Connah's Quay Low Carbon Power

Environmental Statement Volume II
Chapter 13: Water Environment and Flood Risk

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13. Water Environment and Flood Risk

13.1 Introduction

Overview

13.1.1 This chapter of the Environmental Statement (ES) presents an assessment of the likely significant environmental effects of the Connah's Quay Combined Cycle Gas Turbine (CCGT) fitted with Carbon Capture Plant (CCP) (hereafter referred to as the Proposed Development) with respect to Water Environment and Flood Risk during the construction, operation (including maintenance), and decommissioning phases of the Proposed Development. A description of the Proposed Development, including details of maximum parameters, is set out in **Chapter 4: The Proposed Development (EN010166/APP/6.2.4)**. This chapter should be read in conjunction with, and is supported by, information presented within the following chapters in **EN010166/APP/6.2**):

- **Chapter 4: The Proposed Development**;
- **Chapter 5: Construction Management and Programme**;
- **Chapter 11: Terrestrial and Aquatic Ecology**;
- **Chapter 12: Marine Ecology**;
- **Chapter 14: Geology and Ground Conditions**; and
- **Chapter 16: Physical Processes**.

13.1.2 This chapter is supported by the following figures in (**EN010166/APP/6.3**):

- **Figure 3-3: Areas described in the ES;**
- **Figure 13-1: Surface Water Features**;
- **Figure 13-2: Superficial Geology**;
- **Figure 13-3: Bedrock Geology**;
- **Figure 13-4: Superficial Aquifers**;
- **Figure 13-5: Bedrock Aquifers**;
- **Figure 13-6: Water Resources**;
- **Figure 13-7: Flood Map for Planning (Rivers and Seas)**; and
- **Figure 13-8: Surface Water Flood Risk**.

13.1.3 This chapter is supported by the following appendices in (**EN010166/APP/6.4**):

- **Appendix 1-A: Scoping Report**;
- **Appendix 1-B: Scoping Opinion**;
- **Appendix 2-B: Scoping Opinion Responses**;

- **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics**;
- **Appendix 13-A: Water Environment Baseline Survey and Methodology Report**;
- **Appendix 13-B: Water Framework Directive Report**;
- **Appendix 13-C: Flood Consequences Assessment**;
- **Appendix 13-D: Outline Surface Water Drainage Strategy**;
- **Appendix 13-E: Hydrogeological Assessment.**

Legislation, Policy and Guidance

13.1.4 Legislation, planning policy, and guidance relating to Water Environment and Flood Risk relevant to the Proposed Development are listed in **Table 13-1**. Further detail regarding these can be found in **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**).

Table 13-1: Legislation, Planning Policy, and Guidance relating to Water Environment and Flood Risk

Type	Legislation, Policy and Guidance
Legislation	• Environment Act 2021 (Ref 13-1); • Environment (Wales) Act 2016 (Ref 13-2); • Well-being of Future Generations Act (Wales) 2015 (Ref 13-3); • Water Act 2014 (Ref 13-4); • Flood and Water Management Act 2010 (Ref 13-5); • Climate Change Act 2008 (Ref 13-6); • Water Resources Act 1991 (Ref 13-7); • Land Drainage Act 1991 (Ref 13-8); • Environmental Protection Act 1990 (Ref 13-9); • Wildlife and Countryside Act 1981 (Ref 13-10); • Control of Pollution Act 1974 (Ref 13-11); • The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) (Ref 13-12); • Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 13-13); • Water Abstraction and Impounding (Exemptions) Regulations 2017 (Ref 13-14); • Private Water Supplies (Wales) Regulations 2017 (Ref 13-15); • Conservation of Habitats and Species Regulations 2017 (Ref 13-16); • Environmental Permitting (England and Wales) Regulations 2016 (Ref 13-17);

Type	Legislation, Policy and Guidance
	• The Water Resource (Control of Pollution) (Oil Storage) (Wales) Regulations 2016 (Ref 13-18); • Environmental Damage (Prevention and Remediation) Regulations 2015 (Ref 13-19); • Eels (England and Wales) Regulations 2009 (Ref 13-20); • Water Resources Act 1991 (Amendment) (England and Wales) Regulations (Ref 13-21); • Water Resources (Abstractions and Impounding) Regulations 2006 (Ref 13-22); • Control of Substances Hazardous to Health Regulations 2002 (Ref 13-23); and • Groundwater (Water Framework Directive) (Wales) Directions 2016 (Ref 13-24). • Water Framework Directive Standards and Classifications Directions 2015 (as amended) (Ref 13-25).
National Planning Policy	• The Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 13-26); • NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 13-27); • NPS for Electricity Networks Infrastructure (EN-5) (Ref 13-28); • Planning Policy Wales (PPW) (Ref 13-29); • Technical Advice Note (TAN) 15 (Ref 13-30); • UK Government's 25 Year Environment Plan (Ref 13-31); • UK Government's Environmental Improvement Plan 2023 (Ref 13-32); • UK Government's Plan for Water: Our Integrated Plan for Delivering Clean and Plentiful 2023 (Ref 13-33); • Future Wales: The National Plan 2024 (Ref 13-34); • National Strategy for Flood and Coastal Erosion Risk Management in Wales 2020 (Ref 13-35); • Water Strategy for Wales 2015 (Ref 13-36); • UK Marine Policy Statement 2011 (Ref 13-37); • Welsh National Marine Plan 2019 (Ref 13-38); and • The UK Government's Future Water Strategy (2011) (Ref 13-39).
Local Planning Policy and guidance	• River Dee Basin Management Plan 2022 (Ref 13-40); • Flintshire Strategic Flood Consequence Assessment 2018 (Ref 13-41); • Flintshire Council Plan (2023-2028) (Ref 13-42); • Flintshire Local Flood Risk Management Strategy 2013 (Ref 13-43); • The Deeside Plan 2017 (Ref 13-44); • Flintshire County Council Local Development Plan 2015-2030 (Ref 13-45); and

Type	Legislation, Policy and Guidance
	• Supplementary Planning Guidance Note (SPGN 29) 2017 (Ref 13-46); • Shoreline Management Plan: Great Ormes Head to Scotland SMP22 (Ref 13-47).
National Guidance	• Welsh Government, Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems 2018 (Ref 13-48); • Environment Agency Approach to Groundwater Protection 2018 (Ref 13-49); • Non-statutory technical standards for Sustainable Drainage Systems for Wales 2019 (Ref 13-50); and • Clearing the Waters for All (2016) (Ref 13-51).

