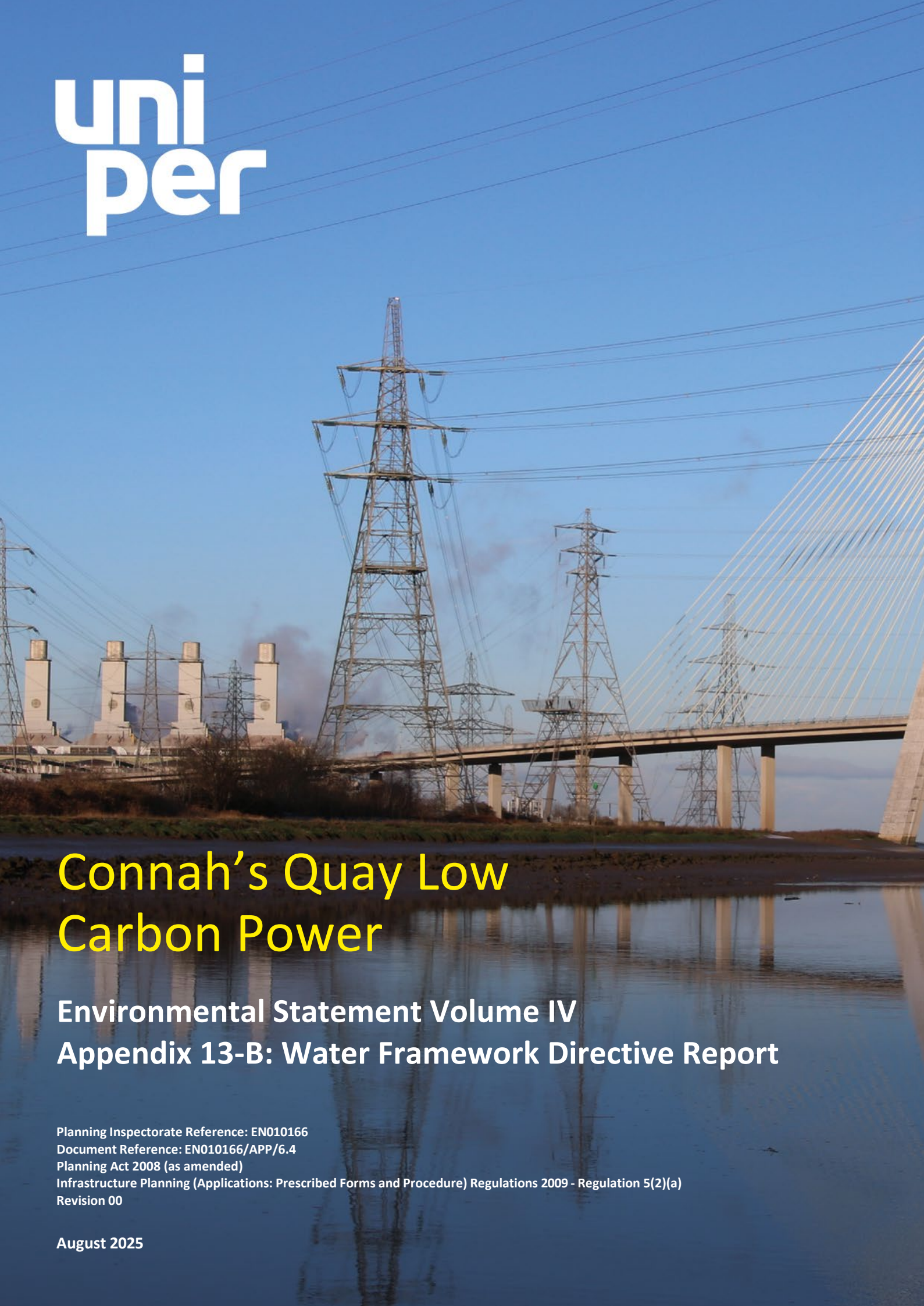

Connah's Quay Low Carbon Power

Environmental Statement Volume IV
Appendix 13-B: Water Framework Directive Report

Planning Inspectorate Reference: EN010166
Document Reference: EN010166/APP/6.4
Planning Act 2008 (as amended)
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)
Revision 00

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1. Introduction

1.1 Background

1.1.1 The Applicant is seeking a Development Consent Order (DCO) for the construction, operation (including maintenance) and decommissioning of a proposed low carbon Combined Cycle Gas Turbine (CCGT) Generating Station fitted with Carbon Capture Plant (CCP) (the 'Connah's Quay Low Carbon Power (CQLCP) Abated Generating Station') and supporting infrastructure (collectively 'the Proposed Development').

1.1.2 The CQLCP Abated Generating Station would comprise up to two CCGT with CCP units (and supporting infrastructure) achieving a net electrical output capacity of more than 350 megawatts (MW; referred to as MWe for electrical output) and up to a likely maximum of 1,380 MWe (with CCP operational) onto the national electricity transmission network.

1.1.3 Through a carbon dioxide (CO_2) pipeline, comprising existing and new elements the Proposed Development would make use of CO_2 transport and storage networks owned and operated by Liverpool Bay CCS Limited, currently under development as part of the HyNet Carbon Dioxide Pipeline project (referred to as the 'HyNet CO_2 Pipeline Project'), that would transport CO_2 captured from existing and new industries in North Wales and North-West England, for offshore storage. The captured CO_2 would be permanently stored in depleted offshore gas reservoirs in Liverpool Bay.

1.1.4 For the purposes of the electrical connection, National Grid Electricity Transmission plc (NGET), which builds and maintains the electricity transmission networks, is responsible for the operation and maintenance of the existing 400 kV NGET Substation.

1.1.5 A description of the Proposed Development, including details of maximum parameters, is set out in **Chapter 4: The Proposed Development** of the **Environmental Statement** (**ES**) (**EN010166/APP/6.2.4**). At this stage in the development, the design of the Proposed Development incorporates a necessary degree of flexibility to allow for ongoing design development.

1.1.6 This Water Framework Directive (WFD) Report is being carried out as part of the ES.

1.1.7 More detail on the key elements on the site is provided in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 13: Water Environment and Flood Risk** (**EN010166/APP/6.2.13**).

1.2 Study Area

1.2.1 The Order limits are located to the north-west of Connah's Quay in Flintshire, north-east Wales. The Order limits are shown on **Figure 3-1: Order limits** (**EN010166/APP/6.3**).

1.2.2 The study area for this WFD represents a Zone of Influence (ZOI) that has been defined to include water bodies likely to be at risk from possible direct and indirect impacts that might arise from the Proposed Development. The potential ZOI is 1 km from the Order limits (including the Accommodation Work Areas) and forms the study area, as shown in **Figure 13-1: Surface Water Features** (**EN010166/APP/6.3**).

1.2.3 During the scoping assessment, as described in Chapter 11: Water Environment and Flood Risk of the Scoping Report (**Appendix 1-A: Scoping Report** (**EN010166/APP/6.4**), a 2 km ZOI was initially considered. However, it has since been found that there are no hydrological connections to water features between 1 km and 2 km distance, and therefore a ZOI of 1 km is considered appropriate. The Dee Estuary is within 1 km of the Proposed Development, and due to the size, this is assumed to be the final receptor.

1.2.4 The tidal influence has also been considered. As detailed in ES **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**), the mean tidal ellipse near the entrance of the Dee Estuary is approximately 6.2 km, with a maximum tidal excursion of 10 km during the highest astronomical tide. Freshwater inflows into the Dee Estuary allows for partial mixing with saline water, leading to density-driven gravitation circulation. While flood tides contribute flows more evenly through the water column, ebb flows remain strongest at the surface resulting in a net seaward flow at the surface and a landward flow closer to the estuary bed. Given the combination of reduced tidal volume, partial mixing, and longitudinal salinity gradient, there is no realistic pathway for significant tidal influence to carry effects upstream. As such, while downstream receptors have been considered, there is no anticipated impact on upstream receptors due to tidal movements.

1.2.5 The Order limits are contained within the Dee Estuary WFD Operational Catchment, within the Dee Management Catchment (Ref 1). In total, the study area contains five WFD water bodies as shown in **Figure 13-1: Surface Water Features** (**EN010166/APP/6.3**), comprising three surface water bodies, one transitional water body and one groundwater body:

- Wepre Brook (GB111067056880);
- Swinchiard Brook (GB111067056840);
- Nant Sir Roger (Dee Estuary) (GB111067057050);
- Dee (N.Wales) Transitional Water Body (GB531106708200); and
- Dee Carboniferous Coal Measures Groundwater Body (GB1102G204800).

1.2.6 There is a large part of the study area which does not fall within a WFD water body catchment as shown in **Figure 13-1: Surface Water Features** (**EN010166/APP/6.3**), but watercourses within this area ultimately flow into the Dee (N.Wales) Transitional Water Body which has been assessed as part of this WFD Report.

1.3 Introduction to the Water Framework Directive

1.3.1 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 2), commonly referred to as the Water Framework Directive (WFD) Regulations, aim to protect and enhance the water environment.

1.3.2 The WFD Regulations takes a holistic approach to sustainable management of the water environment by considering interactions between surface water, groundwater and water-dependent ecosystems. Ecosystem conditions are evaluated according to interactions between classes of biological, chemical, physico-chemical and hydromorphological elements known as 'Quality Elements'.

1.3.3 Under the WFD Regulations, 'water bodies' are the basic management units, defined as all or part of a river system or aquifer. Water bodies form part of a larger 'river basin district' (RBD), for which 'River Basin Management Plans' (RBMPs) are used to summarise baseline conditions and set broad improvement objectives. RBMPs are produced every six years, in accordance with the river basin management planning cycle. The current RBMPs at the date of this assessment are the 2022 Cycle 3 plans, and the most recent RBMP data available is from 2022. The Proposed Development interacts with the Dee RBMP.

1.3.4 In Wales, Natural Resources Wales (NRW) is the appropriate agency for implementing the WFD Regulations, although many objectives are delivered in partnership with other relevant public bodies and private organisations, for example local planning authorities, water companies, rivers trusts, and private landowners and developers. NRW is also responsible for managing flood risk and other activities on Main Rivers. Local planning authorities or drainage boards are responsible for consenting certain activities on Ordinary Watercourses. Local planning authorities are responsible for highways drains, and landowners are responsible for ditches and watercourses and also piped watercourses and culverts. While NRW is ultimately responsible for the WFD on any water body, local authorities are required to plan and consent WFD related activities on Ordinary Watercourses.

1.3.5 As part of its regulatory and statutory consultee role on development consent applications and environmental permitting (under the Environmental Permitting Regulations (England and Wales) 2016) (Ref 4) NRW and WFD-partnering organisations must consider whether proposals for new developments have the potential to:

- cause a deterioration of any quality element of a water body from its current status or potential; and / or
- prevent future attainment of good status or potential where not already achieved.

1.3.6 As stated in The Planning Inspectorate (2025) Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Ref 8), the WFD Regulations place a general duty on the Secretary of State, Welsh Ministers, the Environment Agency and Natural Resources Wales to exercise their 'relevant functions' to secure compliance with the WFD.

1.3.7 These authorities and each public body (as defined in Regulation 2) also have a duty to have regard to the relevant River Basin Management Plan in exercising their functions (Regulation 33). This duty does apply to functions under the Planning Act 2008 in examining and determining DCO applications.

1.3.8 When deciding DCO applications, the Secretary of State will need to consider the potential effects of any proposed development on:

- the environmental objectives and measures within River Basin Management Plan and any supplementary plans; and
- the ability of the UK to comply with the WFD, including (if applicable) the derogation provisions of Article 4.7.

1.3.9 The Examining Authority for an DCO application must also report on these effects and ensure the Secretary of State has enough information to decide whether the development has implications for the UK's obligations under the WFD. This includes information in support of any derogation that may be sought.

1.3.10 Several National Policy Statements, including NPS EN-1 (Ref 3), state that the Environmental Statement (ES) must contain information on impacts arising from the proposed development on water bodies or protected areas under the WFD and other relevant directives.

1.3.11 In determining whether a development is compliant or non-compliant with the WFD objectives for a water body, NRW and partnering organisations must also consider the conservation objectives of any Protected Areas (i.e. Natura 2000 sites or water-dependent Sites of Special Scientific Interest (SSSIs)) and adjacent WFD water bodies, where relevant.

1.3.12 The Planning Inspectorate's Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Ref 7) states that as part of an ES accompanying a DCO application, the outcome of the WFD assessment must be clearly identified in application documents. It is recommended that that this assessment is submitted as a separate report or assessment within the environmental statement.

2. Methodology

2.1 Approach

2.1.1 There are no fixed methods for WFD assessment. The nature of the water environment and the breadth of the legislation mean that assessments are tailored to proposals on a case-by-case basis.

2.1.2 The following general guidance is available which has been applied for this assessment:

- National Resources Wales (2017). GN078 Complying with the WFD Regulations 2017 (Ref 5);
- Environment Agency (2016a). Water Framework Directive risk assessment. How to assess the risk of your activity (Ref 6);
- Environment Agency (2016b). Protecting and improving the water environment. Water Framework Directive compliance of physical works in rivers (Ref 7);
- The Planning Inspectorate (2025). Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Ref 8); and
- Environment Agency (2016c). Water Framework Directive assessment: estuarine and coastal waters. Clearing the Waters for All (Ref 9).

2.1.3 A stepwise approach consisting of screening, scoping and impact assessment phases is generally followed in order to: (a) rationalise the levels of WFD assessment and impact mitigation that are required; and (b) verify that proposals meet the requirements of the WFD. The general approach is described by NRW (Ref 5) and the Planning Inspectorate (Ref 8) and briefly summarised below.

2.1.4 This WFD assessment identifies requirements (if any) for WFD impact mitigation commitments in the planning submission and identifies requirements for further WFD impact assessment at future design stages.

Stage 1 Screening

2.1.5 Screening identifies the ZOI of a proposed development, and if proposed activities pose a risk to the water environment. It is used to identify if there are activities that do not require further consideration for WFD objectives, for example activities which have been ongoing since before the current RBMP plan cycle and which have thus formed part of the baseline.

Stage 2: Scoping

2.1.6 A scoping assessment is required to determine which receptors may be impacted by a proposed development, and therefore need to be assessed in the WFD impact assessment. For coastal and transitional water bodies the relevant receptors are defined in accordance with the Environment Agency Clearing the Waters Guidance (Ref 9) and NRW WFD Guidance (Ref 5) and are based on the water body's quality elements which are:

- hydromorphology;
- water quality;
- biology – habitats;
- biology – fish; and
- protected areas.

Stage 3: Impact Assessment

2.1.7 This involves rationalised assessment of water bodies and quality elements that could be affected by proposed activities, in order to identify any areas of WFD non-compliance. Proposed activities are reviewed in terms of both positive and negative impacts, and the baseline mitigation measures, enhancements, and contributions to the WFD objectives described in the RBMP. Any proposed activities with potentially deleterious impacts are reviewed simultaneously with their corresponding mitigation proposals, to determine a net effect on WFD objectives.

