicles will be regularly inspected and maintained to ensure they are in good working order and clean for use in a sensitive environment. This maintenance is to take place off site if possible or only at designated areas in the compounds.
	A Remediation Strategy will be devised and discussed with the regulatory authorities (including relevant local authorities and the Environment Agency) prior to any remedial works. Contaminated material that is considered to pose a risk would be remediated in line with the Remediation Strategy or disposed of appropriately. Earthworks and

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
	excavations in areas where ground contamination is known or suspected will be carried out in accordance with the Remediation Strategy.
	The EPR will include protocols for pollution incident response. All construction workers will receive spill response training. See Section 18 for further details.
	The Site is to be secure to prevent any vandalism that could lead to a pollution incident.
	Construction waste/ debris are to be prevented from entering any surface water drainage or water body.
	All wash down of vehicles (including wheel washing) and equipment will take place in designated areas, and wash water will be prevented from passing untreated into watercourses (directly or indirectly via drains) and groundwater. It will be adequately contained, prevented from entering any drain, and disposed of off-site at a suitably licenced waste facility using an accredited waste disposal company. It may also be disposed of to the foul sewer only with prior, written consent from the local sewerage undertaker.
	Where practicable, utility supplies will be taken from main supply utility connections, however where this is not possible, utilities will be provided from temporary facilities such as water bowsers, local wastewater storage and transport of waste and wastewater to an approved off-site disposal point. Provision of potable water, emptying of effluent and the removal of any waste would be undertaken by a registered contractor on a regular basis.
	Adequately protect the Proposed Development area from vandalism, theft and fly-tipping by fencing and locking access gates to discourage unauthorised access. Any occurrence of tipping on the site will be reported to the site management who will then inform the local environmental authority and the police if necessary.

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
	Loose materials will be removed/ stored correctly from within the work areas to prevent them being thrown into the watercourse. No plant will be left within the work areas unless within a secure locked steel container and/ or it is fitted with an isolator switch that is lockable. Any plant stored at a works location with risk of flooding will be stored at the highest point possible close to the works area.
Concrete Batching /Use	
It is assumed that concrete will be batched on Site although some may be delivered on an 'as and when' basis in ready mixed lorries. Particular care must be taken with the mixing of, delivery and use of concrete and cement as it is highly corrosive and alkaline. Cementitious substances including powder, workable concrete and grout are extremely alkaline, corrosive and present a risk to the aquatic environment. This includes water running off newly poured surfaces. Concrete also contains chromium, which is potentially polluting not only to watercourses but also to groundwater.	When mixing grout on Site, this must be done on an impervious surface and a suitable barrier must be constructed around the mixing areas, supply lines and around working areas to prevent its escape.
	Trucks, hoppers, mixers and concrete pumps that have contained concrete must be washed out in a contained area, and sited away from any watercourses or drainage channels to prevent accidental escapes of liquid or slurries to the water environment (at least 20 m).
	Wash down water arising from the washing of equipment that has come into contact with concrete must be collected in an impervious container and, if possible, treated to enable recycling/re-use within the wash down area or concrete batching process.
	If possible, wash water should be allowed to dry out leaving solid concrete residue that can either be removed for re-used as general fill or treated as waste and disposed-off accordingly. Where there is too much wash water or when it is unlikely to dry out naturally, the wash water should be sent off-site to a licenced facility for appropriate treatment and/or disposal. If disposal to one of the watercourses on site is proposed this will require additional treatment (e.g. pH correction) and a Water Activity Permit from the Environment Agency.