13.2 Consultation and Scope of Assessment

Consultation

EIA Scoping Opinion

13.2.1 A request for an EIA Scoping Opinion was sought from the Secretary of State (SoS) through the Planning Inspectorate (PINS) in February 2024 as part of the EIA Scoping Process. The EIA Scoping Opinion was adopted on 20 March 2024 (**Appendix 1-B: Scoping Opinion** (**EN010166/APP/6.4**)).

13.2.2 Key issues raised in the EIA Scoping Opinion are summarised in **Table 13-2**, along with a summary of how they have been addressed, where relevant.

Statutory Consultation

13.2.3 Statutory consultation was undertaken in October to November 2024. A Preliminary Environmental Information Report (PEIR) was issued in support of that consultation. **Table 13-3** outlines the statutory consultation responses relating to Water Environment and Flood Risk and how regard has been had to these through the ES.

Targeted Consultation

13.2.4 Following Statutory Consultation, changes were made to the heights of the proposed absorber and HRSG stacks and the Applicant undertook non-statutory targeted consultation. This consultation included a Supporting Information Report which detailed the environmental considerations associated with these changes. This Targeted Consultation was held between Thursday 8 May and Friday 6 June 2025. Responses to this targeted consultation are presented in the **Consultation Report** (**EN010166/APP/5.1**) and **Table 13-4** below outlines how and where these comments have been addressed within this chapter of the ES.

Additional Relevant Engagement

13.2.5 **Table 13-5** summarises the additional Water Environment and Flood Risk consultation and engagement undertaken to during the course of the project to date.

13.2.6 Further detail on consultation can also be found in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**).

Table 13-2: EIA Scoping Opinion Responses

Comment ID	Consultee	Extract of comment	Response
3.6.1	PINS	'*No matters have been proposed to be scoped out of the assessment.*'	This was the case at the time of the Scoping Report. Subsequently, it has been possible to scope certain potential impacts out of assessment following design development and further Proposed Development details being available. Notably, morphological impacts to the River Dee, and water quality impacts to surface water and groundwater relating to Abnormal Indivisible Loads (AIL), the Electrical Connection Corridor, and the Repurposed CO_2 Connection Corridor. Further details are given in the next section of this chapter (Scope of the Assessment).
3.6.2	PINS	'*As noted in ID 3.6.7, there is a high groundwater table, the Applicant should consider any implications of this on contamination for example. Clear cross-referencing should be provided within the ES. NRW [Natural Resources Wales (NRW)] in its response (see Appendix 2) notes that such cross referencing should be present in the major accidents and disasters aspect chapter.*'	This has been considered within the assessment presented in Section 13.6 of this chapter. Cross-references are provided to other chapters as necessary.
3.6.3	PINS	'*It is noted that some of the guidance referenced throughout the aspect chapter in the Scoping Report is not listed in the identified guidance list. In the ES, all referenced guidance should be included within a reference list. NRW has identified additional guidance to be considered (see Appendix 2).*'	All referenced guidance has been included within the reference list for this chapter and/or appendices, as appropriate.

Comment ID	Consultee	Extract of comment	Response
3.6.4	PINS	'*The Applicant should consider whether temperature modelling is required as part of the EIA and Water Framework Directive (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. Details of assessment methodologies are provided in Section 13.3 of this chapter.
3.6.5	PINS	'*NRW comments (see Appendix 2) state that the hydraulic modelling referenced in Scoping Report paragraph 11.4.56, the tidal Dee model, does not include the Proposed Development site within the 1D-2D model extent. It is therefore likely that some additional modelling will be required to quantify the flood risk posed to the Proposed Development site. Further details are provided in NRW's response, which the Applicant should have regard to. The Inspectorate advises that the Applicant discuss and seek to agree with NRW and other relevant consultation bodies if the Proposed Development should be treated as new highly vulnerable development for the purposes of flood risk assessment and application of policy tests. This is not a matter on which the Inspectorate can advise.*'	Additional hydraulic modelling has been undertaken to support **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**). Further consultation has been undertaken with NRW on this process as outlined in **Table 13-5**. **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) considers the Proposed Development as highly vulnerable development in line with TAN 15 2004 as the current guidance.
3.6.6	PINS	'*The Inspectorate advises that a site investigation of groundwater conditions should be provided to establish the baseline conditions given NRW's view that the groundwater table is high. NRW state in its*	A preliminary ground investigation and groundwater monitoring was carried out in January to March 2025, as is

Comment ID	Consultee	Extract of comment	Response
		response (see Appendix 2) that baseline conditions should include a description of gradients and salinity. This information would also be important in assessing contamination pathways for the construction, operation and decommissioning phases notably because of the proximity to designated sites. The ES should consider these matters and provide justifications for any departure(s) from advice.'	reported in **Appendix 14-F: Stage 2, Tier 1 Generic Risk Assessment: Soil and Groundwater** (**EN010166/APP/6.4**), to determine groundwater conditions. The outcomes have been included within this chapter to inform the hydrogeological baseline and impact assessment. The scope of the preliminary ground investigation was developed in consultation with NRW. Also refer to **Appendix 13-E: Hydrogeological Assessment** (**EN010166/APP/6.4**) for descriptions of gradients and salinity.
3.6.7	PINS	'*The ES should confirm if the proposed water abstraction would involve water requirements in addition to the currently licenced quantities. It is likely that amendments to the existing abstraction licence would be required even if the quantities of water do not change. The ES should provide a progress update on these and any other licences being sought.*'	The existing abstraction license and infrastructure would remain unchanged during the operation of the Proposed Development. Therefore, amendments to the existing abstraction licence are not currently anticipated. Permits and consents expected to be required are outlined in Section 13.5 and in the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**).
3.6.8	PINS	'*The ES should include greater detail regarding the specific legislation and guidance used to define the methodology used. Due to the location of the Proposed Development, the Applicant should*	All legislation and guidance used to inform the assessment has been included within Section 13.1 of this