Mitigation Commitments

2.1.8 Proposed mitigation activities relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured. Mitigation could be secured through a Development Consent Order (DCO) or other legally binding methods.

Regulation 19 Derogation

2.1.9 Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, additional assessment is needed in the context of WFD Regulation 19 which covers procedures for WFD derogation.

2.1.10 Regulation 19 is a 'last resort' planning and legal process, and it is a matter for the Secretary of State to consider whether derogation under Regulation 19 is justified. An applicant would be required to provide detailed and often complex evidence to justify its case that the following four stringent tests have been met:

- Test (a): All practicable steps are to be taken to mitigate the adverse impacts on the water body concerned;
- Test (b): The reasons for modifications or alterations are specifically set out and explained in the RBMP;
- Test (c)(1): There is an overriding public interest in the proposed development and/or Test (c)(2): its benefits outweigh the benefits of the WFD objectives (i.e. that the benefits of the project to human health, human safety or sustainable development outweigh the benefits of achieving the WFD objectives); and
- Test (d): The benefits of the project cannot be achieved by a significantly better environmental option (that are technically feasible and do not lead to disproportionate cost).

2.1.11 In addition, the proposed development must not permanently exclude or compromise achievement of the WFD objectives in other bodies of water within the same RBD and must be consistent with the implementation of other environmental legislation. In applying Regulation 19, steps must also be taken to make sure that the new provisions guarantee at least the same level of protection as the existing legislation.

Consultation

2.1.12 An EIA Scoping Opinion (**Appendix 1-A: Scoping Opinion (EN010166/APP/6.4)**) from the Planning Inspectorate was received in March 2024. The parts of the Scoping Opinion that relate to the WFD process are summarised in **Table 1**.

2.1.13 Statutory consultation was undertaken in October to November 2024. A Preliminary Environmental Information Report (PEIR) was issued in support of that consultation. **Table 2** outlines the statutory consultation responses relating to the WFD and how regard has been had to these throughout the WFD assessment.

Table 1: EIA Scoping Opinion responses with regard to the WFD process

Consultee	Comments	Summary of response/how comments have been addressed
PINS	*"The Applicant should consider whether temperature modelling is required as part of the EIA and WFD assessment, which should be used to inform the ES. The methodology for the water resources assessment should be justified in the ES, with effort made to agree it with the relevant consultation bodies."*	The existing permit limits for abstraction and discharge (volume, temperatures and water quality) would be maintained unchanged. NRW confirmed via email exchange dated 27 January 2025 that they are content with this arrangement.
NRW	*"We advise that the scoping out of water bodies should be based on the project's ZoI. Therefore, we do not agree that some water bodies should be screened out as they are 2km away, as there may be impacts to fish, for example, due to a thermal plume."*	This comment is acknowledged. The ZoI/Study Area is stated as 1 km but potential impacts to further water bodies beyond this are considered where there is a reasonable pathway to impact under the source-pathway-receptor impact approach. However, in this case due to the proximity of the Order limits to the River Dee estuary, and the size of this water feature, it is considered that the Dee Estuary is the ultimate downstream receptor for this assessment.
NRW	*"Note that the name of the transitional water body is "Dee (N. Wales)" not "River Dee". We advise that the target status of the Dee (N. Wales) water body is "Good" by 2027. Please also note that an interim classification is due in 2024 and the final assessment should be based on the most up to date information available."*	This has been updated with the correct name and classification status (Cycle 3 2024 Interim) in this WFD assessment.
NRW	*"We concur with the designated sites identified and agree that there are no Bathing Waters in proximity to the development."*	This position on this WFD assessment is acknowledged.
NRW	*"We advise that the "Clearing the Waters for All" WFD guidance is followed to inform screening and scoping. The WFD compliance assessment should include all parts of the development, including those licensable under Marine*	The WFD assessment presented in the ES (this document) follows the 'Clearing the Waters for All' WFD guidance as well as more recent NRW guidance issued to the project team following the statutory consultation period. This includes consideration of all parts of the Proposed Development

Consultee	Comments	Summary of response/how comments have been addressed
	Licensing and the Environmental Permitting Regulations (i.e. water abstraction and discharge)."	initially, but with various aspects screened and scoped out in a staged process in accordance with the guidance.
NRW	*"We agree that the assessment should consider construction, operation and decommissioning as well as abstraction and discharges. We also agree that foul water should be considered. Any risks from the mobilisation of contamination to the water environment (to be addressed in Chapter 12, Geology and Ground Conditions) should also be considered in the WFD compliance assessment."*	Foul water and potential contamination have been considered within the WFD assessment (this document). Where relevant cross references have also been provided to other assessments within the ES.

Table 2: Statutory Consultee Responses with regard to the WFD process

Consultee	Summary of comments	Response
NRW	*"Changes in hydromorphology (the physical characteristics and processes of the river) have the potential to cause deterioration in the WFD quality elements of waterbodies. Watercourse crossings should therefore use trenchless techniques set well back from the watercourses. The construction method for crossing watercourses should ensure that the pipeline causes no loss of water from those watercourses to the ground. Sufficient information should be included in the ES and WFD Compliance Assessment to enable this to be assessed."*	No works requiring watercourse crossings are expected within the Repurposed CO_2 Connection Corridor. With regard to the Proposed CO_2 Connection Corridor, there are no mapped watercourses that would be crossed and no evidence of any watercourses was observed during the site walkover. However, there may be some minor field ditches (likely ephemeral if present) that could potentially be crossed by the pipeline. The location and condition of existing ditches would be investigated through a Pre-Works Surface Water Feature Survey prior to construction as detailed in the **Framework Construction Environmental Management Plan** (**CEMP**) (**EN010166/APP/6.5**). Appropriate mitigation measures for any such crossings of ephemeral ditches (ordinary watercourses) are set out later in **Chapter 13: Water Environment and Flood Risk** (**EN010166/APP/6.2.13**). Impacts on WFD quality elements of water bodies are considered in the WFD assessment (this document).
NRW	*"It is unclear whether power cables installed as part of the project will cross any watercourses. We advise that horizontal directional drilling or other forms of undergrounding are used wherever possible. Detailed information on the proposed methodology, along with evidence to demonstrate that there will not be impacts on*	No works requiring watercourse crossings are expected within the Repurposed CO_2 Connection Corridor. With regard to the Proposed CO_2 Connection Corridor, there are no mapped watercourses that would be crossed and no evidence of any watercourses was observed during the site walkover. However, there may be some minor field ditches (likely ephemeral if present) that could

Consultee	Summary of comments	Response
	fluvial geomorphology, should be provided within the ES and WFD Compliance Assessment."	potentially be crossed by the pipeline. The location and condition of existing ditches would be investigated through a Pre-Works Surface Water Feature Survey prior to construction as secured in the **Framework CEMP** (**EN010166/APP/6.5**). Appropriate mitigation measures for any such crossings of ephemeral ditches (ordinary watercourses) are set out in **Chapter 13: Water Environment and Flood Risk** (**EN010166/APP/6.2.13**). Impacts on WFD quality elements of water bodies are considered in the WFD assessment (this document).
NRW	*"We agree with the inclusion of the Dee (N. Wales) WFD waterbody for assessment of the impacts on marine water quality. Please note that NRW have produced guidance on the process of assessing WFD compliance which can be made available upon request. We advise that this is used for any further WFD Compliance Assessment for this project."*	The NRW guidance has been requested and obtained. This has been used to guide this WFD assessment.
NRW	*"Assessment of the effects of the proposal on the water environment within the entire ZoI will be needed, including upstream of the Water Connection Corridor, where any effects will be transported by the flood tide. Throughout the PEIR and its appendices, multiple spatial definitions for the ZoI of the effects of activities related to the proposed development are used. Chapter 16, figure 16, 16-2 displays both the downstream ZoI and the estimated limit of upstream ZoI. Chapter 16, paragraph 16.4.17 states that modelling of the hydrodynamics of the estuary will*	Noted. Potential impacts throughout the entire ZoI (Study Area) upstream and downstream of the Construction and Operation Area up to 1 km have been considered.

Consultee	Summary of comments	Response
	include the region up to the tidal limit. We welcome the assessment of impacts of proposed activities within the entire region identified as within the ZoI. We advise that this approach should be consistently applied throughout the assessment, including the WFD Compliance Assessment."	
NRW	*"Temporary AIL works should be screened in for assessment if any port of operation is within the Dee (N. Wales) waterbody (e.g. Port of Mostyn and Mid-way Berth), as any vessels used, and their methods of operation may affect the water quality of the estuary."*	Noted. Vessel movements have been considered in terms of potential impacts to the WFD Quality Elements.
NRW	*"We advise that the Environment Agency (EA) are also consulted as the river water bodies lying to the north of the Dee estuary are within the EA's jurisdiction."*	The Order limits have been reduced since the Scoping Report stage, with no potential for impacts to waterbodies north of the Dee estuary. The Environment Agency were consulted and stated that they hold no information for any water body within the study area.

2.2 Desk Study

2.2.1 A desk-based study was carried out to capture information pertaining the Proposed Development that is not attainable through site survey. Review of relevant information relating to the study area was undertaken to develop a baseline for WFD catchments, watercourses and surrounding areas. The following data sources were used for the desk study:

- National Resources Wales WFD data, available from the Water Watch Wales website (Ref 1);
- Historical maps (Ref 10);
- Geology (Ref 11) and soil data (Ref 12);
- Natural environment maps and designations on the MAGIC website (Ref 13);
- Hydrological information (Ref 14); and
- Climate information (Ref 15).

2.3 Field Survey

2.3.1 A site walkover was undertaken on 26 March 2024 by a water scientist and geomorphologist. A summary of the site walkover is provided in ES **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**).

2.4 Limitations and assumptions

2.4.1 This WFD assessment has been undertaken based on the design information of the Proposed Development that is provided in ES **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). Where there is uncertainty in the design, reasonable assumptions have been made and these are described at relevant points within this assessment.

2.4.2 The latest WFD classification data for Cycle 3 from 2024 has been used within this assessment.

2.4.3 The following assumptions have been made for the construction phase of the Proposed Development:

- the Contractor(s) would as a minimum conform to all permit / consent / license requirements and best practice measures to avoid, reduce and minimise the risk of water pollution or unacceptable physical impact (without mitigation) on water bodies;
- the final construction of laydown areas, accounting for exclusion zones, surface consideration, and security measures, would be confirmed based on the chosen technology and engineering, procurement, and construction (EPC) contractor. This would be outlined in the final CEMP which is a requirement of the DCO;
- a Proposed Surface Water Outfall adjacent to the Main Development Area is required adjacent to the existing discharge point. This is secured via the **Design Principles Document** (**EN010166/APP/7.8**);

- the proposed works to be undertaken within the Water Connection Corridor would involve replacing eel screens and minor repairs to surface concrete, metalwork, and timbers. These works would be carried out between the existing inlets and existing concrete manifold on the riverbank. Notably, no cofferdam or jack-up barge would be required for these activities and no piling is required within the Water Connection Corridor. This is secured via the **Design Principles Document** (**EN010166/APP/7.8**).

2.4.4 The following assumptions have been made for the operational phase of the Proposed Development:

- a detailed and robust Surface Water Drainage Strategy would ensure that surface water is treated and attenuated as required during the operational phase. Refer to ES **Appendix 13-D: Outline Drainage Strategy** (**EN010166/APP/6.4**);
- the existing permit limits for discharge of operational cooling water to the River Dee would be maintained, in terms of volume, temperature and water quality;
- existing permitted abstraction rates from the River Dee would be maintained;
- direct contact cooler (DCC) water would be treated, reused where possible, or otherwise discharged within the existing permit limits. Any variation from this would be agreed with NRW and subject to a DCO change;
- it is assumed that potable water would be sourced from the mains water supply for both domestic and process use, while cooling water would be sourced from the River Dee;
- it is assumed that no maintenance dredging would be required for the operational phase. The intake and outfall infrastructure would be kept clear using a compressed air blasting system, with a jet washing system incorporated if necessary. Both activities would occur only during a falling tide to return the silt removed to the estuary sediment budget, as secured in **Appendix 4-A: Operation and Maintenance Mitigation Register (EN010166/APP/6.4)**. If these methods are inadequate, retrievable screens may be used for mechanical cleaning as an alternative;
- black and grey wastewater (i.e. non-cooling and non-process wastewater) from the existing Connah's Quay Power Station is currently directed to an underground septic tank system for storage and settling (as treatment). Current permitted practice is to treat sewage on site and discharge treated sewage waters with main cooling water purge discharge to the River Dee. Due to sub-optimal operation of one of the existing systems, this is currently emptied periodically by a specialist contractor (approximately once per six-month period). The Proposed Development would utilise a new similar system for black and grey wastewater including foul drainage from permanent welfare facilities, with treated black and grey wastewater either to be discharged to the River Dee with main cooling water purge discharge or to be removed by specialist contractor. Connection to the closest public sewer is not

considered feasible due to the presence of the railway line that would need to be crossed. A Water Quality Risk Assessment for discharges to the River Dee would be undertaken if this option is taken forward, once details of effluent quality are available. This is secured through **Appendix 4-A: Operation and Maintenance Mitigation Register (EN010166/APP/6.4)**; and

- no works requiring watercourse crossings are expected within the Repurposed CO_2 Connection Corridor. Within the Proposed CO_2 Connection Corridor, it is anticipated that intrusive pipeline crossings would be limited to ephemeral field drains (if required).

2.4.5 The following assumptions have been made for the decommissioning phase of the Proposed Development:

- it is assumed that, at the end of its design life, decommissioning of the Proposed Development would see the removal of all above ground equipment down to ground level to enable future land re-use, and the ground remediated as required to facilitate future re-use. It is also assumed that cooling water infrastructure within the River Dee would be left in-situ and the associated pipework filled. It is assumed that all underground infrastructure would remain in-situ, with connection and access points being sealed / disconnected;
- any removal contractor would have a legal obligation to undertake decommissioning and demolition in accordance with the prevailing legislation at that time.

2.4.6 Given the above assumptions, this assessment presents a reasonable 'worst case' approach.

3. Baseline Desk Study

3.1 Introduction

3.1.1 The baseline conditions for the study area have been summarised below. For a more detailed report of the baseline conditions for the study area, refer to ES **Appendix 13-A: Water Baseline Survey and Methodology Report** (**EN010166/APP/6.4**).

3.2 Topography and Land-use

3.2.1 The Main Development Area, Electrical Connection Corridor and Construction and Indicative Enhancement Area (C&IEA) of the Proposed Development are characterised by flat, low-lying coastal topography with typical ground levels of approximately 6 m to 8 m Above Ordnance Datum (AOD). The Water Connection Corridor is similar to the aforementioned sites, with the northern portion extending out into the lower marshland and River Dee channel to the north (approximately 3 m to 4 m AOD).

3.2.2 The Abnormal Indivisible Load (AIL) route to the west of the Main Development Area is aligned along the coast with ground levels of approximately 8 m AOD.