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
	No washing out of delivery vehicles to take place on site without suitable provision for the washing out water and provision of a suitable location that is lined with a geotextile to prevent infiltration to ground. Such washing would not be allowed to flow into any drain, watercourse or other water feature. Any washing out water or wheel wash should be handled in accordance with the methodology detailed in the Framework CEMP.
	Wash water would be adequately contained, prevented from entering any drain/watercourse, and removed from site for appropriate disposal at a suitably licenced waste facility or otherwise treated and discharge under any required consent from the Environment Agency.
Working Within, Adjacent to or Above Water	
Working above water or adjacent to water poses similar risks to the water environment as outlined in Site Runoff and Spillage Risk sections within this table. However, there is also the added risks of direct physical damage to waterbodies and the mobilisation of sediments already present in those waterbodies (that may contain nutrients and chemical substances) that if mobilised could lead to adverse impacts (e.g., toxic effects and reduced dissolved oxygen).	Create dry working areas using the least intrusive techniques with measures to prevent any silt and chemical spillages propagating downstream. If required, channel flows to be temporarily flumed or over-pumped. Deploy oil booms as required.
	Dewatering of the working area will be done in an appropriate way that avoids any risk of erosion of the receiving watercourse (e.g., discharging to ground, baffles on the discharge).
	Adequate pumps will be used with spares kept available on Site if additional pumping capacity needed.
	Establish and maintain contact with relevant regulators and other third parties, keeping them regularly informed of the progress and pollution control measures used.
	If the construction requires flow along an existing watercourse to be over-pumped (but there are no major earth works to the channel), some flow should be allowed through the working area on completion of the works each day if possible (and following removal of any equipment and materials).

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
	Ideally, flow should ideally only be allowed back along disturbed channels once banks have been stabilised by vegetation (which typically takes approx. 12 months). This is unlikely to be possible when removing flumes, which will allow the flow along the channel that has been disturbed from open cut. The open-cut watercourse crossings should be stabilised by vegetation as far as possible prior to removal of the flume, if the area is not revegetated then the channel may need to be protected by the use of various sustainable products (e.g., coir matting/ rolls) where deemed necessary. Regular inspections of the open-cut channels will be carried out by the EPC Contractor(s) until 12 months have passed following flume removal. Protection measures are needed where there is a risk of excessive sediment erosion/mobilisation.
	Any works above watercourses (e.g. for pipe bridge crossings) will require measures to prevent materials or equipment falling into the channel. Should material fall into the channel, this should be retrieved (whilst complying with any regulatory requirements).
	Times/tasks to coincide with suitable weather periods noting the construction phase flood risk management measures described in the Appendix 9A Flood Risk Assessment (ES Volume III, EN070009/APP/6.4).
	Where fish may be present, the timing of the works should avoid sensitive periods for fish migration or spawning. Any dewatering should be undertaken only after a fish rescue has been completed by a suitably trained ecologist and complying with any requirements of the Environment Agency. Screens may also be required on the pump inlet.
	Carry out works in accordance with the Flood Risk Assessment (FRA) (e.g., flood warning alerts set up with EA).
	All equipment to be removed from culvert/ brook/ ditch/ pond etc. when works are not being carried out (i.e., end of shift).

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
Management of Pollution Risks During Flooding	
Should a large fluvial flood event occur during the construction period, out of bank flows may erode bare surfaces that have been stripped of vegetation or earth and other material stockpiles and potentially carry this material back into the watercourse as the flood water recedes. This material may then be re-deposited further downstream within the channel, which may result in an adverse impact. In addition, it is also possible that flood waters will enter excavations and will become trapped and thus will need to be pumped out and discharged with appropriate pollution management measures. Flood risks during Main Works have been considered in detail in the Appendix 9A Flood Risk Assessment (ES Volume III, EN070009/APP/6.4). This Outline WMP considers the additional measures that the EPC Contractor(s) may need to implement during a large fluvial flood event affecting the site in order to minimise the risk of water pollution. During a flood event, flows within the channel and those that spill out on to the floodplain will typically have a lower water quality than under normal flow conditions. In particular, it would be expected that flood waters will contain higher total suspended solids washed in from the catchment from both natural and unnatural sources. In addition, given that construction works invariably require	Earth moving works and excavations should, where possible, be undertaken during the drier months of the year (typically spring to early autumn). Areas of vegetation clearance and top-soil strip should be limited as much as practicable. Where possible, vegetation clearance across the Proposed Development will be phased to minimise the areas of exposed ground and reduce the potential risk for runoff. The location of earth or other material stockpiles or other potentially higher risk activities (e.g., compounds etc.) are to be located in as low a flood risk area as is possible by the site and works constraints. The EPR will include pollution incident response protocols, and further details are provided in Section 1.19. All works are to be carried out in accordance with the FRA (e.g., flood warning alerts set up with Environment Agency). Safety of site workers is to take precedence over implementation of pollution prevention measures should a significant flood event occur. Any use of flumes will be sized to maintain the current land drainage regime and the existing flow, following a study to understand the hydrology of the watercourse being crossed in order to assess the range of flows likely during the temporary works. Where there are shallow excavations for compounds and above ground infrastructure, and more widespread site clearance, these should be constructed during the drier months of the year where practical and seeded with grass as soon as possible to bind soil and reduce risk of erosion during a flood event.