Comment ID	Consultee	Extract of comment	Response
		also consult with the Environment Agency (EA) in addition to NRW where appropriate.'	chapter, with further detail in **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**). Details of further consultation are outlined in **Table 13-5**.
3.6.9	PINS	'*A concept/ outline surface water drainage strategy is proposed for the Main Site. The Scoping Report does not justify why it is limited to the Main Site and does not include the other components. The ES should include such a justification, or other sites and components should be included within the concept/ outline surface water drainage strategy.*'	The Outline Surface Water Drainage Strategy is included as **Appendix 13-D** (**EN010166/APP/6.4**), and its suitability for protecting the water environment is assessed within this chapter. The only permanent above ground infrastructure is within the Main Development Area. The Proposed CO_2 Connection Corridor would be underground, meaning the ground would be reinstated to its pre-construction state, and therefore is not included in the drainage strategy. A Construction Environmental Management Plan (CEMP) would be in place for the construction stage which would cover any drainage requirements for this phase. Refer to the **Framework CEMP** (**EN010166/APP/6.5**), which would be developed into a detailed CEMP post

Comment ID	Consultee	Extract of comment	Response
			consent as a requirement of the Development Consent Order (DCO).
3.6.10	PINS	'*The Applicant's attention is drawn to NRW's response (see Appendix 2) noting that an interim classification waterbody status is due in 2024. All assessment should be based upon the most up to date information available.*'	Noted. The most recently published waterbody classifications available on the NRW Water Watch Wales website (Ref 13-54) have been used in this assessment and appendices.
N/A	Flintshire County Council (FCC)	'*Planning/site constraints and opportunities:* *• TAN15 Flood Risk Zones closer to the coast and areas without sea defences*'	This information has been considered in the preparation of the baseline provided in this chapter as well as **Appendix 13-A: Water Environment Baseline Survey** and **Methodology Report** and **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).
N/A	FCC	'*A Sustainable Urban Drainage System (SUDS) which will prevent reductions in water quality, attenuate surface runoff rates and form a part of landscape and ecological mitigation proposals will be required for consideration by the Council under the SAB (SUDS Approval Body).*'	Noted. The **Outline Surface Water Drainage Strategy** is included as **Appendix 13-D** (**EN010166/APP/6.4**), and its suitability for protecting the water environment is assessed within this chapter. A SuDS approach is included in this strategy and we note the requirement for consideration of the SAB.
N/A	FCC	'*During construction there is the risk that contaminants are mobilised and result in pollution. A Flood Consequence Assessment (FCA) should be undertaken.*'	The risk of pollution to surface and groundwater bodies is assessed within this chapter (see Section 13.6) taking

Comment ID	Consultee	Extract of comment	Response
			into account mitigation outlined in Section 13.5. A Flood Consequences Assessment is provided as **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) and is considered within this chapter in EIA terms.
N/A	NRW	'*Our Flood Risk Map confirms the development site to be located partially within Zone C1 (and Zone B) of the Development Advice Map (DAM) contained in Technical Advice Note (TAN) 15: Development and Flood Risk (2004). The Flood Map for Planning (FMfP) identifies the application site to be at risk of flooding and most of it is within Flood Zone 3 (Sea).*'	This point is acknowledged. This information has been considered in the preparation of the baseline provided in this chapter as well as **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** and **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).
N/A	NRW	'*We note that a range of flood risk impacts have been scoped in for both the construction and operational phases, as outlined in Table 11-8. We are satisfied with the potential effects identified. We also note that the applicant has confirmed a Flood Consequences Assessment (FCA) will be prepared in support of the submission. We confirm that we would expect a detailed FCA to be prepared in support of this proposal. We consider that an FCA would be needed for any energy project in Zone C / Flood Zone 3, not only those greater than one hectare as is stated in paragraph 11.2.1 of the Scoping Report.* *The FCA should be prepared in compliance with Technical Advice Note (TAN) 15: Development and Flood Risk (2004). The updated TAN15 is yet to be published or adopted. However, we advise that the*	The position on the scope of the water environment and flood risk assessment is acknowledged. The FCA is provided as **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) and has taken account of NRW's feedback to both the Scoping Report and statutory consultation.

Comment ID	Consultee	Extract of comment	Response
		Flood Map for Planning should still be referred to, as confirmed in the letter from Welsh Government dated 15 December 2021, which confirms the FMfP represents better and more up-to-date information on areas at flood risk than the DAM.'	
N/A	NRW	'*Based on the 'Indicative Site Map' contained within the Connah's Quay Low Carbon Power Project Newsletter (February 2024), a considerable portion of the proposed development would appear to be located on undeveloped arable land, with a smaller section within the footprint of the existing power station. We therefore consider that the proposal should be treated as new highly vulnerable development, as this undeveloped land is unlikely to benefit from an existing land use, and the proposal would also be an intensification of use. However, we advise that the Planning Inspectorate provides direction on this.*'	The FCA has considered the Proposed Development as highly vulnerable development in line with TAN 15 2025 as the current guidance. The FCA is provided as **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).
N/A	NRW	'*The FCA should include a comprehensive assessment of flood risk from all sources, including the tidal Dee and fluvial sources, including Kelsterton Brook. The primary source of flood risk is likely to be tidal from the Dee. We note from paragraph 11.4.56 that "no hydraulic modelling is proposed as part of the EIA as there is sufficient existing hydraulic modelling for this area to be provided by NRW and the Environment Agency." However, the tidal Dee model does not include the site within the 1D-2D model extent, and it is therefore likely that some additional modelling will be required to quantify the flood risk posed to the site (whether this be an update to the existing model or a new study), and to assess the impact on flood risk elsewhere, especially as the Scoping Report indicates land raising of up to 1 metre will be required on parts of the site.*	The FCA is provided as **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) and assesses flood risk from all sources. Additional hydraulic modelling has been undertaken to support the FCA as part of the ES. Refer to **Appendix 13-C: Flood Consequences Assessment (EN010166/APP/6.4)** for details of the modelling undertaken.