3.2.3 The Main Development Area, Electrical Connection Corridor, C&IEA and Water Connection Corridor are bounded to the south-west by the North Wales Main Line railway and to the north-east by the River Dee and associated floodplain/marshland. The A548 passes over the River Dee between the Main Development Area/Water Connection Corridor and C&IEA.

3.2.4 The Repurposed CO_2 Connection Corridor extends from the Main Development Area rising upslope towards the Proposed CO_2 Connection Corridor (ground levels ranging from approximately 36 m AOD to 48 m AOD).

3.2.5 The land use in the south-east of the Main Development Area is predominantly industrial, containing the existing Connah's Quay Power Station, with arable/grasslands surrounding the site to the west, and the River Dee to the north. The C&IEA is constrained by the River Dee to the north and east, with the remainder surrounded by built-up land, with the power station to the north-west and the residential areas of Kelsterton and Golftyn to the south-west.

3.3 Statutory Designated Sites

3.3.1 The Order limits are partly located within multiple statutory designated sites. These include:

- the Dee Estuary Ramsar site, designated due to it supporting internationally important wetlands and wetland species;
- the Dee Estuary SSSI, designated for marine Annex I habitats and Annex II species including sea lamprey *Petromyzon marinus* and river lamprey *Lampetra fluviatilis;*
- River Dee SSSI designated for Annex II Atlantic salmon *Salmo salar* and brown trout *Salmo trutta;*
- the Dee Estuary / Aber Dyfrdwy Special Area of Conservation (SAC), designated for habitats including mudflats, sand flats and saltmarsh;
- River Dee and Bala Lake SAC, designated for Annex II Atlantic salmon *Salmo salmar*; and
- Dee Estuary Special Protection Area (SPA), which is of major importance for waterbirds due to the habitats of intertidal flats, saltmarshes and coastal marsh.

3.3.2 Within the study area, there is also the presence of saltmarsh, considered a high sensitivity habitat within the Clearing Waters for All WFD assessment guidance (Ref 9).

3.3.3 The Dee Estuary/ Aber Afon Dyfrdwy Ground Water Dependent Terrestrial Ecosystem (GWDTE) is present in the study area. The area of this covers the SACs, SPA and SSSIs described above.

3.4 Catchment Geology and Soils

3.4.1 Underlaying the watercourses within the study area, the bedrock geology is mixed. The majority of the Order limits are underlain by Pennine Lower Coal Measures formation (mudstone, siltstone and sandstone) with a band of Etruria formation (mudstone, sandstone and conglomerate) and the Gwespyr Sandstone (sandstone and (Subequal/Subordinate) Argillaceous Rocks, interbedded) to the west. The Bowland Shale Formation (mudstone) is present within the study area but does not underlay the Proposed Development.

3.4.2 Superficial geology deposits within the study area are comprised of Tidal Flat Deposits of clay, silt and sand.

3.5 Catchment Hydrology

3.5.1 Hydrology is taken from the Dee at Chester Suspension Bridge which is upstream of the site and the transitional water body. River flow is reflective of the moderately high catchment size of 1,800 km^2, at 34.078 m^3/s mean flow. At this station, there is a baseflow index of 0.5, Q95 of 5.13 m^3/s, Q5 of 119 m^3/s.

3.5.2 Annual average rainfall is from Hawarden Airport (Ref 15), approximately 6.9 km south-east of the Proposed Development. From 1991 – 2020, there has been an average annual rainfall of 728 mm per year, with the wettest months in October, November and December. This is lower than the UKs average annual rainfall of 1,162 mm.

3.6 Surface Water Body WFD Status

3.6.1 The study area falls within the Dee (N.Wales) Transitional Water body and tributaries of this water body. Further details regarding the WFD classifications of this water body are given in **Table 3**.

Table 3: Summary of the WFD status of the Dee (N. Wales) Transitional Water Body

WFD Parameter	Status / Summary
Water Body ID	GB531106708200
Water Body Name	Dee (N. Wales)
Water Body Type	Transitional
Water Body Area (km^2)	305.8
Water Body Length (km)	334.7
Hydromorphological Designation	Heavily Modified
Overall Ecological Potential	Moderate
Current Overall Status	Moderate
Status Objective	Good by 2027

3.6.2 The study area falls within three WFD river water bodies. Further details regarding the WFD classifications of these water bodies are given in **Table 4**.

Table 4: Summary of the WFD status of the WFD surface water bodies

WFD Parameter	Status / Summary	Status / Summary	Status / Summary
Water Body ID	GB111067056880	GB111067056940	GB111067057050
Water Body Name	Wepre Brook	Swinchiard Brook	Nant Sir Roger (Dee Estuary)
Water Body Type	River	River	River
Water Body Area (km^2)	58.1	68	36.3
Water Body Length (km)	59.5	49	39
Hydromorphological Designation	Natural	Natural	Natural

WFD Parameter	Status / Summary	Status / Summary	Status / Summary
Overall Ecological Status	Moderate	Good	Good
Current Overall Status	Poor	Good	Good
Chemical Status	High	High	High

3.6.3 The study area overlies the Dee Carboniferous Coal Measures Groundwater body. Further details regarding the WFD classifications of this water body are given in **Table 5**. Note that the latest WFD classification for groundwater bodies is from 2021.

Table 5: Summary of the WFD status of the Dee Carboniferous Coal Measures Groundwater body

WFD Parameter	Status / Summary
Water Body ID	GB41102G204800
Water Body Name	Dee Carboniferous Coal Measures
Water Body Type	Groundwater
Water Body Area (km^2)	1184
Hydromorphological Designation	Natural
Overall Ecological Status	Good
Current Overall Status	Poor
Chemical Status	Poor

3.7 Surface Water Quality

3.7.1 Water quality is monitored by NRW for the Dee (N. Wales) WFD water body, as shown on Water Watch Wales (Ref 1).

3.7.2 **Table 6** provides an overview of water quality sample locations for the River Dee.

3.7.3 The monitoring locations at Powergen Buoyage Point and Johnson Hole were originally established to assess the impacts of industrial discharge from local manufacturing and power generation facilities. As such, these locations are not fully representative of baseline water quality conditions in the estuary, as they reflect the influence of these industrial inputs. However, they have been included in the baseline monitoring to indicate the broader impacts of industrial discharges on the estuarine environment.

3.7.4 In contrast, the monitoring locations at White Sands and The Grindes are more likely to provide a closer representation of the baseline water quality of the estuary, as they are located in areas less influenced by industrial activities.

Table 6: Overview of water quality sample locations for the River Dee

Monitoring Station	NGR	Duration	Number of samples
Powergen Buoyage Point	SJ2840071200	2014-2024	50
Johnson Hole	SJ2923370304	2014-2024	13
White Sands	SJ2612473753	2014-2015	5
The Grindes	SJ2906470442	2014-2015	4

3.7.5 **Table 7** presents a summary of monitoring data for the River Dee.

Table 7: Results of water quality sampling undertaken by NRW for the River Dee (2014-2024)

Parameter Name	Units	Environmental Quality Standards (EQS)	Powergen Buoyage Point			Johnsons Hole			White Sands			The Grindes		
			Min	Max	Mean[1]	Min	Max	Mean[1]	Min	Max	Mean[1]	Min	Max	Mean[1]
Temperature of water	ºC	-	4.07	21.10	10.84	4.36	17.67	11.69	11.50	17.60	14.72	12.60	17.20	14.88
Salinity (In Situ)	µg/l	-	1.73	30.92	19.42	7.70	30.92	19.34	11.45	25.71	19.19	0.66	24.49	17.09
Dissolved Oxygen %	%	-	78.7	113.1	91.4	83.7	123	93.0	87.0	114.2	95.6	88.9	116.1	88.9
Dissolved Organic Carbon as C	mg/l	-	1.32	5.71	2.74	2.12	8.87	4.51	-	-	-	-	-	-
Lead (dissolved)	µg/l	1.3	0.05	0.44	0.13	<0.40	<0.40	<0.40	-	-	-	-	-	-
Mercury (dissolved)	µg/l	0.07	<0.01	0.01	0.01	<0.01	0.03	0.01	-	-	-	-	-	-
Cadmium (dissolved)	µg/l	0.2	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	-	-	-	-
Zinc (dissolved)[3]	µg/l	6.8	3.17	20.5	6.80	2.90	6.90	5.34	-	-	-	-	-	-
Nickel (dissolved)	µg/l	0.3 / 2	0.59	1.32	0.86	<0.20	<0.20	<0.20	-	-	-	-	-	-
Arsenic (dissolved)	µg/l	25	<2	2.93	2.13	<2	<2	<2	-	-	-	-	-	-
Copper (dissolved)	µg/l	3.76[2]	0.73	1.75	1.12	<3	<3	<3	-	-	-	-	-	-
Chromium Hexavalent (dissolved) Cr VI	µg/l	0.6	<0.3	<0.3	<0.3	-	-	-	-	-	-	-	-	-

Notes

1- Average concentrations have been conservatively calculated so that that values below level of detection are at the level of detection.

2 – EQS is for DOC less than 1 mg/l, EQS will be variable and higher for this water body given the elevated DOC.

3 – Zinc average annual concentration will be variable and higher than EQS for this water body accounting for ambient background concentrations.

Pink highlight where EQS values are met or exceeded.

3.7.6 These data indicate that many of the parameters are below the detectable limit against the WFD EQS (Ref 16) for transitional waters. However, there is some evidence of dissolved metal concentrations across the monitoring sites, including exceedances of the EQS at Powergen Buoyage Point for Zinc and Nickel. Zinc average annual concentrations at Powergen Buoyage Point are at around the EQS, however would be higher than the EQS taking into account the ambient background concentration. Nickel concentrations at Powergen Buoyage Point exceed the average annual EQS, however do not exceed the maximum allowable EQS. It is important to note that these concentrations have not been measured in the wider estuary in the publicly available datasets.

3.8 Marine Ecology Overview

3.8.1 Full details regarding marine ecology within the study area are provided in ES **Chapter 12: Marine Ecology** (**EN010166/APP/6.2.12**). A brief summary is provided below.

3.8.2 No protected or rare invertebrate species were identified during Environment Agency surveys of the Dee Estuary in 2015 (Ref 17).

3.8.3 One marine INNS, the Chinese mitten crab *Eriocheir sinensis* was identified during the desk study within the study area.

3.8.4 The Dee Estuary and River Dee is an important breeding, sheltering and nursery area for many coastal fish species. It also supports a number of migratory species including Atlantic salmon *(Salmo salar)*, brown trout *(Salmo trutta),* river lamprey *Lampetra fluviatilis*, sea lamprey *Petromyzon marinus*, European eel *Anguilla Anguilla*, twaite shad *Alosa fallax* and smelt *Osmerus eperlanus*. These species are all listed as Species of Principal Importance (SOPI) under the Natural Environment and Rural Communities (NERC) Act 2006. Atlantic salmon *Salmo salar*, river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* are Annex II species under European Union Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora (known as the Habitats Directive) (Ref 18).

3.9 Aquatic Ecology Overview

3.9.1 Full details regarding aquatic ecology within the study area are provided in **Appendix 11-G: Aquatic Ecology and Baseline Information** (**EN010166/APP/6.4**). A brief summary is provided below.

3.9.2 Several notable fish species were recorded within 2 km of the Proposed Development using NRW data (Ref 19) and survey data for the Proposed Development. These include the protected species of Atlantic salmon *Salmo salar*, brown/sea trout *Salmo trutta*, bullhead *Cottus gobio* and European eel *Anguilla anguilla.*

3.9.3 No notable macrophyte species have been recorded within the study area. Data received from NRW in May 2024 identified one flowering plant macrophyte species present on Swinchiard and Wepre Brook as hemlock water-dropwort *Oenanthe crocata*. All other species identified were liverworts and mosses. Within the study area, three invasive non-native macrophyte species were identified. Parrot's-feather *Myriophyllum aquaticum* was

identified under 1 km from the Proposed Development Site within a pond. Himalayan balsam *Impatiens glandulifera* and Japanese knotweed *Reynoutria japonica* were also identified within 500 m from the Proposed Development Site. All three species are listed under the Wildlife and Countryside Act 1981 (Ref 20), whilst parrot's-feather is also listed under the Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 21).

3.9.4 The River Dee SAC notes the presence of Britain's only known population of stonefly *Isogenus nubcula* and the Nationally Scarce club-tailed dragonfly *Gomphus vulgatissimus.* Both species can be found in the lower reaches of the River Dee which extends into the Dee Estuary. Further up the River Dee, the middle reaches are also known for the water beetle *Bidessus minutissimus* and the Nationally Scarce freshwater pearl mussel *Margaritifera margaritifera.*

3.9.5 There were no records of the white-clawed crayfish *Austropotamobius pallipes* within 2 km of the Proposed Development boundary within the last ten years and there is no mention of their presence within any of the designations in the area. However, there have been recent records of the non-native species Chinese mitten crab *Eriocheir sinensis* on Wepre Brook, although this watercourse is not within the ZOI for this assessment and is not hydrologically connected to the Proposed Development.

4. Screening and Scoping

4.1 Screening of WFD water bodies

4.1.1 The water bodies screened into the assessment have been selected based on the following criteria:

- all surface water and groundwater bodies that may potentially be directly or indirectly impacted by the Proposed Development; and
- the relevant water bodies have been determined using a ZOI approach, which firstly requires the identification of all potential pathways to an effect on all quality elements, and secondly determination of the extent of the effect (i.e. the ZOI).

4.1.2 The Proposed Development interacts with a number of WFD surface water and groundwater bodies. WFD Screening of these water bodies is provided in **Table 8**.

Table 8: Screening of WFD Water Bodies potentially impacted by the Proposed Development

Water Body ID	Screening Outcome	Justification
Dee (N.Wales) GB 531106708200	In	The footprint of the Proposed Development interacts with this water body. Thus, there is a risk to WFD quality elements and the ecological and chemical status of the receptor water body.
Wepre Brook GB 111067056880	Out	The Proposed Development does not encroach on these water bodies and is not hydrologically connected, and therefore they are screened out of further assessment.
Swinchiard Brook GB 111067056840		
Nant Sir Roger (Dee Estuary) GB 111067057050		
Dee Carboniferous Coal Measures GB 41102G204800	In	The WFD groundwater body underlays the Proposed Development and therefore may be impacted.

4.1.3 **Table 9** summarises other watercourses that have been identified within a 1 km study area surrounding the Proposed Development. Each watercourse ultimately drains into the Dee (N.Wales) WFD water body.