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
the removal of vegetation that helps to bind and protect soils, as well as excavations, construction of embankments, stockpiles of earth and other materials, and given the potentially widespread nature of flooding in some locations of the site, it is not possible to entirely eliminate the risk that material may be washed downstream during a significant flood event. Nevertheless, it is still important that the works minimise the risk of increasing the suspended solid load being washed downstream by undertaking appropriate measures, and these are considered in this table to the right. To manage water pollution risks measures to avoid, and measures to manage, the risk of impacts is required. Avoidance measures include planning works accordingly to avoid wetter periods of the year where possible and when flooding is perhaps more likely to occur, as well as minimising the need for clearance of vegetation and locating earth stockpiles in a location that has as low a flood risk as possible. Management measures may include as appropriate regularly monitoring weather reports and flood risk alerts and planning activities accordingly, protecting the surfaces of exposed soils/ stockpiles by seeding them with grass or using biodegradable matting or a geotextile, having pollution incident response protocols in place, protecting the base of stockpiles to erosion from flood water, and where possible and appropriate to do so, slowing the flow of flood water from the site to enable fine sediment to either settle out	

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
naturally or for the water to be pumped out with treatment by a measure proposed by the EPC Contractor(s).	
Management of Flood Risk from Dewatering	
Dewatering activities during heavy rainfall may increase flood risk as the peak pumped flow rate must be disposed of at the time when surface water bodies and surface water drainage infrastructure are already at high flows. In addition, soils are likely to be fully saturated, further increasing flood risk. To manage the water pollution risks and potential flood risk, measures to avoid, and measures to manage, the risk of impacts is required. Avoidance measures include planning works accordingly to cease dewatering during periods of heavy rainfall and when flooding is perhaps more likely to occur. Management measures include regularly monitoring weather reports and flood risk alerts.	Dewatering will not take place during heavy rainfall and/ or high flows and will cease until heavy rainfall has stopped. All dewatering activities will only occur once the appropriate permissions have been obtained from the Environment Agency. Works would be implemented in accordance with a Construction Dewatering Strategy to be produced post consent.

POTENTIAL IMPACTS	MANAGEMENT OF IMPACTS
Management of contaminated groundwater and/ or groundwater contamination during Dewatering	
Dewatering activities may result in the contamination of groundwater where the water table is high and/ or in areas where there are freely draining soils and geological formations with high permeability. These activities may also encounter contaminated groundwater from historic diffuse pollution which needs to be carefully managed as part of the dewatering process. To manage the water pollution risks during construction, measures to avoid and manage the risk of adverse impacts are required. Avoidance measures include planning works accordingly to cease dewatering if contaminated groundwater is encountered. Management measures include regularly monitoring groundwater quality and ensuring appropriate pollution prevention measures are implemented.	Groundwater dewatering may be required for the various pipeline installations or HDD/MTB pits or shafts. Early assessments consider it is unlikely that the excavations will encounter the groundwater table, however groundwater ingress from superficial deposits may occur. Groundwater pumped from excavations will be discharged to ground if clean, or be subject to additional treatment if needed prior to discharge to ground. A more detailed hydrogeological risk assessment will be undertaken at detailed design, where trenchless techniques or dewatering is required in high sensitivity groundwater and surface water environments. Where dewatering is required, a dewatering scheme will be developed prior to construction (in consultation with the EA and appropriate public water abstraction companies) to demonstrate that there is an effective strategy to manage water arising from the operations. Any such assessment will consider the effects of any draw down or impacts on nearby abstractions or resources. If required, a remediation strategy will be devised and discussed with the regulatory authorities (including relevant local authorities and the EA) prior to any remedial works. Contaminated material that is considered to pose a risk would be remediated in line with the remediation strategy or disposed of appropriately. Furthermore, good practice guidance and pollution prevention measures will be implemented across all excavation sites to ensure groundwater is not contaminated by any dewatering activities.

17.0 PERMITS AND CONSENTS

17.1.1 The Other Consents and Licences Statement (EN070009/APP/5.7) sets out details of all the secondary consents that may be required for the construction and operation of the Proposed Development and whether it is intended for each type of secondary consent to be disapplied by the DCO and replaced where applicable with Protective Provisions. However, at the time of writing agreements with all regulators have not yet been completed. Therefore, Table B-7 summarises the main secondary permits and licences which may be required by the Proposed Development. The status of which type of agreement(s) are needed will be reviewed and adjusted accordingly in the final WMP.