Comment ID	Consultee	Extract of comment	Response
		We note that paragraph 11.5.6 refers to "existing NRW defences" which interface with the proposed development site. However, we understand that the feature along the site boundary is maintained privately, and we have no information on the standard of protection, maintenance regime or composition of this defence. We would therefore advise any modelling study to be based on an 'undefended' scenario which ignores the presence of this defence, to provide a precautionary assessment of flood risk.'	Meetings have been held with NRW to discuss and agree the approach to hydraulic modelling. Further details of all of the consultation undertaken to date is provided in **Table 13-5**. The hydraulic modelling has been undertaken using an 'undefended' scenario configuration that was agreed with NRW in May 2025. Refer to **Appendix 13-C: Flood Consequences Assessment (EN010166/APP/6.4)** for details of the modelling undertaken.
N/A	NRW	'*Several sections of the Scoping Report (including Table 11-8) refer to the breach scenario being a 'residual risk'. We advise that a breach scenario (or in this case the undefended scenario due to the nature of the defence adjacent to the site) should be considered as the design event, and not a residual risk. The FCA should demonstrate that the entire site (as defined by the redline application boundary) can be designed to be flood-free in the 0.5% Annual Exceedance Probability (AEP) undefended event with an allowance for climate change for tidal flood risk, and the 1% AEP event with an allowance for climate change for fluvial flood risk.*'	This point has been discussed with NRW further to inform the FCA, which is presented in **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**). Further details of all of the consultation undertaken to date are provided in **Table 13-5**.
N/A	NRW	'*The 0.1% AEP event (with an allowance for climate change for tidal flood risk) should also be assessed, and the assessment of the proposal's impacts on flood risk elsewhere should be based on this event. The impacts of any land raising on tidal and fluvial flood risk*	**Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) has considered the potential impacts of land raising to

Comment ID	Consultee	Extract of comment	Response
		should be quantified, and if any increases in flood risk elsewhere are identified these will need to be managed to an acceptable level.'	ensure no unacceptable increases in flooding. This has been supported by hydraulic modelling taking into account appropriate design events as agreed with NRW. Refer to **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) for full details.
N/A	NRW	'*As it is for your Authority to determine whether the risks and consequences of flooding can be managed in accordance with TAN15, we recommend you consider consulting other professional advisors on matters such as emergency plans, procedures, and measures to address structural damage that may result from flooding. Please note, we do not normally comment on the adequacy of flood emergency response plans and procedures accompanying development proposals, as we do not carry out these roles during a flood. Our involvement during a flood emergency would be limited to delivering flood warnings to occupants/users.*'	This comment is noted. **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) has considered risk and consequences of flooding in accordance with TAN15. Further details on consultation are provided within **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**) and within this chapter.
N/A	NRW	'*We advise that the scoping out of water bodies should be based on the project's ZoI (see para. 96 and 101 of our Physical Processes advice below,). Therefore, we do not agree that some water bodies should be screened out as they are 2 km away (i.e. paragraph 11.4.1 and Table 11-1), as there may be impacts to fish, for example, due to a thermal plume.*'	This comment is acknowledged. The Zone of Influence (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 approach. However, in this case due to the proximity of the Order limits to the River Dee, and the size of this water

Comment ID	Consultee	Extract of comment	Response
			feature, it is considered that the River Dee is the ultimate downstream receptor for this assessment.
N/A	NRW	'*Table 11-2: 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 chapter and in **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**).
N/A	NRW	'*Table 11-3: we concur with the designated sites identified and agree that there are no Bathing Waters in proximity to the development.*'	This position on the baseline is acknowledged. Refer to **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**) for full baseline details.
N/A	NRW	'*Paragraph 11.4.59: 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 Licensing and the Environmental Permitting Regulations (i.e. water abstraction and discharge).*'	The WFD assessment presented in the ES 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. Refer to **Appendix 13-B: Water Framework Directive Report** (**EN010166/APP/6.4**) for full details of the approach taken. This includes consideration of all parts of the Proposed Development initially, but

Comment ID	Consultee	Extract of comment	Response
			with various aspects screened and scoped out in a staged process in accordance with the guidance.
N/A	NRW	'*Paragraph 11.5.1: 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 River Dee. The Environment Agency were consulted and stated that they hold no information for any waterbody within the Study Area.
N/A	NRW	'*Paragraph 11.5.2: 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 mobilization of existing contamination have been considered within **Appendix 13-B: Water Framework Directive Report** (**EN010166/APP/6.4**) as well as the impact assessment within this chapter. Where relevant cross references have also been provided to other assessments within the ES.
N/A	NRW	'*Paragraph 11.5.5: H1 assessment, dispersion modelling and sediment transport modelling are mentioned as potential assessment techniques. We advise that temperature modelling may also be required if a thermal plume is to be generated by the development.*'	The existing permit limits for abstraction and discharge of cooling water (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. As such, H1 assessment, dispersion