Table 9: Other named watercourses in the study area that are not defined WFD water bodies

Surface watercourse	Relevance to Proposed Development
Kelsterton Brook	This ordinary watercourse is culverted beneath the existing Connah's Quay Power Station site.
Old Rockcliffe Brook	This ordinary watercourse originates to the south of the Main Development Area and is culverted beneath Chester Road and the railway line. It joins Kelsterton Brook immediately upstream of the existing Connah's Quay Power Station and is culverted beneath the existing Connah's Quay Power Station. It would receive surface water discharge from the Main Development Area.
Lead Brook including Oakenholt Reservoir	This location is immediately upstream of the Order limits. The ordinary watercourse is culverted beneath Oakenholt Mills and the railway line before discharging to a wide-open channel that extends along the full length of the western boundary of the Main Development Area, before eventually discharging to the River Dee through a tidal reach.
Pentre Brook (also known as Pandy Brook)	The Pentre Brook ordinary watercourse flows approximately 480 m west of the Proposed CO_2 Connection Corridor, through Pentre Ffwrndan, prior to discharging to the Dee Estuary. Tributaries of Pentre Brook are crossed by the Repurposed and Proposed CO_2 Connection Corridors.
Oakenholt Brook	An unnamed ordinary watercourse drains the area between Lead Brook and Pentre Brook, which flows in a northerly direction prior to being culverted beneath Chester Road and the railway line. The pathway of this watercourse south of the railway line is not known.
Allt-Goch Brook and tributary	Two unnamed ordinary watercourses are crossed by the Repurposed and Proposed CO_2 Connection Corridors. These drain the catchment between Lead Brook and Pentre Brook, and eventually discharge to Pentre Brook on the coastal floodplain.
Unnamed streams south of Main Development Area	Various small unnamed watercourses are likely to be located within the study area.

4.2 Screening of activities

4.2.1 The Proposed Development comprises a number of activities which may present a potential risk to the WFD status of water bodies. These activities are listed in **Table 10**.

Table 10: Screening of the Proposed Development's Activities against WFD Quality Elements

Activity	Description	Screening Outcome	Justification
Main Development Area	The Main Development Area includes the entirety of Work No. 1 and Work No. 5 in addition to parts of Work No. 2, Work No. 4, Work No. 10 and Work No. 13. Work No.1 comprises an electricity generating station of more than 350 megawatts net electrical output. Work No. 2 is infrastructure connection works. Work No. 4 is temporary construction and laydown areas. Work No. 5 is the construction of a	In Dee (N.Wales) GB 531106708200 Dee Carboniferous Coal Measures GB 41102G204800	Groundwater levels have been recorded within 4 m of the ground surface within the Main Development Area, therefore, this element is screened in for further assessment due to potential impacts to the Dee Carboniferous Coal Measures groundwater body. Piled foundations are anticipated to be required for certain components of the Proposed Development, such as the absorber stack, Heat Recovery Steam Generator (HRSG), and turbine hall. The design and methodology for piling would be determined during the detailed design stage, once the site-specific ground investigation is complete, and would be informed by the findings of this investigation. Given the nature of the former site operations, it is possible that subsurface contamination may be present at the Main Development Area and a soil and groundwater investigation would be undertaken prior to commencing construction, secured in the **Framework CEMP** (**EN010166/APP/6.5**). The design and extent of this investigation would be based on the detailed design for the Proposed Development and would be conducted to also provide the necessary information to inform the requirements of an Environmental Permit that is required by NRW for the operation of the Proposed Development. Full details regarding excavation depth and method for the Main Development Area would be developed at detailed design stage. It is anticipated that shallow cut and fill excavations would take place for the Main Development Area. Until full details are available, this element is screened in for further assessment. A detailed hydrogeological assessment, available in **Appendix 13-E: Hydrogeological Assessment** (**EN010166/APP/6.4**), has been undertaken where excavations and/or dewatering is required. A Flood Consequences Assessment, available in **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**), has been undertaken to assess the risk of flooding at the Main Development Area. Targeted ground raising

Activity	Description	Screening Outcome	Justification
	surface water discharge. Work No. 10 includes works to provide site access. Work No. 13 is landscaping, biodiversity enhancement measures and boundary treatment. It is assumed that the above and below ground structures currently on the Main Development Area would be removed, cleared and remediated to a suitable development platform level as determined through technical studies.		would be undertaken to increase ground levels to 7.7 m AOD which is 600 mm above the 1 in 200 year (0.5% AEP) plus 2100 climate change event level in the Dee Estuary in order to protect critical operational infrastructure from flood events. Surface water would be appropriately segregated and treated prior to discharge. An Outline Surface Water Drainage Strategy has been developed and is provided in **Appendix 13-D: Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**). Works would be required to, or in the immediate vicinity of, the existing surface water outfall adjacent to the Main Development Area, subject to the recommendations of the **Appendix 13-D: Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**). This includes maintenance, minor upgrades, or repairs to the existing artificial outfall structure with a 10 m buffer zone around the outfall. The final design of a new discharge/outfall pipe would be subject to various technical assessments to identify the most appropriate solution. Any construction works associated with the Proposed Surface Water Outfall to Old Rockcliffe Brook may result in uncontrolled release of construction site runoff that may include high levels of fine sediment and oils. There may also be localised direct impacts to the bank of Old Rockcliffe Brook. A closed drain waste collection and disposal package is required for acid, amine and reflux drain effluent from the CCP. Disposal shall be by vacuum truck connection to off-site disposal. Drain drums shall be supplied with sufficient volume of drained fluids plus a safety margin with the final capacities confirmed at the detailed design stage. Process wastewater (acid wash and ammonia stripping process water) would be taken off site by tanker, should there be any new contaminant streams which would otherwise require a variation to the Environmental Permit. There is no existing sewerage connection for grey and black (i.e. non-cooling) wastewater export from the Main Development Area. Black and grey wastewater (i.e. non-cooling and non-process wastewater) from the existing Connah's Quay

Activity	Description	Screening Outcome	Justification
			Power Station is currently directed to an underground septic tank system for storage and settling, which is emptied periodically by a specialist contractor (approximately once per six-month period). Current permitted practice is to treat sewage on site and discharge treated sewage waters with main cooling water purge discharge to the River Dee. It is expected that the Proposed Development would utilise a new similar system for black and grey wastewater including foul drainage from permanent welfare facilities. All wastewater would be treated prior to being discharged into watercourses. The firewater strategy for the Main Development Area is to be developed in consultation with NRW and FCC post-DCO consent. If firewater runoff is to be directed to the new surface water network, bunding and penstocks would be used to contain potentially contaminated runoff and prevent it from entering the surface water network prior to testing. Uncontaminated runoff would be released by opening the penstocks, and contaminated runoff would be removed for treatment elsewhere. The development of a Detailed Surface Water Drainage Strategy generally in accordance with **Appendix 13-D Outline Surface Water Drainage Strategy (EN010166/APP/6.4)** is a requirement of the DCO, and would include the firewater strategy. The terminal points of the connection to existing potable/ towns water import connection is located within the Main Development Area and expected to be re-used for the Proposed Development. Any additional connections for the Proposed Development would be within the Main Development Area downstream of this terminal point. Works to divert existing culverted watercourses within the footprint of the Proposed Development, and potentially to tie surface water drainage into these

Activity	Description	Screening Outcome	Justification
			existing culverted watercourses, would form part of the Proposed Development within the Main Development Area. There may be potential impacts on water quality due to uncontrolled discharge of sediment laden water, oils, fuels, or other construction chemicals, associated with construction activities of the Main Development Area.
Repurposed CO_2 Connection Corridor	The Proposed Development would utilise approximately 3 km of the overall 27 km existing pipeline route.	Out Dee (N.Wales) GB 531106708200 Dee Carboniferous Coal Measures GB 41102G204800	It is understood that the Repurposed CO_2 Connection Corridor pipeline infrastructure is in a suitable condition for re-use. No works requiring watercourse crossings are expected within the Repurposed CO_2 Connection Corridor, and therefore this activity is screened out of further assessment.
Proposed CO_2 Connection Corridor	Construction of an underground Carbon Dioxide (CO_2) pipeline 422 metres in length and with an external diameter of 24 inches (609.6 millimetres) between Work No. 8 and the	In Dee Carboniferous Coal Measures GB 41102G204800	The final location and routing of the Proposed CO_2 Connection is subject to ongoing technical studies. It is expected that the Proposed CO_2 Connection would be constructed in the same way as a natural gas transmission pipeline, involving excavation of an open cut method (to provide a depth of cover, typically 1.2 m), lowering of the pipe into the trench and backfilling with the excavated material. Construction works would generally be contained within a fenced 32 m-wide working area. Topsoil would be removed and stored separately to the subsoil. There are no mapped watercourses within the Proposed CO_2 Connection Corridor, and no evidence of any watercourses was observed during the site

Activity	Description	Screening Outcome	Justification
	existing pipeline. Captured CO_2 emissions from the Proposed Development would be discharged from the Repurposed CO_2 Connection Corridor, via a new pipeline spur (the Proposed CO_2 Connection) into Flint Above-Ground Installation (AGI). Work No. 8 is the modification of an AGI at Flint.	Dee (N.Wales) GB 531106708200	walkover. However, there may be some minor field ditches (likely ephemeral if present) that could potentially be crossed by the pipeline. The location and condition of existing ditches would be investigated through a Pre-Works Surface Water Feature Survey prior to construction as detailed in the **Framework CEMP** (**EN010166/APP/6.5**). If drains are identified that need to be crossed, embedded mitigation measures would be followed.
Water Connection Corridor (and cooling water abstraction)	Cooling water for the Proposed Development would be abstracted from and discharged to the River Dee, in-line with the current process for the existing Connah's Quay Power Station CCGT.	In Dee (N.Wales) GB 531106708200 Out Dee Carboniferous Coal Measures GB 41102G204800	Subject to minor modification and alteration, the Proposed Development would utilise the existing Connah's Quay Power Station cooling water abstraction and discharge infrastructure located within the River Dee. Upgrades to the existing cooling water intake equipment or new infrastructure to meet current legislative requirements including the Eels (England and Wales) Regulations 2009 ('Eels Regulations') (Ref 22) would be required. This would comprise installation of new 2 mm eel screens on existing intakes, in addition to minor repairs to surface concrete, metalwork, and timbers. Refurbishment and upgrades would be carried out primarily by divers, supported by a boat and/or barge, or through foot-only access via the saltmarsh over an

Activity	Description	Screening Outcome	Justification
	The Proposed Development would utilise and refurbish the existing cooling water abstraction and discharge infrastructure with minor modification to install eel screens. The Water Connection Corridor shown on **Figure 3-3: Areas Described in the ES** (**EN010166/APP/6.3**) covers the land required for use and repurposing of the existing infrastructure. Work No. 3 is the water supply connection works to provide cooling water to Work No. 1 and discharge used cooling water and		estimated three- to five-month period. The works are expected to be limited to pre-works surveys (including diving operations where required) along the Dee Estuary, followed by the installation of new 2 mm screening to ensure compliance with the Eels Regulations. Minor repairs to surface concrete, metalwork, and timbers would also be undertaken. The work within the Water Connection Corridor would not require interaction with the riverbed. Materials, if needed, would be stored on a support barge, and a working area would be created using scaffolding attached to the existing protection structure. The refurbishment would be conducted at each of the intake pipes, with temporary seals applied to ensure the continued operation of the existing Connah's Quay Power Station during construction. No cofferdam would be required as part of these works. The methods employed would ensure that the necessary refurbishment can be completed without the need to obstruct the River Dee Estuary, minimising impacts on the surrounding Water Environment. There may also be potential changes in marine water quality due to accidental spills from vessels associated with replacement or refurbishment activities. Cooling water abstraction would be limited to no more than three hours per tide around high water in line with the current abstraction permit. Cooling water would be abstracted at a rate of up to 3.04 cubic metres per second (m^3/s) and up to 33 megalitres (ML) per high tide. During operation there is potential for scour and change in hydrological regimes from discharge of cooling water from outfall into estuary. There is also potential for sediments to be mobilised as a result of the operation of the intake and outfall structures. Therefore, there is the potential for impacts on the water quality and hydromorphology quality elements of affected watercourses.

Activity	Description	Screening Outcome	Justification
	treated process water, including works to the existing cooling water supply and discharge pipelines running between Work No. 1 and the existing intake structures within the river Dee between the existing concrete manifold and existing protection structure.		At this stage the discharge of used cooling water from the Proposed Development is unlikely to cause deterioration as it is proposed that this would not be materially different to the current cooling water discharges from the existing Connah's Quay Power Station. However, the influence of future climate change (including warming sea water) would need to be considered in any future permit variations. Nonetheless, no change in temperature of the estuary against the baseline would occur as a result of the Proposed Development. It is also noted that the Dee Estuary Transitional and Coastal (TRaC) water body is currently at Moderate Ecological Status due to Moderate Polycyclic Hydrocarbons (PAHs) and Bromodiphenyl ether (BDPE) concentrations, and thus it would be important to consider whether the future operation of the Proposed Development might contribute to preventing the improvement of the water body overall in the future. In the operational phase of the Proposed Development, it is assumed that the intakes and outfalls would be kept clear either through the use of a compressed air blasting system, and if required a jet washing system which would be incorporated into the design. The air blast and jet washing activities would only take place on a falling tide to return the silt removed to the estuary sediment budget. Should these options not be sufficient to maintain clean flow through the screen, the use of retrievable screens for mechanical cleaning may be required. The jet washing system would be in place to return silt to the estuary sediment budget and has the potential for small, localised, temporary disturbance to benthic habitats and species under the footprint of the Water Connection Corridor.
Upgrade of Alternative Access tracks	Light goods vehicles (LGV) and cars may access the Main Development Area	Out Dee (N.Wales)	These access roads are not within 10 m of watercourses and therefore should not have an effect of the WFD status of the receiving WFD water body.

Activity	Description	Screening Outcome	Justification
	via the proposed Alternative Access to Main Development Area and Access to C&IEA located to the south-east of the Main Development Area via the B159 Kelsterton Road south of the existing National Grid Electricity Transmission (NGET) 400kV Deeside Substation, as shown on **Figure 3-3: Areas Described in the ES** (**EN010166/APP/6.3**). These access roads may require minor upgrade works to ensure they are suitable for use for the operational phase of the Proposed Development.	GB 531106708200 Dee Carboniferous Coal Measures GB 41102G204800	Any works that may generate runoff or spillages during construction are anticipated to be adequately addressed through measures to be outlined in the **Framework CEMP** (**EN010166/APP/6.5**), and Water Management Plan (WMP) in order to avoid adverse impacts on water quality to watercourses receiving drainage from the site.
Electrical Connection Corridor	A new connection would be required from the CQLCP	Out Dee (N.Wales)	Water quality impacts to surface and groundwater associated with the Electrical Connection Corridor are expected to be minimal. Construction works within the corridor are expected to be very limited and primarily involve minor activities such

Activity	Description	Screening Outcome	Justification
	Abated Generating Station to the existing NGET 400 kV substation including works within the existing National Grid substation.	GB 531106708200 Dee Carboniferous Coal Measures GB 41102G204800	as installing additional protection or monitoring equipment, with minimal new infrastructure required and no new connections outside of the Main Development Area. Given the minimal interventions, the Electrical Connection Corridor areas are screened out of further assessment.
Accommodation Work Areas	It is anticipated that AILs would be delivered to site via roads or transported by vessel to nearby ports and transferred onto abnormal load transport trailers. Accommodation works to facilitate haulage route access, including the temporary removal of a gate and fence adjacent to the railway and subsequent reinstatement and re-establishment and use of waterborne	In Dee (N.Wales) GB 531106708200 Out Dee Carboniferous Coal Measures GB 41102G204800	Accommodation works are screened in for assessment if any port of operation is within the Dee (N. Wales) water body (e.g. Port of Mostyn and Mid-way Berth), as any vessels used and their methods of operation may affect the water quality of the estuary.