17.1.2 Secondary consents must generally be in place before the associated activities commence, otherwise it may be deemed an illegal activity potentially leading to enforcement action from the respective Statutory Body and/ or the Environment Agency.

17.1.3 The EPC Contractor(s) will consult the relevant authorities to confirm where and what permissions may be required prior to undertaking any works.

17.1.4 For works adjacent to, or within, an ordinary watercourse that may affect flow or flood risk, a Land Drainage Consent under Section 23 of the Land Drainage Act 1991 (HM Government, 1991a), is normally required from the LLFA. Similarly, under Regulation 12 of the Environmental Permitting (England and Wales) Regulations 2016 (HM Government, 2016), with reference to Schedule 25, certain works affecting Main Rivers and their floodplains require a Flood Risk Activity Permit (FRAP) from the Environment Agency. These are intended to be disapplied by the DCO.

17.1.5 The discharge of construction site runoff, including water from excavations, may require a Water Activity Permit under the Environmental Permitting (England and Wales) Regulations 2016 (HM Government, 2016) where it is considered that the water is 'unclean' (i.e., it is not substantially composed of just rainwater). Potentially contaminated Site runoff should ideally be treated on Site (e.g., to remove excess fine sediment) and discharged ideally to ground or to drain naturally to watercourses in accordance with a Water Activity Permit from the Environment Agency.

17.1.6 Where construction site runoff is contaminated and cannot be adequately treated on Site for discharge to ground or a watercourse, the contaminated discharge should either be discharged to a local public foul sewer (following consultation with a local sewage undertaker and obtaining a Trade Effluent Discharge Consent under the Water Industry Act 1991 (HM Government, 1991b) (as amended) or removed from the Site for disposal at a suitable licenced treatment facility.

17.1.7 Potential secondary permissions that may be required have been listed in Table B-7.

Table B-7: Summary of Likely Relevant Permissions for Construction

STATUTORY BODY	DESCRIPTION OF WORKS	TYPE OF PERMISSIONS	LEGISLATION	FURTHER DETAIL
Environment Agency	Discharge of effluent or wastewater from construction sites to surface or ground water (including potential dewaters from excavations).	Water Activity Permit	Environmental Permitting Regulations (England and Wales) Regulations 2016 (as amended) (EPR 2016)	Environmental Permit may be required by the EA for discharge of surface water run-off to controlled waters (e.g., ditches, streams, rivers, lakes and to ground).
	Discharge of uncontaminated water from temporary dewatering from excavations to surface water	Regulatory Position Statement 261 (RPS)	Not applicable.	Conditions of the RPS (2023) must be adhered to otherwise the activity will be treated as an unconsented discharge under EPR 2016.
	Any works affecting Main Rivers, their floodplains or near flood defence structures	Flood Risk Activity Permit (FRAP)	Environmental Permitting Regulations (England and Wales) Regulations 2016 (as amended)	Erecting temporary and permanent structures in river such as culverts (flumes), pipe crossings, erosional protection and bridges are all considered to be regulated activities.

STATUTORY BODY	DESCRIPTION OF WORKS	TYPE OF PERMISSIONS	LEGISLATION	FURTHER DETAIL
	All dewatering / over pumping activities	Water Abstraction Licence	Water Resources Act 1991 (as amended)	Any abstraction / over pumping of watercourse during construction works of more than 20m^3 of water per day. A temporary licence may be granted to abstract more than 20 m^3 of water a day over a period of less than 28 days.
	Sealing of watercourses to install flumed crossings	Impoundment Licence	Water Resources Act 1991 (as amended)	Creating an impoundment structure such as a sluice, weir or dam that may change water levels.
LLFAs	Temporary and permanent works affecting the flow in Ordinary Watercourses	Land Drainage Consent	Land Drainage Act 1991 Section 23	Required for any temporary or permanent works that may affect the flow of an Ordinary Watercourse (i.e., all watercourses/ ditches that can convey water at times that are not Main Rivers).