Comment ID	Consultee	Extract of comment	Response
			modelling, temperature modelling and sediment transport modelling have not been required.
N/A	NRW	'*We note from paragraph 11.5.13 that any modelling requirements will be agreed with NRW, and we would welcome further engagement regarding this.*'	Consultation has been undertaken with NRW to inform the approach to hydraulic modelling (see **Table 13-4** and **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**)). No other form of modelling has been undertaken.
N/A	NRW	'*We are content with the proposed scoping of hydrological elements for the EIA. We advise that all works in and adjacent to watercourses associated with the proposal should aim to:* *• reduce impacts as far as practicable through expert geomorphological input in the siting and design of assets within the river and riparian zone (e.g. favouring directional drilling above open cut techniques, using clear-span structures rather than culverts)* *• mitigate any residual risks and impacts, work with the natural riverine processes present and actively seek to enhance the local environment through restoration of natural features and processes.*'	This approach has been followed in development of the chapter (and the Preliminary Environmental Information Report), which has included specialist input from suitably qualified hydromorphologists.
N/A	NRW	'*We note that the proposal will require water to be abstracted from the River Dee estuary. We advise that the ES should confirm if this would involve additional water to the currently licenced quantities. It is likely that amendments to the existing abstraction licence would be required even if the quantities of water do not change, such as a change of "purpose", licence holder or intake location. Any such*	The existing abstraction license and infrastructure would remain unchanged during the operation of the Proposed Development. Therefore, amendments to the existing abstraction licence are not currently anticipated.

Comment ID	Consultee	Extract of comment	Response
		amendments would need to be addressed by NRW's abstraction licencing process.'	Permits and consents expected to be required are outlined in Section 13.5 and in the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**).
N/A	NRW	'*We note that reference 203 of the Scoping Report (page 145), contains the wrong web page address. We therefore advise that the correct address is used in the ES.*'	This has been corrected within the reference list provided in this chapter.
N/A	NRW	'*We are content with the scoping in of the various water quality aspects as per Chapter 11 and note that there are also some key uncertainties (paragraph 11.3.3) which may require water quality modelling to support the EIA. We also note that a CEMP would be produced, and this would incorporate control measures for potential water quality impacts.*'	Water quality modelling is not considered to be required on the basis that the existing discharge limits and location for cooling water from the Proposed Development to the River Dee would be unchanged during operation. NRW confirmed via email exchange dated 27 January 2025 that they are content with this arrangement. Furthermore, there would be no intrusive works undertaken in the River Dee that might have the potential to mobilise sediment. As such, H1 assessment, dispersion modelling, temperature modelling and sediment transport modelling have not been required. A CEMP would be in place for the construction stage. Refer to the

Comment ID	Consultee	Extract of comment	Response
			Framework CEMP (**EN010166/APP/6.5**) which outlines the control measures for mitigating water quality impacts. This would be developed into a detailed CEMP post consent as a requirement of the DCO. The detailed CEMP, secured by a DCO requirement, would be supported by a Water Management Plan to be submitted post consent but prior to construction.
N/A	NRW	'*With regards to Section 11.6 (Embedded Mitigation) we advise that the applicant considers the Guidance for Pollution Prevention series.*'	This guidance series has been considered within this chapter where appropriate.
N/A	NRW	'*We note that groundwater flooding is scoped in. We advise that the groundwater flood risk at this site is heightened because the groundwater table is high. A robust baseline of groundwater conditions should therefore be determined. Such conditions would include groundwater depths as these will vary as a result of tidal influence, flow paths, gradients, and salinity. This information would also be important in assessing contamination pathways for the construction, operation, and decommissioning phases notably because of the proximity to designated sites. Changing climate impacts on tidal influence, tidal surges, sea-level rise, and salinity should also be considered as these have the potential to influence the transport of chemicals that may have leaked or been inadvertently released into the subsurface during the operational life of the facility.*	A preliminary ground investigation including for determination of groundwater conditions was undertaken in January-March 2025. The outcomes have been included within this chapter to inform the hydrogeological baseline and a hydrogeological impact assessment has also been undertaken. The scope of the preliminary ground investigation has been developed through ongoing consultation with NRW.

Comment ID	Consultee	Extract of comment	Response
		The permeability of near-surface materials including Tidal Flat Deposits may be moderate to high and depending on the nature of construction excavations, hydraulic control through dewatering has the potential to generate significant volumes of water. Dewatering could also generate a moderate cone of influence which may 'spread' existing contamination and salinity, although saline groundwater may be ubiquitously present given the site setting. Saline conditions should be confirmed through site investigation. A site investigation that defines the baseline groundwater conditions, including permeabilities, against knowledge of what will need to be excavated and its location would help to determine the nature of dewatering and potential associated contamination issues. This should be considered within the EIA. *The ability to assess the potential of groundwater flow impediment is predicated on a sound understanding of baseline groundwater conditions and what would be built in the subsurface and its location. Groundwater levels may rise at the site because of sea-level rise during the operational life of the project and this should be considered within the risk assessment. The presence of private water supplies, notably any that relies on near-surface groundwater, should be determined as changes to the flow regimes from the construction (dewatering) and operational site can potentially affect their performance; for example, increasing the salinity of the local groundwater because of dewatering or operational influence.*'	Data on Private Water Supplies has been obtained and is presented in this chapter and has been taken into account within the impact assessment.
N/A	NRW	'*The site is located close to the River Dee, which is a main river. We advise that a Flood Risk Activity Permit (FRAP) (Environmental*	These consenting comments were noted. The expected consent