Activity	Description	Screening Outcome	Justification
	transport offloading facilities at Connah's Quay North.		

Screening Outcome

4.2.2 The following water bodies have been identified within the study area as having potential to be impacted by activities within the Proposed Development and are screened in for further consideration:

- Dee (N.Wales) (GB 531106708200); and
- Dee Carboniferous Coal Measures (GB 41102G204800).

4.3 WFD Scoping

4.3.1 A scoping assessment is required to determine whether any coastal and estuarine receptors may be impacted by the Proposed Development, and therefore need to be assessed in the WFD impact assessment (Stage 3). These receptors are defined in accordance with the NRW WFD Guidance (Ref 5) and Environment Agency Clearing the Waters Guidance (Ref 9) and are based on the water body's quality elements which are:

- hydromorphology;
- water quality;
- biology – habitats;
- biology – fish;
- protected areas; and
- the scoping assessment also considers Invasive Non-Native Species (INNS).

4.3.2 As the scoping assessment outlined in the Clearing the Waters Guidance is designed for coastal and estuarine water bodies it is applied here to the Dee (N. Wales) water body.

4.3.3 A scoping assessment has also been undertaken for the groundwater body screened in at Stage 1.

Hydromorphology

4.3.4 Hydromorphology refers to the physical characteristics of water bodies. Hydromorphological quality elements include the size, shape and structure of the water body, and the flow and quantity of water and sediment. Impacts on hydromorphology include changes to morphological conditions (for example variation in the structure of the seabed and intertidal zone) and tidal patterns (for example dominant currents, freshwater flow and wave exposure). Hydromorphology is only a WFD quality element for high status water bodies but significantly influences other elements, particularly biological ones, and thus is an important part of the assessment.

4.3.5 The Proposed Development has the potential to affect hydromorphological quality elements in the Dee (N.Wales) water body through replacement of eel screens on existing intakes, in addition to minor repairs to surface concrete, metalwork and timbers in the Water Connection Corridor. A working area would be established using scaffolding attached to the existing protection structure with materials stored in a support barge moored

adjacent to the existing protection structure. There would be no physical interaction with the riverbed. Therefore, impacts to hydromorphology would be temporary and localised.

4.3.6 During construction of the main site (including decommissioning of the existing works), there is a risk that runoff containing fine sediment could lead to negative impacts on hydromorphology.

4.3.7 Works would be required to, or in the immediate vicinity of, the existing surface water outfall adjacent to the Main Development Area (see **Appendix 13-D: Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**). There would be localised direct impacts to the bank of Old Rockcliffe Brook for the construction and decommissioning of the Proposed Surface Water Outfall, and therefore there would be negative impacts on the hydromorphology of a tributary to the Dee (N Wales) WFD water body if not mitigated.

4.3.8 Works may also be required on ephemeral drainage channels, which ultimately drain to the Dee (N Wales) WFD water body. Unavoidable damage to banks may be caused by open-cut crossings to channels to construct pipelines. Therefore, there may be negative impacts on the hydromorphology of tributaries to the Dee (N Wales) WFD water body.

4.3.9 During operation there is potential for scour and change in hydrological regimes from discharge of cooling water from outfall into estuary. There is also potential for sediments to be mobilised as a result of the operation of the intake and outfall structures.

4.3.10 The scoping assessment of the potential effects to hydromorphology is provided in **Table 11** below.

Table 11: Assessment of hydromorphology risk from activity

Activity	Impact assessment required (Yes/No)	Justification
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	No	The water body is not at high status.
Could significantly impact the hydromorphology of any water body	Yes	There is potential for scour and mobilisation of sediment due to cooling water discharge to the Dee Estuary, which could impact on the hydromorphology of the water body. There may also be localised direct impacts to the bank of Old Rockcliffe Brook, or if open cut crossings are

Activity	Impact assessment required (Yes/No)	Justification
		required for ephemeral drainage channels, therefore there may be negative impacts on the hydromorphology of a tributary or the Dee Estuary WFD water body.
Is in a water body that is heavily modified for the same use as your activity	No	The water body is heavily modified for navigation, which is not the same use as activities within the Proposed Development.

Water Quality – Physico-chemical Quality Elements

4.3.11 Impacts to ecological water quality relate to effects on any of the following: Water clarity, temperature, salinity, oxygen levels, nutrients, microbial patterns for longer than a spring neap tidal cycle (approximately 14 days). In addition to the above, if the water body has a history of harmful algae or a phytoplankton status of Moderate, Poor or Bad, this would need to be considered.

4.3.12 There is the potential for chemical spillages and runoff containing contaminants related to works on or close to the estuary during construction.

4.3.13 During operation, changes in water quality could occur from operational discharges of treated process wastewater and water from the cooling system although these would be controlled under the existing permit. Additionally, changes in water quality may occur from surface water runoff if not appropriately treated.

4.3.14 Vessels would be used to transport AILs or deliver supplies. There may be impacts to water quality of the Dee Estuary due to accidental spills from vessels.

4.3.15 Where construction and decommissioning works are undertaken in close proximity to water features, close to existing drains providing pathway to surface watercourses, groundwater or ponds, and steep terrain sloping towards a water feature, there is potential for adverse effects on water quality due to deposition or spillage of soil, sediment, oil, fuels, or other construction chemicals spills onsite.

4.3.16 The increase in sediment laden surface water run-off, mobilisation of fine sediments, and potential spillage of oils, fuels or other chemicals has the potential to impact on the River Dee Estuary, Kelsterton Brook and Old Rockcliffe Brook, and Lead Brook.

4.3.17 The scoping assessment of the potential effects to hydromorphology is provided in **Table 12** below.

Table 12: Assessment of water quality risks from activity

Activity	Impact assessment required (Yes/No)	Justification
Consider if your activity could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	Yes	Discharge of cooling water and process water into the Dee Estuary is currently proposed to be consistent with the permit limits for operation of the existing power station. Construction of the Proposed Surface Water Outfall and refurbishment of Existing Surface Water Outfall and intake structures may cause localised increase sediment loads to watercourses, impacting on oxygen and nutrient levels. There may be changes in marine water quality due to accidental spills from vessels.
Consider if your activity is in a water body with a phytoplankton status of moderate, poor or bad	No	Phytoplankton status is good
Consider if your activity is in a water body with a history of harmful algae	No	Is not within a water body which has a history of harmful algae
Consider if your activity uses or releases chemicals (for example through sediment disturbance or buildings works)	Yes	Increased runoff of chemicals from construction, operation and decommissioning may impact on ordinary watercourses within the study area and ultimately the Dee Estuary. Chemicals and fuels may be accidentally released from vessels. Refurbishment to outfall and intake structure, and operation of the intake and outfall structures may disturb sediments and release chemicals into the water column.

Activity	Impact assessment required (Yes/No)	Justification
Consider if your activity has a mixing zone (like a discharge pipeline or outfall)	No	Although the cooling water discharge may contain some chemical compounds, these would be consistent with the current discharge and would comply within the existing environmental permit.

Biology – Habitats

4.3.18 A number of habitats have been highlighted in the Environment Agency Clearing the Waters guidance (Ref 9) as being of higher and lower sensitivity based on their resistance to, and recovery rate, from human pressures.

4.3.19 **Table 13** outlines the assessment, in accordance with NRW and Environment Agency guidance, of potential risks to biological habitats.

Table 13: Assessment of biology (habitats) risks from activity

Activity	Impact assessment required (Yes/No)	Justification
Is the footprint of the activity 0.5 km^2 or larger?	No	The Main Development Area is proposed to be 1.07 km^2, and only 0.01 km^2 is proposed to be within the Dee (N Wales) water body.
Is the footprint of the activity 1% or more of the water body's area?	No	The Main Development Area is approximately 1% of the water body area, however less than 1% of the Main Development Area is within the water body.
Is the footprint of the activity within 500 m of any higher sensitivity habitat	Yes	The Main Development Area is adjacent to an area of saltmarsh.
Is the footprint of the activity 1% or more of any lower sensitivity habitat	No	The Main Development Area is adjacent to an area of mudflats and sandflats but not within a lower sensitivity habitat.

Fish

4.3.20 The Dee (N Wales) water body is known to support several nationally and internationally protected migratory fish species (e.g. Atlantic salmon, brown trout, European eel, river lamprey and sea lamprey). Atlantic salmon, sea lamprey and river lamprey are protected as an Annex II species of the Habitats Directive.

4.3.21 The release of pollutants from runoff or spillages during construction, operation and decommissioning could affect fish population health in the short term or longer term (spillages and routine discharges from the Proposed Development). Additionally, spillages from vessels may impact marine fish populations due to changes in marine water quality.

4.3.22 **Table 14** outlines the assessment of potential impacts to fish.

Table 14: Assessment of biology (fish) risks from activity

Activity	Impact assessment required (Yes/No)	Justification
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Yes	Activities within the Dee Estuary may impact on fish populations.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Yes	Potential direct impacts on fish population from release of contaminated construction site runoff and works to replace eel screens. Spillages from vessels may cause a chemical change which could impact on fish populations. Discharge of cooling water into the Dee Estuary is currently proposed to be consistent with the operation of the existing power station. Therefore, there would be no indirect impacts to marine ecology from chemical or thermal impacts during operation and can therefore be

Activity	Impact assessment required (Yes/No)	Justification
		scoped out of further assessment.
Could cause entrainment or impingement of fish	No	It is unlikely that activities would cause entrainment or impingement of fish with addition of eel screens.

WFD Protected Areas

4.3.23 The location of the Proposed Development in relation to the following WFD Protected Areas has been considered:

- SAC;
- SPA;
- shellfish waters;
- bathing waters; and
- nutrient sensitive areas.

4.3.24 Groundwater Dependent Terrestrial Ecosystems (GWDTEs) have also been considered.

4.3.25 The outcome of the scoping assessment for WFD protected area is shown in **Table 15.**

Table 15: Assessment of risk to WFD Protected Areas

Protected Area	Impact assessment required (Yes/No)	Justification
Special Areas of Conservation	Yes	The Main Development Area lies within 2 km of the Dee Estuary SAC and is therefore scoped in for further assessment
Special Protection Areas	Yes	The Main Development Area lies within the Dee Estuary SPA and is therefore scoped in for further assessment.
Shellfish Waters	Yes	The Proposed Development down tide ZOI overlaps with the Shellfish Protected Area: Dee (West).
Bathing Waters	No	The Proposed Development does not interact with Bathing Waters.
Nutrient Sensitive Areas	No	The Proposed Development does not interact with Nutrient Sensitive areas.
GWDTE	Yes	The Proposed Development interacts with the Dee Estuary GWDTE.

Invasive Non-Native Species (INNS)

4.3.26 INNS harm the environment. They can be small and hard to spot and so are easily spread on damp equipment and clothing. If a proposed development risks introducing or spreading INNS, this should be included in the WFD impact assessment. The risks of introducing or spreading INNS includes marine vessels, marine plant, construction materials or equipment being used that have come from, have been used in or have travelled through other water bodies and activities that help spread existing INNS either within the immediate water body or to other water bodies.

4.3.27 The scoping assessment of risks from INNS is summarised in **Table 16**.

Table 16: Scoping assessment of risks from INNS

Risk	Impact assessment required (Yes / No)	INNS Issues
Activity may introduce or spread INNS to a water body	Yes	Vessels are required to deliver AILs and may be required to deliver materials for refurbishment of the abstraction infrastructure and so have the potential to introduce INNS to the water body.

Groundwater Body

4.3.28 **Table 17** outlines the WFD scoping assessment for the groundwater body.

Table 17: Scoping outcome for groundwater body

WFD Quality Element	Potential risk to receptor?	Risk Issues	Justification
Quantitative Elements	Yes	In	Potential for new pathways could be created along foundations of structures or along utilities which could result in contaminants migrating and entering groundwater.
Chemical Elements	Yes	In	Contamination of groundwater as a result of chemical spills in the chemical storage area and its subsequent run-off.

Summary

4.3.29 A summary of the receptors and relevant WFD quality elements that have been scoped into the WFD impact assessment for the Dee (N. Wales) water body and Dee Carboniferous Coal Measures groundwater body is shown in **Table 18**.

Table 18: Summary of scoping outcome

Receptor	Potential risk to receptor?	Risk Issues
Hydromorphology	Yes	There is potential for scour and mobilisation of sediment due to cooling water discharge to the Dee Estuary, which could impact on the hydromorphology of the water body.
Biology: habitats	Yes	The footprint of the Main Development Area is adjacent to an area of saltmarsh (a higher sensitivity habitat).
Biology: fish	Yes	Potential direct impacts on fish population from release of contaminated construction site runoff and works to replace eel screens and outfall structure. Spillages from vessels may cause a chemical change which could impact on fish populations.
Water quality	Yes	It is assumed that all discharges from the CCP would be tankered off site. However, there may be a need to consider whether continued discharges similar to that from the current power station may be contributing to preventing improvement of the Dee Estuary, which is currently at Moderate Ecological Status due to PAHs and BDPE concentrations. Potential replacement of outfall and operation of intake and outfall structures may increase sediment loads to watercourses, impacting on oxygen and nutrient levels. Chemicals and fuels may be

Receptor	Potential risk to receptor?	Risk Issues
		accidentally released from vessels. Discharge of cooling water into the Dee Estuary is currently proposed to be consistent with the operation of the existing power station. However, if water is not sufficiently cooled it could create a thermal change within the water body at a local scale. The influence of future climate change and warming sea water would also need to be considered should there be any future permit variations. Although the cooling water may contain some chemical compounds, these would be consistent with the current discharge and would comply within the existing environmental permit for the consented discharge. Therefore, discharge of cooling water is not anticipated to have a negative effect on water quality.
Protected areas	Yes	The Main Development Area lies within the Dee Estuary SPA, within 2 km of the Dee Estuary SAC and within the Dee Estuary GWDTE.
INNS	Yes	Vessels are required to deliver AILs and may be required to deliver materials for refurbishment of the abstraction infrastructure and so have the potential to introduce INNS to the water body.
Groundwater	Yes	Contamination of groundwater may result from chemical spills and new pathways along foundations of structures or along utilities.

5. WFD Impact Assessment

5.1 No Deterioration Assessment

5.1.1 The first stage of the impact assessment (Stage 3) is to consider the likely impact of the Proposed Development on WFD parameters and whether it is likely to cause deterioration of any WFD quality elements or prevent NRW mitigation measures from being implemented.