STATUTORY BODY	DESCRIPTION OF WORKS	TYPE OF PERMISSIONS	LEGISLATION	FURTHER DETAIL
Northumbrian Water	Possible discharge to public foul sewers.	Trade Effluent Discharge Consent.	Water Industry Act 1991 (as amended)	For discharges over six months duration full consent would be required. At this stage it is considered unlikely to be needed but may be required for the temporary discharge of construction site runoff, should the Contractor decide to drain to a public sewer. As applicable, consent would be sought from Northumbrian Water by the EPC Contractor(s).

18.0 INCIDENTS AND EMERGENCIES

18.1 Introduction

18.1.1 The Applicant is to ensure that protection measures to control the risk of pollution are included within the final WMP. This is primarily addressed in the separate Emergency Response Plan (ERP), which also includes protocols for pollution incident response. These will both be prepared by the EPC Contractor(s) ahead of any on site works taking place.

Reporting

18.1.2 All environmental incidents shall be reported and investigated and follow the EPC Contractor's procedure, will be included in the ERP.

18.2 Pollution Incident Response

18.2.1 The pollution incident response protocols presented in the ERP produced by the EPC Contractor(s) will be agreed in advance with the Environment Agency and will set out the appropriate actions in the event of an incident and/ or that monitoring identifies unusual or anomalous results. It will be prepared in accordance with advice from the Environment Agency and will likely include measures such as those set out in the Draft Action Plan set out below.

18.2.2 Reporting of any potential or actual significant pollution incidents during construction will include as a minimum:

- A description of the pollution incident, including its location and Ordnance Survey (OS) grid reference, the type and quantity of contaminant and the likely receptor(s);
- Details of monitoring undertaken;
- Details of contributory causes;
- Details of any adverse effects that have occurred as a result of the pollution incident;
- A description of the measures implemented to mitigate adverse effects; and
- Any recommendations to reduce the risk of similar events occurring in future on the Site.

18.2.3 The pollution incident response protocols set out actions in the event that monitoring identifies anomalous or unusual results when compared to the baseline data and/ or Environmental Quality Standards (see the WFD (Standards and Classification) Directions (England and Wales) 2015 (HM Government, 2015b)). The protocol will also describe the actions to be followed depending on the level of risk triggered.

18.3 Draft Action Plan

18.3.1 In the event of an incident or emergency where contaminants have entered or are a threat of entering a watercourse or drain (e.g. a large chemical spillage on site), it is proposed that the measures set out below shall be implemented.

18.3.2 The Draft Action Plan sets out the triggers for action in the event that monitoring identifies anomalous or unusual results when compared to the baseline data and/or Environmental Quality Standards. The Draft Action Plan also describes the actions to be followed depending on the level of risk triggered.

18.3.3 It is proposed to align the Draft Action Plan with the four point risk scale of the Common Incident Reporting System where an incident is defined as a specific event or occurrence, in a single location or multiple sites, that has had or has the potential to cause environmental harm, pollution of surface and groundwater, an impact on human health, or nuisance to the local community.

18.3.4 Table B-8 presents the four incident categories with a description of the likely effects that may occur. The descriptions of each category are indicative and do not represent specific risks that water receptors would be exposed to from the Proposed Development.

18.3.5 Table B-9 presents the Draft Action Plan including monitoring outcomes and proposed actions for each of the four classes of incident.

18.3.6 Significant environmental incidents where water borne pollution is evident shall be reported to the Environment Agency immediately using their 24-hour incident telephone number 0800 80 70 60. Copies of the incident investigation shall be provided to the Environment Agency and appropriate local authority (depending where across the Proposed Development Site the incident occurred.

18.3.7 Where problems are recognised, the corrective action will be identified by the EPC Contractor(s) in consultation with the Environment Agency and LPA and corrective actions undertaken by the EPC Contractor(s) within a defined time frame.