Comment ID	Consultee	Extract of comment	Response
		Permitting (England & Wales) Regulations 2016) may be required for any permanent or temporary works in, over, under or within 16 metres of a tidal main river, or within 16 metres of any flood defence structure on that river, or within a flood plain. See our website for further information: Natural Resources Wales / Flood risk activity permits. We note that some works will be in the marine environment and will be subject to a Marine Licence, including the possible new abstraction and discharge infrastructure and new eel screens. Any works covered by a Marine Licence will be excluded from requiring a FRAP. However, any works that do not require or are exempt from a Marine Licence may still need a FRAP, if they meet the definition of a flood risk activity.'	requirements based on the Proposed Development design at the time of the DCO submission are discussed in Section 13.5 of this chapter and within the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**).
N/A	Network Rail	'*Soakaways / attenuation ponds / septic tanks etc, as a means of storm/surface water disposal must not be constructed near/within 5 metres of Network Rail's boundary or at any point which could adversely affect the stability of Network Rail's property / infrastructure. Storm / surface water must not be discharged onto Network Rail's property or into Network Rail's culverts or drains. Network Rail's drainage system(s) are not to be compromised by any work(s). Suitable drainage or other works must be provided and maintained by the Developer to prevent surface water flows or run-off onto Network Rail's property / infrastructure. Ground levels – if altered, to be such that water flows away from the railway. Drainage does not show up on Buried service checks.*'	This has been considered during development of **Appendix 13-D: Outline Drainage Strategy** (**EN010166/APP/6.4**). This strategy has been designed in such a way so as not to adversely affect the stability of Network Rail's property / infrastructure.
N/A	Welsh Water (N.B. late response so not included in main	'*It appears the application does not propose to connect to the public sewerage system, and therefore Dwr Cymru Welsh Water has no objections in principle. However, should circumstances change and a*	It remains the case that connection to the public sewerage system is not proposed, with connection prevented by the location of the railway line. Black

Comment ID	Consultee	Extract of comment	Response
	Scoping Opinion report)	*connection to the public sewerage system/public sewage treatment works is preferred we must be reconsulted on this application.*'	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 practice is then to treat sewage on site and discharge treated sewage waters with main cooling water purge discharge to the River Dee under the conditions of the Environmental Permit. Due to sub-optimal operation of one of the existing systems, the septic tank is instead currently emptied periodically by a specialist contractor (approximately once per six-month period). It is proposed 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 accordance with the existing permit) or to be removed by specialist contractor.
N/A	Welsh Water (N.B. late	'*It appears the application does not propose to connect to the public watermains system, and therefore Dwr Cymru Welsh Water has no*	This response is partially correct. There would be a water supply to the

Comment ID	Consultee	Extract of comment	Response
	response so not included in main Scoping Opinion report)	*objections in principle. However, should circumstances change and a connection to the public watermain system is preferred we must be re-consulted on this application.*'	Proposed Development from public mains (e.g. for boiler feed and domestic purposes but not evaporative cooling), but any changes to the watermains system would be within the Main Development Area.

Table 13-3: Statutory Consultee Responses

Consultee	Summary of Comment	Response
Public Health Wales	'*PHW supports the proposal to obtain further information on local water abstraction points, private water supplies and historic pollution incidents.* *PHW would like a clearer understanding of the plans for abstraction of water as well as discharges of surface water, cooling water and process water. PHW understands that the decision on the modifications to the cooling water infrastructure will influence the need for further study to understand potential effluents, risks to the water environment and flood risks.*'	Details of water abstraction points, private water supplies, and historic pollution incidents are presented in **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**). It is proposed to maintain the existing cooling water abstraction license and operate within the requirements of this license. 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 to meet current legislative requirements would be required. This would comprise installation of new 2 mm eel screens on existing inlets (with minor repairs to surface concrete, metalwork, and timbers) subject to legislative control within a Marine Licence. The existing Environmental Permit for discharge to the River Dee would be complied with.
Environment Agency	'*Issue - Potential placement of laydown area and cranes within flood risk areas.*	The Order limits no longer include any works in England, and so there would be no flood risk in relation to works undertaken in England.

Consultee	Summary of Comment	Response
	Impact - Increase flood risk by decreasing flood storage volume and impeding flood flow routes. *Solution - Position cranes and laydown areas outside of the design flood extent.*'	
Environment Agency	'*Issue - The applicant has not assessed the breach scenario for proposed works within England.* *Impact - It is unclear whether the applicant can safely manage residual flood risk for the proposed works within England e.g., Ellesmere Port.* *Solution - Assess the breach scenario and ensure that residual flood risk can be managed safely.*'	The Order limits no longer include any works in England, and so there would be no flood risk in relation to works undertaken in England.
Environment Agency	'*Issue - The applicant has not considered adverse effects to flood assets from impact or vibration from the Abnormal Indivisible Loads (AIL) within England.* *Impact - Potential increase in flood risk.* *Solution - Assess potential for adverse effects from impact, or vibration, for the movement of AIL within England. Propose appropriate mitigations where needed (e.g., pre-works and post works surveys with remediation for defects, real-time monitoring of vibration within safe thresholds, not using cranes in high winds, etc). This should be carried out to protect flood assets within proximity to the proposed routing of AIL.*'	The Order limits no longer include any works in England, and so there would be no adverse effects to flood assets from the AIL movements within England.
Environment Agency	'*Issue - The applicant has not considered the risk of flooding in England*	The Environment Agency have been consulted in response to these comments and the extent of

Consultee	Summary of Comment	Response
	Impact - Potential increase in flood risk *Solution - The applicant should provide a Flood Risk Assessment for proposed works within England* *Additional narrative/ explanation (if necessary): The applicant should request relevant models from the Environment Agency to help in their assessment of flood risk (e.g., the Manchester Shipping Canal model, tidal flood risk for the Mersey, and models relating to nearby tributaries such as the Rivacre Brook).* *Also to note: the Environmental Permitting (England and Wales) Regulations 2016 require a permit or exemption to be obtained for any activities which will take place:* • *on or within 8 metres of a main river (16 metres if tidal)* • *on or within 8 metres of a flood defence structure or culverted main river (16 metres if tidal)* • *on or within 16 metres of a sea defence* • *involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert; and* • *in the floodplain of a main river if the activity could affect flood flow or storage and potential impacts are not controlled by a planning permission.'*	works in England outlined (i.e. the Order limits no longer include any works in England). A meeting was held on 27 March 2025 and it was confirmed that a Flood Risk Assessment for England was not required, and that the FCA covering the Proposed Development would be sufficient**.** Refer to **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) for assessment of flood risk in relation to the Proposed Development. Permitting requirements for England are noted but are not required from the Environment Agency in this case given there would be no works in England, with all such consents to be obtained via NRW for Wales.
Environment Agency	'*Issue - No abstraction/ discharge should occur for the new development until this has been agreed with the relevant permitting authority* *Impact - Potential delays to scheme. Pollution risk.*	Noted. However, it is proposed to maintain the existing cooling water abstraction license and operate within the requirements of this license. The existing Environmental Permit for discharge to