5.1.2 The appraisal of these two WFD objectives is considered under the following subsections.

5.2 Potential Construction Phase Impacts

5.2.1 Construction phase impacts that could occur, prior to the implementation of mitigation, are related to the following activities:

- temporary impacts on surface water quality due to deposition or spillage of soils, sediments, oils, fuels or other construction chemicals, or through mobilization of contamination following disturbance of contaminants in sediments, ground or groundwater, or through uncontrolled site run off. There may also be indirect effects to downstream receptors, as spills or contaminated water can propagate along the initial receiving watercourse. The increase in sediment laden surface water run-off, mobilisation of fine sediments, and potential spillage of oils, fuels or other chemicals has the potential to impact on the River Dee Estuary, Kelsterton Brook and Old Rockcliffe Brook, and Lead Brook;
- demolition of the existing facilities on the Main Development Area would occur before construction of the Proposed Development begins. Activities such as disassembling above-ground buildings and plant, managing waste, and handling piles of construction materials during the demolition works can disturb soils. Demolition work generates dust and wastewater from internal drainage systems, which can exacerbate soil erosion and water quality issues. Exposed soil becomes vulnerable to erosion during rainfall events generating runoff that can result in excessive quantities of fine sediment being transported into watercourses, adversely impacting water quality;
- earthworks, including re-profiling, foundation excavation, and removal of surplus materials could potentially mobilise existing contaminants contamination that may be present. It is also expected that sections of the Proposed Development may include some earthworks associated with the reprofiling and excavations for foundation purposes and the construction of the drainage features and the carrier pipes; and
- changes to the hydrogeological regime (e.g. dewatering activities) may impact groundwater.

5.2.2 There would be potential for conveyance of spills and fine sediment during construction of the Proposed Surface Water Outfall and works to the existing drainage outfall adjacent to the Main Development Area. All water features that are potentially impacted ultimately discharge to the River Dee Estuary, where there is potential for a cumulative impact in terms of fine sediment impacts on water quality.

5.2.3 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. 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.

5.2.4 Construction works within, along the banks and across watercourses can also be a direct source of fine sediment mobilisation, and this sediment could contain contaminants given the previous industrial land-uses at the Proposed Development Site.

5.2.5 Other potential sources of fine sediment during construction works include water runoff from earth stockpiles, dewatering of excavations (surface and groundwater), mud deposited on site and local access roads, and that which is generated by the construction works themselves or from vehicle washing.

5.2.6 The use of vessels for the delivery and transport of construction materials is expected and construction support presents a potential risk of accidental release of fuels and oils, which would negatively affect water quality.

5.2.7 Similar impacts would be likely during the decommissioning phase.

5.3 Construction Phase Mitigation

5.3.1 For the purposes of this assessment, it is assumed that the measures set out below would be implemented by any contractors undertaking construction work in relation to the Proposed Development.

5.3.2 A **Framework CEMP** (**EN010166/APP/6.5**) accompanies the DCO application and would be developed into a detailed CEMP post consent as a requirement of the DCO.

Surface Water

5.3.3 During construction, accidental water pollution may occur directly from spillages of polluting substances into water bodies, or indirectly by being conveyed in runoff from hard standing, other sealed surfaces or from construction machinery. Fine sediment may also be disturbed in water bodies directly or also wash off working areas and hard standing (including approach roads) into water bodies indirectly via existing drainage systems or overland. This sediment may potentially contain contaminants that could be harmful to the aquatic environment. Plans to avoid, prevent and reduce adverse effects on the water environment and deal with any accidental pollution would be included within the CEMP prepared by the Contractor, prior to commencement of construction.

5.3.4 The CEMP would be reviewed and updated to ensure all relevant potential impacts and effects are considered and addressed as far as reasonably practicable, taking into account available good practice. The principles of the mitigation measures set out below are the minimum standards that the Contractor would implement, acknowledging that for some issues, there are multiple ways to address. Methods to deal with pollutant risk would be

reviewed and adapted as construction works progress in response to different activities, weather conditions, and work locations.

5.3.5 The final CEMP would be supported by a Water Management Plan (WMP) as a technical appendix which would provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse impacts during construction.

5.3.6 The construction of the Proposed Development would be in accordance with good practice guidance. This is regulatory guidance in Wales. The following relevant Guidance for Pollution Prevention (GPP) have been released to date on the NetRegs website (Ref 24) and should be identified as good practice:

- GPP 1: Understanding your environmental responsibilities – good environmental practices (Ref 25);
- GPP 2: Above ground oil storage tanks (Ref 26);
- GPP 3: Use and design of oil separators in surface water drainage systems (Ref 27);
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (Ref 28);
- GPP 5: Works and maintenance in or near water (Ref 29);
- GPP 6: Working on construction and demolition sites (Ref 30);
- GPP 8: Safe storage and disposal of used oils (Ref 31);
- GPP 13: Vehicle washing and cleaning (Ref 32);
- GPP 19: Vehicles: Service and Repair (Ref 33);
- GPP 20: Dewatering underground ducts and chambers (Ref 34);
- GPP 21: Pollution Incident Response Planning (Ref 35);
- GPP 22: Dealing with spills (Ref 36);
- GPP 26: Safe storage – drums and intermediate bulk containers (Ref 37); and
- GPP 27: Installation, decommissioning and removal of underground storage tanks (Ref 38).

5.3.7 Where new GPP are yet to be published, previous Pollution Prevention Guidance (PPG) (Environment Agency, 2001) continues to provide useful advice on the management of construction to avoid, minimise and reduce environmental impacts, although they should not be relied upon to provide accurate details of the current legal and regulatory requirements and processes. Construction phase activities would be carried out in accordance with guidance contained within the PPG (also available at NetRegs), including:

- PPG18: Managing Fire Water and Chemical Spillages (Ref 39).

5.3.8 Additional good practice guidance for mitigation to protect the water environment can be found in a range of CIRIA documents and British Standards Institute (BSI) documents:

- British Standards Institute BS8582 Code of Practice for Surface Water Management of Development Sites (Ref 40);
- C753 (2015) The SuDS Manual (second edition) (Ref 41);
- C811 (2023) Environmental good practice on site guide (fifth edition) (Ref 42);
- C648 (2006) Control of water pollution from linear construction projects, technical guidance (Ref 43);
- C532 (2001) Control of water pollution from construction sites – Guidance for consultants and contractors (Ref 44); and
- C736F Containment systems for prevention of pollution (Ref 45).

Management of Construction Site Runoff

5.3.9 Some of the key measures to manage construction site runoff are outlined below. These, alongside additional measures, are included in the **Framework CEMP** (**EN010166/APP/6.5**), and would be required for the management of fine sediment in surface water runoff as a result of the construction activities:

- Reasonably practicable measures would be taken to prevent the deposition of fine sediment or other material in, and the pollution by sediment of, any existing water body during construction taking into account relevant industry guidelines including CIRIA report 'C532: Control of water pollution from construction sites' (Ref 44). This may typically include use and maintenance of temporary lagoons, tanks, seeding/ covering of earth stockpiles, earth bunds, straw bales and sandbag walls, other proprietary measures, fabric silt fences or silt screens and consideration of the type of plant used;
- Temporary drainage systems would be developed to prevent runoff contaminated with fine particulates from entering surface water drains without treatment. Installation of measures around excavation, exposed ground and stockpiles to prevent uncontrolled release of sediment from the Main Development Area, installation of measures to control the movement of construction run off, which include the implantation of buffers around water features. It would be for the contractor to continually monitor the need for measures depending on the nature of the works bring undertaken, the weather conditions, and the performance of sustainable drainage systems installed;
- Where reasonably practicable, earth moving works would seek to avoid periods of very wet weather, to minimise the risk of generating runoff contaminated with fine particulates. However, it is likely that some working during wet weather periods would be unavoidable, in which case, mitigation measures would be implemented to control fine sediment laden runoff; and
- To protect water bodies from fine sediment runoff, topsoil/ subsoil would be stored a minimum of 20 m from watercourses on flat lying land. Where this is not reasonably practicable and material is to be stockpiled for longer than two weeks, material would either be covered with geotextile mats or seeded to promote vegetation growth, with runoff from

the stockpile prevented from draining to any watercourses, without prior treatment.

Management of Construction Chemical Spillage Risk

5.3.10 Measures would be implemented to manage the risk of accidental spillages and potential conveyance to nearby water bodies via surface run off. These measures relating to control of spillages and leaks are included in the **Framework CEMP** (**EN010166/APP/6.5**).

5.3.11 Measures would be in accordance with prevailing pollution prevention legislation in the Control of Substances Hazardous to Health Regulations 2002 (COSHH) (Ref 46), and Control of Pollution (Oil Storage) (Wales) Regulations 2016 (Ref 47) and following good practice guidelines. They would include details on how fuel and other chemicals would be stored, used, equipment and plant cleaning, as well as how leaks and spillages would be prevented or remediated if required.

5.3.12 A Pollution Prevention and Emergency Response Plan secured through the WMP would be implemented. In addition, any site welfare facilities would be appropriately managed. The Proposed Development would utilise a new system for black and grey wastewater including foul drainage from permanent welfare facilities, with treated black and grey wastewater either to be discharged to the River Dee with main cooling water purge discharge or to be removed by specialist contractor.

Ground Investigations and Dewatering

5.3.13 An understanding of groundwater levels relevant to the Main Development Area has been obtained from the ground investigation to help understand the baseline conditions. Monitoring during and after construction is proposed as dewatering has the potential to locally lower groundwater levels, alter flow regimes and spread existing contamination and salinity within an area of influence around dewatered excavations. This is also discussed in **Appendix 13-E: Hydrogeological Assessment** (**EN010166/APP/6.4**) **and Chapter 14: Geology and Ground Conditions** (**EN010166/APP/6.2.14**).

5.3.14 An initial high-level hydrogeological assessment has been undertaken to consider the impacts associated with dewatering and drawdown during the construction phase. The assessment reviews anticipated excavation depths alongside the permeability and groundwater levels to provide an indicative Radius of Influence (ROI) in which drawdown impacts are likely. This is discussed further in **Appendix 13E: Hydrogeological Assessment** (**EN010166/APP/6.4**). Receptors within the ROI could potentially receive an impact from the dewatering undertaken for construction, however this impact is likely to be temporary and of short duration.

5.3.15 Where dewatering is required, a Dewatering Scheme would be developed prior to construction to demonstrate that there is an effective strategy to manage water arising from the construction activities and, where required, sufficient proposals to treat the water prior to controlled discharge. Any such Dewatering Scheme would consider the effects of any drawdown or impacts on nearby abstractions or resources. The need for this would be secured through the **Framework CEMP** (**EN010166/APP/6.5**). The Dewatering Scheme would demonstrate that there is an effective strategy in which to manage water rising from construction. Sufficient proposals to treat the water

may be required prior to controlled discharge. This is also discussed in **Chapter 14: Geology & Ground Conditions** (**EN010166/APP/6.2.14**).

5.3.16 A groundwater abstraction licence may be required for construction activities (i.e. dewatering) depending on the abstraction volume (>20 m^3/d) and duration of abstraction. The proposed discharge of any water pumped out of excavations may be subject to a separate consent under the Environmental Permitting (England and Wales) Regulations 2016. An approved environmental permit would be required for all pumping operations (before dewatering or discharges commence) if not exempt under the Water Abstraction and Impounding (Exemptions) Regulations 2017. Water would never be pumped directly to a watercourse or be allowed to directly enter a watercourse.

Soil and Groundwater Pollution Control Mitigation

5.3.17 Piled foundations are anticipated to be required for certain components of the Proposed Development, such as the absorber stack, HRSG, and turbine hall. The design and methodology for piling would be determined during the detailed design stage (post consent), once the site-specific ground investigation is complete, and would be informed by the findings of this investigation.

5.3.18 To prevent potential contamination of the bedrock and superficial aquifers during piling activities, the piling design would include method statements that are informed by the Foundation Works Risk Assessment (FWRA). These method statements would outline specific measures for pollution prevention, which would include techniques for avoiding the creation of flow paths between groundwater and/or contaminated soils.

5.3.19 The FWRA would be submitted for approval to the relevant planning authority. All piling and penetrative foundation works would be carried out in accordance with the approved method statements. These would be secured through the **Framework CEMP** (**EN010166/APP/6.5**) and subject to a Requirement of the **Draft DCO** (**EN010166/APP/3.1**).

5.3.20 A Site Waste Management Plan would be developed in accordance with the Outline Site Waste Management Plan which is an appendix to the **Framework CEMP** (**EN010166/APP/6.5**) to manage and outline measures to control earthworks given the risk of historical contamination. This should include a pre-construction condition survey to establish baseline conditions of existing ground conditions, and a method statement outlining specific construction methods, restoration specifications, and processes informed by the pre-construction survey.

Management of Construction Vessels

5.3.21 Vessels would be required for transportation and delivery of construction materials. It is required that all vessels associated with the Proposed Development would adhere to the following:

- International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS (Ref 48);
- International Maritime Organisation (IMO) Guidelines for the control and management of ships' biofouling to minimise the transfer of invasive aquatic species (Biofouling Guidelines) (Ref 49);
- International Regulations for Preventing Collisions at Sea (Ref 50) and regulations relating to International Convention for the Prevention of Pollution from Ships (Ref 51) with the aim of preventing and minimising pollution from ships; and
- The Shipboard Oil Pollution Emergency Plan (SOPEP) guidelines (Ref 52); all vessels shall have a contingency plan for marine oil pollution.

5.3.22 Additionally, visual inspection of project equipment (including vessels) would be undertaken to ascertain the biosecurity risk.

5.3.23 The mitigation described above would be secured through the **Framework CEMP** (**EN010166/APP/6.5**), with the CEMP being a Requirement of the **Draft DCO** (**EN010166/APP/3.1**).

Proposed CO_2 Connection Corridor

5.3.24 No mapped watercourses are present within the Proposed CO_2 Connection Corridor, however minor ephemeral drainage ditches could be potentially crossed by the pipeline. The following mitigation would be applied and secured through the **Framework CEMP** (**EN010166/APP/6.5**). The location and condition of existing ditches would be investigated prior to the commencement of any works. Any construction of crossings over any ephemeral watercourses encountered would be undertaken in dry conditions (where possible) and in accordance with good practice guidelines. A pre-works riparian and morphology survey of the channel of each watercourse would be undertaken prior to construction to ensure that watercourses are reinstated as found. Once the watercourse is reinstated, silt fences, geotextile matting, straw bales or other similar measures etc. would be used initially to capture mobilised sediments until the watercourse has returned to a settled state and thereby reduce risks of downstream impacts.

Repurposed CO_2 Connection Corridor

5.3.25 It is understood that the Repurposed CO_2 Connection Corridor pipeline infrastructure is in a suitable condition for re-use. No intrusive works are expected to the Repurposed CO_2 Connection itself within the Repurposed CO_2 Connection Corridor. On this basis, no impact to the water environment relating to the Repurposed CO_2 Connection Corridor would be expected.