Table B-8: Draft Action Plan – Incident Categories

INCIDENT CATEGORY	INDICATIVE INCIDENT DESCRIPTION
Category 1 – major, serious, persistent and/or extensive impact or effect on the environment, people and/or property	Persistent impact on water quality lasting at least 7 days and affecting an extensive area over several kilometres of a watercourse or large area of a water body (e.g. 1 to 2 km's). Pollution of a water body by levels of dangerous substance(s) exceeding Maximum Allowable Concentration, Environmental Quality Standards or other standards known to define conditions when serious harm/death to aquatic life or dissolved oxygen levels at critical levels may occur. Necessary closure of a strategically important potable water supply to prevent contamination or further contamination. Deterioration in ecological status or potential of a water body or prevention of reaching its objective (including physical impacts). Damage to a statutorily protected site or species. This may include an impact on Site of Special Scientific Interest (SSSI) insofar that it may prevent them from reaching or maintaining their favourable conservation status; or damage to a European protected species or its habitat that has a significant adverse effect on reaching or maintaining its favourable conservation status. Gross and extensive contamination or coverage of the bed of the watercourse, water column or surface by fungal / bacterial / algal growths, sewage debris or particulate matter. Fatality or serious effect on human health from direct contact/exposure to pollutants in surface waters, or through the supply of contaminated potable water following an incident affecting surface water or groundwater. Public exposed to concentration levels over a widespread area giving rise to serious and known health risks as a result of contamination of surface waters or groundwater following a pollution or algal incident. Supply of contaminated drinking water with levels of pollutants/pathogens exceeding toxicological limits known to cause serious health problems. Major adverse effect on an important recreational activity or national event such as the cancellation, partial or full suspension of recreational bathing, fishing activity or an organised water sports event. Incidents that cause extensive damage to the physical habitat of a water body that would fall under the Environmental Damage Regulations. The destruction of a large or important area of fish habitat (particularly spawning areas), sustained damage to fish spawning, such as by actively digging or removing bed material used by spawning fish, and / or the illegal construction of an obstruction to fish

INCIDENT CATEGORY	INDICATIVE INCIDENT DESCRIPTION
	migration (please refer to EA Guidance Document "Incidents and their classification: the Common Incident Classification Scheme - Doc No. 04_01, 2014 (EA, 2014)" for details of guidelines on incident class thresholds for numbers of fish mortality and types).
Category 2 – significant impact or effect on the environment, people and/or property	Significant effect on the quality or use of that water but normally localised. Typically include fine sediment (>500 mg/l compared to background levels), low dissolved oxygen levels or high ammonia along hundreds of metres to potentially kilometres of a watercourse or area of a water body. Precautionary closure of a strategically important potable water supply to prevent contamination of source. Necessary closure of a minor un-licensed potable water supply. Significant action / treatment by operator to address deterioration in water quality (e.g. blending with uncontaminated water). Significant but localised or temporary deterioration in ecological status or potential of a WFD water body or delaying the water body reaching its ecological objectives (including physical impacts). Damage to a statutorily protected site or species, but no significant effect on favourable conservation status. Significant damage to BAP species or habitats, which affects the viability of the species locally and / or extensive / significant damage to non-statutory protected site or BAP habitat that affects the nature conservation status of the site or habitat. Gross but localised contamination or coverage of the bed of the watercourse, water column or surface by fungal/bacterial/algal growths, sewage debris or particulate matter. Significant effect on human health from direct contact/exposure to pollutants in surface water or groundwater, or through the supply of contaminated potable water following an incident. Public exposed to concentration levels giving rise to minor health problems due to contamination of surface waters or groundwater following a pollution or algal incident. Supply of contaminated drinking water with levels of pollutants or pathogens known to cause minor health problems. Significant adverse effect on a recreational activity or event appropriate to the surface water body such as the cancellation of a local event or short lived disruption (e.g. less than one week). Significant but localised destruction of fish habitats, interference with spawning fish by creating disturbance, such as by sustained paddling / moving through a spawning area, and / or incidents involving the illegal obstruction to fish migration, including illegal

INCIDENT CATEGORY	INDICATIVE INCIDENT DESCRIPTION
	alteration to a fish pass (please refer to EA Guidance Document "Incidents and their classification: the Common Incident Classification Scheme - Doc No. 04_01, 2014" for details of guidelines on incident class thresholds for numbers of fish mortality and types).
Category 3 – minor or minimal impact or effect on the environment, people and/or property	Limited and localised effect (around point of discharge but could include lower magnitude effects over a few kilometres) on a water body which has a minimal impact on the quality or use of that water. Precautionary closure of a minor un-licensed potable water supply. Minor action / treatment by operator to address deterioration in water quality (e.g. blending with uncontaminated water). Very limited or no significant effect on the status or objectives of a WFD water body. Bed, column or surface of watercourse only marginally contaminated around point of discharge or in localised area. Such as a limited growth of sewage fungus around an outfall pipe. Very limited impact upon nature conservation sites. Reversible small-scale, short-term damage to non-statutorily protected sites or BAP habitats or species. Minor effect on human health from direct contact to pollutants in surface waters or groundwater, or through the supply of contaminated potable water following an incident (e.g. a few individuals with temporary sore throats). Public exposed to concentration levels that present no known or minimal risk to health. Minor impact on amenity value, recreational fishing activity and/or aesthetic quality (e.g. small amount of litter, thin oil film, non-harmful colour changes). Minor loss of fish habitat and / or interference with spawning fish resulting in localised, limited damage, such as by paddling / moving through a spawning area (please refer to EA Guidance Document "Incidents and their classification: the Common Incident Classification Scheme - Doc No. 04_01, 2014" for details of guidelines on incident class thresholds for numbers of fish mortality and types).
Category 4 – substantiated incident with no impact.	No measurable adverse impacts.