Consultee	Summary of Comment	Response
	Solution - A water strategy is required. *Additional narrative/ explanation (if necessary): When an abstraction licence or discharge application is received within proximity to the English/Welsh Dee border it falls into the 'cross border application process' which the Environment Agency's National Permitting Service Team leads on (and the equivalent for Natural Resources Wales). If abstractions sit in Wales only, the Environment Agency should still be consulted if it falls into 'cross border' so we can raise any concerns thereby making the process smoother.*'	the River Dee would also be complied with, without any variation. NRW confirmed via email exchange dated 27 January 2025 that they are content with this arrangement.
Environment Agency	'*Issue - The potential requirement for dewatering during construction is noted. We assume this refers to the main site, however if any intrusive works are required at Ellesmere Port, dewatering may also be necessary.* *Impact - Dewatering may require a permit, dependent on duration and quantity.* *Solution - Liaise with the Environment Agency early to discuss permit requirements for dewatering at Ellesmere Port, if it is considered that dewatering might be required. If this is the case, please identify this in a permits and consents strategy document.*'	No intrusive works are being undertaken at Ellesmere Port.
NRW	'***Watercourse crossings*** *Paragraph 13.5.34 states: "There is potential for watercourse crossings within the corridor depending on the final arrangement of infrastructure. The locations are not known at this stage, but affected watercourses may include Allt-Goch and tributary. At this stage, and applying a precautionary worst-case scenario, it is assumed that all of these watercourses will be crossed using open-cut techniques, following all embedded mitigation measures*	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

Consultee	Summary of Comment	Response
	outlined for the Proposed CO_2 Connection Corridor would apply to any works within the Repurposed CO_2 Connection Corridor". Changes in hydromorphology (the physical characteristics and processes of the river) have the potential to cause deterioration in the Water Framework Directive (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.'	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**). Appropriate mitigation measures for any such crossings of ephemeral ditches (ordinary watercourses) are set out in this chapter. Impacts on WFD quality elements of water bodies are considered in **Appendix 13-B: Water Framework Directive Report** (**EN010166/APP/6.4**).
NRW	'*We advise that the Applicant follows the principles in NRW's Position Statement on 'Culverting of main rivers'. Whilst this is for main rivers, the same principles can be applied to any watercourse. The Applicant should also liaise with Flintshire County Council in relation to ordinary watercourses.*'	No new culverting of watercourses is proposed. However, works to divert Oakenholt Brook culvert (ordinary watercourse) within the footprint of the CQLCP Abated Generating Station form part of the Proposed Development within the Main Development Area. The need for Ordinary Watercourse Consent from Flintshire County Council in its role as Lead Local Flood Authority (LLFA) is noted as detailed in the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**). Initial discussion has been held with Flintshire County Council regarding the culvert diversion at a meeting on 14/04/25. Requirements have been taken into account in development of **Appendix 13-D: Outline Drainage Strategy** (**EN010166/APP/6.4**). The Council suggested that they would support daylighting of the culvert.

Consultee	Summary of Comment	Response
		However, further survey has shown the culvert to be very deep, meaning an open watercourse would need to be of significant width, and thus not achievable within the Main Development Area.
NRW	'*We advise that the use of culverts is avoided. For access purposes, bridges should be used wherever possible to maintain the natural flow, allow natural channel migration and maintain natural sediment and gravel movement downstream. Where culverting is proposed, the Applicant should fully demonstrate why it is both necessary and the only reasonable alternative. We refer the Applicant to the 'NRW National Culverts Study' and appendix A of that report.*'	No new culverting of watercourses is proposed. However, works to divert existing culverted watercourses (ordinary watercourses) within the footprint of the CQLCP Abated Generating Station form part of the Proposed Development within the Main Development Area. Ordinary Watercourse Consent from Flintshire County Council in its role as LLFA would be applied for to enable these works as detailed in the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**).
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 fluvial geomorphology, should be provided within the ES and WFD Compliance Assessment'*	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 secured in the **Framework CEMP** (**EN010166/APP/6.5**). Appropriate mitigation

Consultee	Summary of Comment	Response
		measures for any such crossings of ephemeral ditches (ordinary watercourses) are set out in this chapter. Impacts on WFD quality elements of water bodies are considered in **Appendix 13-B: Water Framework Directive Report** (**EN010166/APP/6.4**).
NRW	'***Water Resources*** *No abstraction/discharge should occur for the new development until this has been agreed with NRW and the relevant permit obtained.*'	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	'*Paragraph 13.5.48 refers to the proposed site drainage including a foul sewer for sanitary wastewater. Paragraph 13.5.55 explains that "A new cesspit and filtration system will be installed for storage and settling of black and grey wastewater, keeping with current site arrangements…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 anticipated that this will continue with no change to the existing permitted discharge limits." However, paragraph 13.6.73 states: "There is no existing sewage connection for grey and black wastewater export from the Main Site. Black and grey wastewater from the existing power station is currently directed to an underground cesspit and filtration system for storage and settling, which is emptied periodically by a waste management company for offsite disposal at a suitable and licenced waste facility. It is expected that the Proposed Development will utilise a new filtration system for black and grey wastewater." On this basis, we note that grey/black wastewater is currently discharged to a cesspit and then removed*	It remains the case that connection to the public sewerage system is not proposed, with connection prevented by the location of the railway line. 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 practice is then to treat sewage on site and discharge treated sewage waters with main cooling water purge discharge to the River Dee under the conditions of the environmental permit. Due to sub-optimal operation of one of the existing systems, the septic tank is instead currently emptied periodically by a specialist contractor (approximately once per six-month period). It is proposed that the Proposed Development would utilise a new similar system for black and grey wastewater including foul