Main Development Area Surface Water Outfall

5.3.26 The existing surface water outfall may require maintenance or minor upgrade works, such as clearing of debris or repairs of damage to the existing artificial structure. In addition, the construction of an additional permanent artificial for surface drainage would be required in the immediate vicinity of the existing surface water outfall, including a new surface water outfall, which would be adjacent to the existing surface water outfall. If possible, the Proposed Surface Water Outfall would be pre-cast off site and appropriately positioned to minimise impacts to Old Rockcliffe Brook, the receiving watercourse. This mitigation would be applied and secured through the **Framework CEMP** (**EN010166/APP/6.5**).

Construction Phase Assessment

Dee Estuary

Water Quality

5.3.27 Implementation of good practice construction approaches, as outlined above, including measures outlined in the final CEMP(s) and WMP would mitigate for impacts during the construction phase of the Proposed Development. Overall, given that the construction phase mitigation measures described above would be in place, it is considered that there would be a very minor localised and temporary minor impact to the Dee Estuary. As such, no reduction in status of any WFD element would occur due to construction runoff or spillages, nor any non-compliance with WFD objectives for the water body.

5.3.28 It is anticipated that works required for the refurbishment of cooling water infrastructure would be undertaken through hand-based approaches and that any sediment mobilised would be minimal and temporary and would not have a significant long term negative impact on WFD water quality elements, particularly as there would be no required disturbance of the bed or banks within the Dee Estuary.

5.3.29 In terms of leaks and spills from vessels, with the mitigation measures in place, the risk of any significant detrimental impact on water quality is considered unlikely. However, should it occur, the leak or spill is expected to be minor, localised and temporary with only small amounts of pollutant released into the marine environment which would be subject to immediate dilution and dispersion over the tidal cycle. With the proposed mitigation in place, it is not expected that there would be an impact to the water quality element.

5.3.30 Works to divert the existing culverted section of Kelsterton Brook beneath the Main Development Area would have the potential for mobilisation of fine sediment and potential spills of construction fuels and chemicals. However any impacts on water quality are likely to be temporary and would be appropriately managed by construction mitigation measures described above, therefore it is considered unlikely that there would be a significant impact on WFD quality elements.

5.3.31 Overall, the likely impact of the construction phase for the Proposed Development on WFD parameters is likely to cause no deterioration of any WFD quality elements or prevention of any future improvement of the WFD element at the water body scale.

Marine Ecology

5.3.32 Likely impacts during the construction phase, as detailed in **Chapter 12: Marine Ecology** (**EN010166/APP/6.2.12**), include changes in the marine environment as a result of surface water runoff from land based construction activities, accidental spills of fuels and oils from vessels, introduction and spread of INNS from use of vessels and collisions between project vessels and marine mammals.

5.3.33 A summary of the construction impacts is described below. For further details, refer to **Chapter 12: Marine Ecology** (**EN010166/APP/6.2.12**).

5.3.34 During land-based construction activities for the Proposed Development, there is the potential for impacts on marine water quality in Dee (N. Wales) from surface water run-off or accidental discharges into the marine environment. However, embedded mitigation measures would be implemented during construction to minimise impacts and effects on the water environment, including appropriate management of construction site run-off and emergency spillage controls. With these mitigation measures in place, no significant impacts are expected.

5.3.35 With regard to vessels, all vessels utilised during the Proposed Development would be required to adhere to the International Regulations for Preventing Collisions at Sea (Ref 50) and regulations relating to International Convention for the Prevention of Pollution from Ships (Ref 51). Any spillages are expected to be small and would likely undergo rapid dispersion and evaporation when subjected to wave action, wind and currents. Given the regulatory measures in place, any significant effect to marine receptors from vessels would be unlikely.

5.3.36 The construction phase of the Proposed Development is likely to require the deployment of several vessels for the delivery of materials. This may result in collisions with mammals which could cause injury or mortality to mammals. The vessels used for the Proposed Development are likely to be travelling at slow speeds (estimated to be less than 10 knots) due to the shallow water depth in the river, and therefore unlikely to pose a significant risk of collision to marine mammals. Therefore, this is considered unlikely to be a significant impact.

5.3.37 Overall, as a result of good practice and the mitigation measures outlined above, it is not considered that there would be any deterioration in any WFD quality elements, nor any prevention of future objectives being met within the Dee (N. Wales) Water Body.

Morphology

5.3.38 Open cut crossings of tributary watercourses to the Dee Estuary may occur on ephemeral field ditches, although no flowing watercourses that might be affected were noted on the site visit. Should these be found to be required, then intrusive crossings would cause unavoidable disturbance of watercourse channel banks and the bed as well as disturbances of sediment which could be conveyed downstream to the Dee Estuary water body.

5.3.39 The construction of the Proposed Surface Water Outfall and potential maintenance to the Existing Surface Water Outfall to Old Rockcliffe Brook would impact the banks of a tributary to the Dee Estuary WFD water body. Additionally, works to divert the existing culverted watercourse beneath the Main Development Area would have the potential for mobilisation of fine sediment and potential spills of construction fuels and chemicals. However, appropriate mitigation described above would be applied to ensure that any permanent morphological impacts on watercourses would be localised. Additionally, the watercourse is already heavily modified due to it being culverted beneath the Main Development Area, and due to the scale of the WFD water body, there would unlikely be any deterioration in WFD elements or prevention of future improvements.

5.3.40 Although there would be no physical works proposed to the Dee (N. Wales) WFD water body, the construction of the Proposed Surface Water Outfall on its tributary, Old Rockcliffe Brook, would cause a localised morphological impact. However, due to the scale of the Dee (N. Wales) WFD water body, there would unlikely be any deterioration to WFD quality elements at water body scale. Morphological impacts to the Dee Estuary WFD water body would also include increased sediment loads received by the watercourse from construction on land adjacent. Construction impacts would be controlled by the final CEMP and any morphological impacts would be negligible.

5.3.41 Overall, with the implementation of mitigation described above, impacts of the construction phase for the Proposed Development on WFD parameters are likely to be localised and cause no deterioration of any WFD quality elements or prevention of any future improvement of the WFD element at the water body scale.

Introduction and Spread of Invasive Non-Native Species

5.3.42 Physical works to construct the Proposed Surface Water Outfall adjacent to the Existing Surface Water Outfall are proposed to a tributary of the Dee (N. Wales) WFD water body. Therefore, there is the potential to spread INNS. A plant INNS survey would be undertaken to inform an Invasive Species Management Plan, if required. This would specify measures to prevent the spread of plant and animal INNS, and plus the good practice measures in relation to vessels, the introduction and spread of INNS is unlikely. Furthermore, a Marine Invasive Non-Native Species Management Plan is included in **Appendix 12-F** (**EN010166/APP/6.4**). This would be secured through the **Framework CEMP** (**EN010166/APP/6.5**) and subject to a Requirement of the **Draft DCO** (**EN010166/APP/3.1**). As such, there would be no detriment or prevention of future improvement to the WFD water body.

Groundwater Body

5.3.43 Excavations have the potential to disrupt groundwater flow. It is anticipated that there would be piled foundations within the Main Development Area. A FWRA would be undertaken, secured through **Framework CEMP** (**EN010166/APP/6.5**) and subject to a Requirement of the **Draft DCO** (**EN010166/APP/3.1**).

5.3.44 A Ground Investigation has been undertaken to inform the design development and to guide appropriate construction methods to minimise impacts on groundwater flow, which may in turn impact baseflow in rivers or groundwater abstractions.

5.3.45 There is the potential for accidental leaks and spills of liquid chemical substances to infiltrate to ground during construction where pollution of groundwater may occur. However, the **Framework CEMP** (**EN010166/APP/6.5**) includes measures to control and minimise the risk of pollution to groundwater. Therefore, there is unlikely to be a significant impact.

5.3.46 The Dee Estuary/ Aber Afon Dyfrdwy GWDTE is supported by baseflow from a large catchment. The area of the Proposed Development in relation to the catchment supporting the GWDTE is insignificant and therefore the activities and potential impacts arising during the construction phase are likely to have a negligible impact on this receptor.

5.3.47 Overall, with the implementation of the mitigation measures described above and set out within the **Framework CEMP** (**EN010166/APP/6.5**) and **Appendix 13E: Hydrogeological Assessment** (**EN010166/APP/6.4**), any residual impacts to the WFD groundwater bodies would be temporary and minor and therefore would not be significant at the water body scale. The Proposed Development is therefore compliant with the WFD objectives during construction. As such, there would be no detriment or prevention of future improvement to the WFD water body.

Cumulative Impacts on WFD Water Bodies during Construction

5.3.48 There is the potential for cumulative impacts on WFD water bodies, where impacts associated with the Proposed Development may act in conjunction with those impacts associated with other planned projects and local plan allocations in the vicinity (hereafter referred to as 'proposed schemes'). This is considered in detail in **Chapter 24: Cumulative and Combined Effects** (**EN010166/APP/6.2.24**). There are eight 'proposed schemes' which have been identified within 15 km of the Proposed Development.

5.3.49 Overall, there is the potential for short term, temporary construction related pollutants generated from both the Proposed Development and the proposed schemes identified in **Chapter 24: Cumulative and Combined Effects** (**EN010166/APP/6.2.24**) to impact on WFD water bodies in the study area. However, provided that good practices measures are implemented across the proposed schemes through their respective CEMPs and planning permission, the cumulative risk can be effectively managed and there would not be a significant increase in the risks to any water bodies. As such, there would not be any additional cumulative impacts during construction that

would lead to deterioration or prevention of future improvement of WFD water bodies considered herein.

Operation Phase Impacts

5.3.50 During the operation phase the following potential water environment impacts may occur, if appropriate mitigation is not applied:

- impacts on receiving water features from diffuse urban pollutants and sediments in surface water runoff, or as a result of accidental spillages;
- changes in water quality from operational discharges including the discharge of cooling water and treated process wastewater (this includes increases in nutrients to receiving water features);
- impacts on hydromorphology due to scour from cooling water discharges; and
- contamination of groundwater as a result of chemical spills in the chemical storage area and its subsequent run-off.

Operation Phase Mitigation

Cooling water abstraction and discharge

5.3.51 It is proposed to maintain the permitted abstraction and discharge parameters relating to the Water Connection Corridor.

5.3.52 Abstraction would continue to be limited to periods around high water in line with the current abstraction licence (see **Chapter 13: Water Environment and Flood Risk** (**EN010166/APP/6.2.13**) for further details).

5.3.53 Cooling water could, if not adequately treated and monitored prior to discharge, contain potential pollutants, including residual biocides and other blowdown products. However, the discharge of cooling water would continue to be subject to existing pollution control and environmental protection regulation and permitting regimes as is the case with the existing permit. It is reasonable to assume that permit requirements would be properly applied and enforced by the relevant regulator, NRW.

5.3.54 Cooling water would only be discharged at a rate (velocity) and with a chemical and thermal water quality compliant with the discharge limits set by NRW within the Environmental Permit. It is assumed that cooling water discharge would meet the Best Available Techniques (BAT) Reference Document (BREF) for Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector 2016 (Ref 53). Furthermore, cooling water would need to be monitored prior to discharge in compliance with the conditions of the relevant permit(s). Given these substantial regulatory controls, it is not likely that discharged water would contain pollutants, including biocides, at concentrations which could impact on aquatic ecology, and cause deterioration against any WFD elements or prevention of future improvement.

5.3.55 The capacity of the outfall and intake structures and the rate of cooling water discharge into the estuary would be the same design as the existing power station. Therefore, there would be no change (associated with scour and erosion) to the riverbed as water is discharged into the estuary.

Process wastewater

5.3.56 A number of potential sources of wastewater would arise from the CQLCP Abated Generating Station including (but not limited to):

- neutralised effluent streams from the demineralisation plant;
- blowdown from the CCP and CCGT;
- treated effluent from the CCP; and
- contaminated surface water arising from process areas, that may contain chemicals such as oils or flue gas treatment products.

5.3.57 These would either be collected for transfer off-site or alternatively treated to meet environmental quality standards (EQS) for ammonia and other substances in an on-site wastewater treatment plant, prior to discharge to the River Dee. The discharge would be regulated by NRW through the Environmental Permit required for the operation of the Proposed Development.

5.3.58 Disposal by vacuum truck operated by specialist contractor would be utilised for process wastewater and any other new contaminant streams which would otherwise require a variation to the Environmental Permit (i.e. amine).

Surface water drainage

5.3.59 An **Outline Surface Water Drainage Strategy (Appendix 13-D (EN010166/APP/6.4)**) has been developed to address surface water runoff management during operation and maintenance of the site. The surface water drainage strategy is only required for the Main Development Area, as it would be the only new permanent ground infrastructure, with the Proposed CO_2 Corridor anticipated to be below ground with above ground surfaces reinstated. Additionally, any works required to reinstate existing drainage systems interrupted by new works would be taken into account to ensure the integrity and functionality of the overall drainage system.

5.3.60 Initial interception and attenuation of surface water runoff would be provided by SuDS measures before ultimately being discharged to Old Rockcliffe Brook, upstream of the River Dee. The SuDS would provide a degree of water quality treatment. The proposed SuDS include permeable or porous paving within the parking areas, designed to allow for the runoff from adjacent areas to be intercepted and treated. Proposed filter drains or grassed swales would provide initial treatment of road and/or building drainage. Attenuation tank(s) are also included within the drainage network. Oil interceptors and/or downstream defenders would be provided within each drainage catchment to remove oils, suspended solids and sediment bound hydrocarbons. The attenuation tank(s) would contain the majority of design storm water during tidal lock conditions, with more extreme events being permitted to overtop and floodwater routed away from infrastructure.

5.3.61 Process operations on site would require the storage and use of a range of potentially polluting chemicals. Any runoff from areas where chemical spillages may occur, and so may contain potentially contaminated water, would be collected either for off-site disposal by a suitably registered contractor, or sent for on-site treatment prior to discharge.

5.3.62 In exceptional circumstances fire-water may be generated. Fire-fighting water may contain chemicals that can be harmful to the water environment. The firewater strategy for the Main Development Area is to be developed post-DCO consent. If firewater runoff is to be directed to the new surface water network, bunding and penstocks would be used to contain potentially contaminated runoff and prevent it from entering the surface water network prior to testing. Uncontaminated runoff would be released by opening the penstocks, and contaminated runoff would be removed for treatment elsewhere.

5.3.63 The development of a Detailed Surface Water Drainage Strategy generally in accordance with **Appendix 13-D Outline Surface Water Drainage Strategy (EN010166/APP/6.4)** is a requirement of the DCO. The Detailed Surface Water Drainage Strategy would outline the consequences for the drainage system should the Proposed Development close or be decommissioned. This would also outline the final details of firewater management and drainage and it would include an appropriate water quality risk assessment.