Table B-9: Draft Action Plan – Monitoring Evidence and Actions

	MONITORING OUTCOMES	EXAMPLES	PROPOSED ACTIONS
Categories 1 & 2	Significant pollution incident evident by Visual Inspection and / or water quality monitoring.	Spillage of significant volumes of fuel, construction runoff containing high levels of fine sediment or powder cement into a watercourse.	Fully implement Incident and Emergency Response procedure as described in the PIRP. Immediately stop all relevant works (that may reasonably be the source of the pollution) until investigation completed and corrective actions agreed with EA / local authority. Inform EA / relevant local authority immediately and seek advice regarding pollution containment and remediation. Notify any relevant third parties immediately (e.g. PWS). Prepare Incident and Lessons Learned Report and issue to EA/planning authority. Report should detail actual impacts, outcomes of actions taken, and proposals for additional monitoring of affected site and receptors.
Category 3	Visual Inspections and / or water quality monitoring results deviate from baseline or now exceed EQS.	Moderate elevation in total suspended sediment levels, fine sediment deposits across river bed gravels or some minor evidence of oil sheen / odour on the surface of water.	Investigate likely causes and pause relevant construction works. Confirm Construction Method Statements are being implemented correctly and mitigation measures operating as required. If yes, review Construction Method Statements and adequacy of mitigation measures. Prepare Incident and Lessons Learned Report and issue to EA/planning authority to agree any remedial action if required. Consider making additional Visual Inspections and water quality sampling.
Category 4	Water quality monitoring results slightly deviate from baseline.	No obvious visual impacts.	No immediate actions. Continue to monitor in accordance with monitoring plan.

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ANNEX A SILT MANAGEMENT OPTIONS

Fabric silt fences

These are geotextiles installed in the path of sheet flow runoff to filter out sediment. They are often installed around water bodies, below the toe of a cleared slope or around temporary earth stockpiles. Silt fences detain sediment-laden water and promote settlement and may remove 80-90% sand, 50-80% silty loam, and up to 20% silt-clay loam in runoff (CIRIA 648, 2006).

Measures to control rate of temporary discharge

If the rate and energy of temporary discharges are not controlled there is a risk of eroding the bed and banks of the receiving water body. The use of baffle pads or boulders below the outfall are both ways in which the energy of the outfall can be dispersed to avoid bank and bed erosion.

Silt bubble barriers

Bubble barriers are essentially tubes deployed on the bed of the watercourse which emit bubbles. They can control movement of silt with the additional advantage of delivering an oxygen enriched environment. Without this, silt plumes can raise oxygen demand in the waterbody, thereby causing stress to aquatic organisms. They can also be used for general aeration of lakes and ponds.

Silt mats and silt check dams

Silt mats are used to capture sediment as it drops out of suspension and should be located in areas of natural deposition where water energy is low. They are typically staked to the bed and have a natural fibre matrix to contain sediment effectively and prevent resuspension.

Silt check dams are also available (e.g. wood waste filter media or rocks within netting). They are used to reduce speed of flow in ditches and swales, and distribute flows across the channel.

Earth bunds

These are temporary barriers to conveyance of construction runoff and can be used to create temporary storage lagoons or barriers between construction works and water bodies. Care needed as earth bunds may themselves be a source of fine sediment, although this can be minimised by covering with a suitable geotextile or seeding if they are to be in place for a longer period of time and not part of topsoil storage.

Drainage grips (option to include check dams / sumps)

Drainage grips (otherwise known as cut-off or temporary drains) are temporary drains installed to intercept runoff from slopes above construction works to prevent it entering the site or cleared slopes within the site itself. They are an effective way to temporarily manage surface water runoff and convey flows contaminated with fine sediment to storage and treatment areas. Gravel and straw bale check dams can be created at regular intervals to encourage fine sediments to settle out during conveyance.

Pumps, settlement tanks and lamella clarifiers

Pre-treatment of construction site runoff can be provided by first pumping runoff through a settlement tank. These use gravity to encourage fine particulates to settle out and become trapped at the bottom of the tank. Greater levels of treatment can be achieved by using Lamella Clarifiers that include a series of inclined plates to provide a larger effective settling area for a small footprint. There are a range of products depending on application and flow rates and these can also be deployed in series and with chemical dosing tanks, if required.

Chemical treatments and dosing tanks

Chemical dosing tanks provide a way in which high concentrations of metals in runoff can be precipitated out before the treated water is discharged from the site. Chemical dosing tanks are often containerised, partly to reduce the risk of chemical spillage.

Chemical flocculation treatments are also available, often in block form that slowly release into the water. Flocculation is the process by which negatively charged particulates bind together in the presence of a positively charged flocculant.

Tanker for off-site disposal

Where it has not been possible to adequately treat construction site runoff there remains the option to pump the runoff out to a tanker for disposal off-site at a suitably licensed waste facility.

Sand bags / straw bales

Sand bags provide a flexible way to prevent sediment-laden runoff entering a watercourse by creating temporary dams and barriers to runoff. This is most effective on the face of temporary watercourses crossings and short length land depressions where there are preferential flow pathways.

Like fabric silt fences and sand bags, straw bales are a multipurpose way to manage construction site runoff to prevent untreated ingress to water bodies and to support the filtration of fine particulates from runoff.

Vegetated buffer zone

Vegetated buffer zones protect water bodies by provided a separation between the water body and the area of construction works and a means by which any overland flows can be treated before it drains to the water body. When planning the works a Contractor should minimise the area of vegetation clearance, especially around water bodies to maintain natural buffer zones.

Temporary settlement lagoon

Temporary settlement lagoons are an effective way to remove suspended fine particulates from construction site runoff by storing water and allowing the fine particulates to settle out. Where high concentrations are expected, a long retention time is required for significant settlement (due to the very fine nature of the sediment), or space is limited, a series of lagoons may be required with intervening gravel weirs, or the use of a flocculent could be considered. The storage required depends on site requirements, character of fine sediment, and the duration of works.

Measure: Primary & Secondary Purpose

MEASURE	SOURCE CONTROL	CONVEYANCE	TREATMENT
Fabric silt fences	●	○	○
Earth bunds	●	○	
Sand bags & straw bales	●	○	○
Silt curtains	●		
Temporary discharge control	●	●	
Drainage grips		●	○
Vegetated buffer zones			●
Conveyance swales		●	○
Silt bubble barriers	●		○
Pumps, tanks, lamella clarifiers		●	●
Temporary settlement lagoons			●
Skips in series			●
Silt mats and check dams		○	●
Tanker for off-site disposal	○	○	○
Chemical treatments & dosing tanks			●

● Primary Purpose of Measure
○ Secondary Purpose of Measure

Silt curtains / nets

Floating silt curtains are designed to control and manage sediment flow within standing waters. It consists of a top flotation pocket below which is suspended vertically an impermeable curtain, and then a ballast at set intervals to hold the curtain in place. It is typical for a bespoke curtain to be created for the particular water body (i.e. changes in bathymetry, flow conditions can be taken into account). Similar products exist for use in low river flows, although they are generally less effective than when deployed in calmer water.

Conveyance swale (option to include check dams / sumps)

Similar to drainage grips, conveyance swales provide a way in which construction site runoff can be directed to storage and treatment areas. The wider cross sectional area of a swale when compared to a drain encourages greater settlement of fine particulates. Settlement can be enhanced by the inclusion of check dams and sediment traps, although the build-up of deposited fine material will need to be monitored and regularly cleared out.

Skips in series

Where there are constraints on space that prohibit the use of construction SuDS (i.e. settlement lagoons as described above) an alternative option might be to drain runoff through a series of skips filled with clean aggregate or straw bales to encourage filtration and settlement of suspended fine particulates.