5.3.64 It is also proposed that a Surface Water Maintenance and Management Plan (SWMMP) would be provided by the future site operator (post consent), secured via **Appendix 13-D Outline Surface Water Drainage Strategy (EN010166/APP/6.4)**. This would detail the requirements of access and frequency for maintaining all drainage systems proposed on the Proposed Development Site. The maintenance regime must be fully implemented throughout the lifetime of the Proposed Development to avoid issues such as blockages which could lead to flooding, or failure of the spillage containment and pollution prevention systems.

5.3.65 The SWMMP would include an outline of responsibilities with regard to water management, required water quality monitoring, pollution prevention measures, and training requirements.

5.3.66 The maintenance required for SuDS would be based on standard guidance and good practice. Requirements for maintenance and management of vegetated drainage systems (e.g. swales) are described in The SuDS Manual (Ref 41). Maintenance of proprietary treatment systems would be in accordance with the manufacturer's requirements. Furthermore, it is expected that interceptors used would be fitted with silt/ oil alarms to alert operators when they require emptying.

Domestic and Sanitary Effluent

5.3.67 Black and grey wastewater (i.e. non-cooling and non-process wastewater) from the existing Connah's Quay Power Station is currently directed to an underground septic tank system for storage and settling (as treatment). Current permitted practice is to treat sewage on site and discharge treated sewage waters with main cooling water purge discharge to the River Dee. Due to sub-optimal operation of one of the existing systems, this is currently emptied periodically by a specialist contractor (approximately once per six-month period). It is expected that the Proposed Development would utilise a new similar system for black and grey wastewater including foul drainage from permanent welfare facilities, with treated black and grey wastewater either to be discharged to the River Dee with main cooling water purge discharge (in line with the existing permit) or to be removed by a specialist contractor. Connection to the closest public sewer is not considered feasible due to the presence of the railway line that would need to be crossed.

Chemical and Material Storage

5.3.68 A number of chemicals would be required to be transported to, stored and used at the CQLCP Abated Generating Station. These include:

- solvent that would remove the CO_2 from the gas stream in the CCP. The process includes equipment for reclaiming used solvent within the process, but make-up would be required;
- power plant treatment chemicals (which may include ammonia or urea (for Selective Catalytic Reduction (SCR));
- capture plant treatment chemicals (which may include sodium hydroxide, sulphuric acid and hydrogen for (generator cooling and deoxygenation of the product CO2 stream)); and
- cooling tower chemicals (biocides, anti-scalants, bio-dispersants, corrosion inhibitors).

5.3.69 Other chemicals required for routine cleaning, maintenance and emergency firefighting uses would also be required.

5.3.70 The extent of the CQLCP Abated Generating Station would therefore contain chemical storage facilities including a road tanker unloading area(s). Where any substance could pose a risk to the environment through an uncontrolled release (e.g. surface water drains), the substance would be stored within appropriate containment facilities including impermeable concrete surfaces, isolated drainage areas and appropriately designed and sized bunds.

5.3.71 Chemical storage would be regulated by NRW through an Environmental Permit that would be required for the operation of the Proposed Development and the inventory of materials to be stored within the extent of the CQLCP Abated Generating Station would be developed through the detailed design. However, where storage of hazardous materials, individually or in-combination, exceeds the relevant thresholds, separate permissions would be sought from the Health and Safety Executive (HSE) and the local planning authority as appropriate for their storage, under the Planning (Hazardous Substances) Regulations 2015 and Control of Major Accident Hazards Regulations 2015 (COMAH) regimes.

5.3.72 A site Emergency Response Plan (prepared for Regulation 9 of the COMAH Regulations) would be in place for dealing with emergency situations involving loss of containment of hazardous substances. This would detail how to contain and control incidents to minimise the effects and limit danger to persons, the environment and property.

5.3.73 Many impact avoidance measures implemented during the construction phase would remain for the Proposed Development's operational phase and would be maintained through the site operator's Environmental Management System (EMS).

Operation Phase Assessment

Dee Estuary

Water Quality

5.3.74 The area of impermeable surfaces across the Main Development Area would increase with the Proposed Development. This would be associated with an increase in the volume and rate of surface water runoff, and therefore diffuse urban pollutants associated with these surfaces. This may include fine sediment, particulate metals, hydrocarbons, nutrients and organic matter etc. as well as litter that may find its way into receiving water features via new drainage systems or overland flow if not appropriately captured and treated. There is also a risk that a significant chemical spillage or pollution incident occurs on the Site and is discharged to Dee Estuary via the Proposed Surface Water Outfall, which has the potential to impact the River Dee and Old Rockcliffe Brook. Taking into account good practice measures and embedded mitigation to install a suitably designed drainage system (as outlined in **Appendix 13-D Outline Surface Water Drainage Strategy (EN010166/APP/6.4)**, including oil separators, bunded areas around chemical storage, and attenuation tanks, there is unlikely to be an impact on WFD quality elements.

5.3.75 Cooling water discharge (and potentially foul water discharge) would operate within the limits of the existing Environmental Permit for the site, and process water would be tankered off site where any new contaminants are introduced. As such, there would be no deterioration in water quality elements in the River Dee.

5.3.76 Given that there is sufficient water supply available from the water body and that any abstraction would be licensed by NRW, a negligible impact is predicted on water availability from these sources and no adverse impact is predicted to water quantity or quality if the existing abstraction licence is used.

5.3.77 As such, there would be no deterioration in any WFD quality element or prevention of future improvement to the WFD water body at the water body scale in relation to water quality.

Marine Ecology

5.3.78 To minimise risks to marine ecology during operation, the Proposed Development includes the installation of upgraded intake screens compliant with the Eels (England and Wales) Regulations 2009. This compliance aims to minimise the risk of entrapment for European eel, while also providing benefits to other fish species and life stages. Therefore, there is expected to be a betterment to marine ecology during operation as currently there are no eel screens present on the existing intake infrastructure. As such, there would be no deterioration in any WFD quality element or prevention of future improvement to the WFD water body at the water body scale.

Morphology

5.3.79 Given that the cooling water discharge would operate under existing permits, there would be no deterioration in hydromorphology quality elements. Additionally, the estuary is dynamic, undergoing natural changes over varying timescales on a local and wider scale. The intake and outfall infrastructure would be kept clear using a compressed air blasting system, with a jet washing system incorporated if necessary. Both activities would occur only during a falling tide to return the silt removed to the estuary sediment budget. If these methods are inadequate, retrievable screens may be used for mechanical cleaning as an alternative. The influence of intake and outfall discharges would be outweighed by the larger-scale natural processes influencing the wider estuary geomorphology. As such, there would be no deterioration in any WFD quality element at the water body scale or prevention of future improvement being met within the WFD water body.

Introduction of Invasive Non-Native Species

5.3.80 Overall, there are no operational activities identified that are likely to impact on INNS for the Proposed Development. There is not considered to be potential for deterioration of any WFD quality element or prevention of any future improvement of any WFD element at the water body scale.

Groundwater Body

5.3.81 Permanent subsurface structures such foundations, piles and pipelines could potentially have an impact on groundwater flow and quantity by impeding subsurface flow, causing groundwater mounding on the upgradient side of the structure and reduced groundwater levels on the downgradient side of the structure. However, the potential for significant impact is low. Contamination of groundwater as a result of chemical spills in the chemical storage area and its subsequent run-off has the potential to occur. However, with embedded mitigation in place, including oil separators, bunded areas around chemical storage and attenuation basins, there is not expected to be a deterioration in WFD groundwater body status, or a prevention of future improvement.

Cumulative Impacts on WFD Water Bodies during Operation

5.3.82 There is the potential for cumulative impacts on WFD water bodies, where impacts associated with the Proposed Development may act in conjunction with those associated with other planned projects and local plan allocations in the vicinity (hereafter referred to as 'proposed schemes). This is considered in detail in **Chapter 24: Cumulative and Combined Effects** (**EN010166/APP/6.2.24**). There are eight 'proposed schemes which have been identified within 15 km of the Proposed Development.

5.3.83 It is assumed that drainage strategies for all of the proposed schemes included in the cumulative assessment **Chapter 24: Cumulative and Combined Effects** (**EN010166/APP/6.2.24**) have been or would be produced with reference to relevant policies and guidance and would have to show that they are compliant with WFD requirements. The Proposed Development would similarly be designed to ensure no long-term deterioration in water quality or impact to marine and aquatic habitats and species. Attenuation and treatment would be provided for runoff from the Proposed Development prior to discharge to water bodies as has been outlined in this assessment. As such, provided that all the mitigation measures are implemented for all schemes, then the cumulative impacts from the Proposed Development and the above schemes would not cause a deterioration or prevention in future improvement to any of the identified WFD water bodies assessed herein.

Decommissioning Phase Assessment

5.3.84 Each Train of the Proposed Development would have an operational life of up to 30 years. At the end of its operational life, the most likely scenario would be that the Proposed Development would be shut down, with all above-ground structures on the Main Development Area removed, and the ground remediated as required to facilitate future re-use. It is also assumed that cooling water infrastructure within the Dee Estuary would be left in-situ and the associated pipework filled.

5.3.85 Impacts on water environment and flood risk features during decommissioning of the Proposed Development are likely to include:

- decommissioning of the Proposed Development would be undertaken in accordance with the Environmental Permits. This may include decommissioning of all potential polluting plant and equipment so that it does not pose an unacceptable risk of contamination; and
- the impacts at the decommissioning phase would be limited to water bodies in close proximity to the Construction and Operation Area and would be similar to the impacts outlined for the construction phases.

5.3.86 The potential effects from decommissioning should therefore be regarded as the same as construction.

5.3.87 A Decommissioning Environmental Management Plan (DEMP) would be produced at the time of decommissioning, pursuant to a Requirement of the **Draft DCO** (**EN010166/APP/3.1**).

5.3.88 The DEMP would include an outline programme of works, would consider all potential environmental risks and contain guidance on how risks can be

removed, mitigated or managed, accounting for potential future changes to baseline conditions. This would include procedure on how surface water drainage should be managed during decommissioning and removal.

5.3.89 Overall, no significant effects to WFD water bodies are anticipated during the Proposed Development decommissioning provided that the appropriate mitigation measures are implemented, and therefore there is not anticipated to be any non-compliance with WFD objectives. As such, it is considered that there would not be a deterioration in status or prevention of future objectives to any of the identified water bodies.

5.4 Assessment against WFD Mitigation Measures

5.4.1 NRW identifies mitigation measures for water bodies, which are actions that can be implemented to protect and improve the water environment and help achieve objectives. This section of the assessment considers the nature of the measures identified by NRW for the Dee (N.Wales) water body and assesses whether the Proposed Development may prevent such measures being implemented. **Table 19** provides an assessment of the Proposed Development against mitigation measures identified by NRW.

Table 19: Dee Estuary – Mitigation Measures Assessment

Mitigation Measure Option	Mitigation Measure status	Appraisal
Modify vessel design	In place	Any impacts associated with vessels would be appropriately mitigated by measures outlined in the **Framework CEMP** (**EN010166/APP/6.5**) and therefore there would be no impact on the implementation of this measure. A Decommissioning Environmental Management Plan (DEMP) would be produced at the time of decommissioning, pursuant to a Requirement of the **Draft DCO** (**EN010166/APP/3.1**), which would include measures to mitigate impacts from vessels.
Vessel management	In place	Any impacts associated with vessels would be appropriately mitigated by measures outlined in the **Framework CEMP** (**EN010166/APP/6.5**), and therefore there would be no impact on the implementation of this measure. All vessels associated with the Proposed Development would adhere to

Mitigation Measure Option	Mitigation Measure status	Appraisal
		best practice guidelines outlined in Section 5.3. A DEMP would be produced at the time of decommissioning, pursuant to a Requirement of the **Draft DCO** (**EN010166/APP/3.1**), which would include measures to mitigate impacts from vessels.
Avoid the need to dredge	In place	No activities undertaken during construction, operation and decommissioning would require there to be any increase in dredging.
Dredging disposal strategy	In place	No activities undertaken during construction, operation and decommissioning would require there to be any increase in dredging.
Reduce impact of dredging	In place	No activities undertaken during construction, operation and decommissioning would require there to be any increase in dredging.
Reduce sediment resuspension	In place	Measures outlined in the **Framework CEMP** (**EN010166/APP/6.5**) would mitigate against increased fine sediment loads and therefore there would be no impact on the implementation of this measure. Additionally, no activities within the Proposed Development would disturb the bed or banks of the River Dee.
Retime dredging or disposal	In place	No activities undertaken during construction, operation and decommissioning would require there to be any increase in dredging.
Sediment management	In place	Measures outlined in the **Framework CEMP** (**EN010166/APP/6.5**) would mitigate against increased fine sediment loads during construction. During operation, sediment would be managed by

Mitigation Measure Option	Mitigation Measure status	Appraisal
		a suitably designed drainage system. A DEMP would be produced at the time of decommissioning, pursuant to a Requirement of the **Draft DCO** (**EN010166/APP/3.1**), which would include measures to mitigate impact fine sediment input and therefore there would be no impact on the implementation of this measure.
Dredge disposal site selection	In place	No activities undertaken during construction, operation and decommissioning would require there to be any increase in dredging.
Manage disturbance	In place	Measures outlined in the **Framework CEMP** (**EN010166/APP/6.5**) and DEMP (a Requirement of the **Draft DCO** (**EN010166/APP/3.1**) would mitigate any potential disturbance and therefore there would be no impact on the implementation of this measure.
Modify structure	In place	No works would impact on existing structures, other than Water Connection Corridor Infrastructure, where works required would be minimal.
Flow manipulation	In place	There is not expected to be any activities which would significantly impact on discharge within the Dee Estuary (i.e. no change to the baseline).
Modify channel	In place	No direct works would be occurring to the Dee Estuary channel and therefore would not impact the implementation of this measure.
Remove obsolete structure	In place	No works would impact on the implementation of this measure.

5.4.2 With the outlined mitigation in place, no deterioration of the water bodies scoped into the assessment has been identified. On this basis, a WFD derogation is not required.

6. Conclusion

6.1.1 This WFD Report is provided following guidance outlined in the "Clearing Waters for All guidance" (Ref 9), NRW's "Complying with the WFD Regulations" (Ref 5), and the Planning Inspectorate Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Ref 8). Based on the current understanding of the Proposed Development, no significant adverse impacts to WFD relevant water bodies would occur provided that the outline mitigation measures are implemented. Therefore, the Proposed Development is compliant with the WFD objectives for:

- Dee (N. Wales) (GB531106708200); and
- Dee Carboniferous Coal Measures (GB41102G204800).

6.1.2 The following three river water bodies were screened out of assessment as it has been assessed that they are not hydrologically linked to the Proposed Development:

- Wepre Brook (GB111067056880);
- Swinchiard Brook (GB111067056840); and
- Nant Sir Roger (Dee Estuary) (GB111067057050).

6.1.3 The mitigation measures proposed include best practise to be adopted during construction to manage all pollution risks, and which would be implemented by the Contractor using a WMP prepared as part of a final CEMP. They also include operational measures to treat surface water runoff, process water, and to manage the risk of future spillages or pollution incidents occurring on the Proposed Development Site.

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