Consultee	Summary of Comment	Response
	off site and is also treated on site in-line with an existing permit. It is unclear as to whether the current practises will continue. *We note the proposed development is in a publicly sewered area and as such, we would expect the site to connect to the mains sewerage system. Further information should therefore be submitted to demonstrate that either the foul drainage will be discharged to the main sewerage system or that it is not reasonable to connect to the mains.* *We refer you to Welsh Government Circular 008/2018 on the use of private sewerage in new development, specifically paragraphs 2.3-2.5 which stress the first presumption must be to provide a system of foul drainage discharging into a public sewer. Only where having considered the cost and/or practicability it can be shown to the satisfaction of the determining authority that connection to a public sewer is not feasible, should non-mains foul sewage disposal solutions be considered.* *We therefore advise that you should thoroughly investigate the possibility of connecting to the foul sewer by taking the following steps:* *• Approach the sewerage undertaker to reach an agreement for a connection to the foul sewer.* *• If the sewerage undertaker refuses connection to the public sewer, request that they adopt the proposed treatment system.* *• If the sewerage undertaker refuses both of the above, you must appeal the refusal with Ofwat.*	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 accordance with the existing permit) or to be removed by specialist contractor. Connection to the mains sewer is not considered feasible due to a railway crossing being required for any new connection. The Proposed Development would continue to operate within current permit limits, and therefore would not present any new risk to the water environment.

Consultee	Summary of Comment	Response
	For further details please see Natural Resources Wales / Private sewage treatment in an area with a public sewer *Should a connection to the mains sewer not be feasible, you will also need to demonstrate that the proposal would not pose an unacceptable risk to the water environment. Welsh Government Circular 008/2018 advises that a full and detailed consideration be given to the environmental criteria listed under paragraph 2.6 of the Circular, to justify the use of private sewerage.*'	
NRW	'*It is noted that the ES will address potential impacts to water, recognising that robust mitigation measures will need to be implemented to prevent pollution from the project. A Construction Environmental Management Plan (CEMP) should be produced to include any necessary mitigation measures for pollution prevention. It should also be ensured that GPP5 and GPP6 are adhered to during the works.* *We also note that an Outline Surface Water Drainage Strategy will be produced which should address water quality issues during operation and maintenance of the site. Only clean and uncontaminated water should be directed to surface water drains. Any fuels, oils and chemicals should be appropriately bunded and kept at least 10 metres away from any surface water drain/watercourse.*'	A CEMP would be in place for the construction stage. Refer to the **Framework CEMP** (**EN010166/APP/6.5**) which outlines the control measures for mitigating water quality impacts, taking into account Guidance for Pollution Prevention (GPP) documents GPP5 and GPP6. This would be developed into a detailed CEMP post consent as a requirement of the DCO. The detailed CEMP, secured by a DCO requirement, would be supported by a Water Management Plan to be submitted post consent but prior to construction. The **Outline Surface Water Drainage Strategy** is included as **Appendix 13-D** (**EN010166/APP/6.4**), and its suitability for protecting the water environment is assessed within this chapter. Fuels, oils and chemicals would be appropriately bunded and have a suitable buffer from watercourses.

Consultee	Summary of Comment	Response
NRW	'*Position statement RPS261 (Temporary dewatering from excavations to surface water: RPS 261 - GOV.UK (www.gov.uk)) should be considered regarding dewatering activities. If the conditions cannot be met a permit would be needed for dewatering.*'	Noted. RPS261 has been considered with regard to dewatering activities. Impacts associated with dewatering are assessed within this chapter.
NRW	'***Water Quality*** *We cannot currently agree with any conclusions relating to chemical contamination of the Dee estuary in the absence of a baseline dataset.* *We cannot currently agree to any conclusions that assume no contamination of the sediment (marine) or soil (terrestrial) that may be disturbed during the construction, operation or decommissioning of the proposed development.*'	Comment is noted and covered by responses below. Further correspondence has been undertaken with NRW regarding these concerns, and it is understood the NRW were provisionally content with the subsequent responses with regard to water quality (as covered below), pending review of the final ES.
NRW	'*We do not agree with any conclusions of "no significant impact" (or "negligible" effect) that are predicated on the mitigation measures to be outlined in a CEMP or a WMP (Water Management Plan).*'	It is understood that this comment relates to lack of detail regarding water mitigation measures that would be provided within a CEMP, which was unavailable at the time of statutory consultation. A **Framework CEMP** (**EN010166/APP/6.5**) is now included within the DCO Application which outlines the control measures for mitigating water quality impacts. This would be developed into a detailed CEMP post consent as a requirement of the DCO. The detailed CEMP, secured by a DCO requirement, would be supported by a Water Management Plan to be submitted post consent but prior to construction. Further details regarding the contents of these documents are given in Section 13.5 and the **Framework CEMP**

Consultee	Summary of Comment	Response
		(**EN010166/APP/6.5**), through which this is secured.
NRW	'*We agree with the general approach to the assessment of impacts of the proposed development. However, we do not concur with the methods used in support of that approach. The PEIR states that the "worst-case scenario" is considered (e.g. paragraphs 13.3.6, 13.3.8), but assumptions have been made in relation to the baseline environmental conditions that are based on a lack of data*'	It is noted that NRW agreed with the general approach to the assessment. It is understood from the further NRW comments below and further correspondence with NRW that concerns regarding methodology were due to a lack of baseline water quality data for the River Dee. There are no longer any works proposed in the River Dee aside from minor modifications comprising installation of new 2 mm eel screens on existing inlets (with minor repairs to surface concrete, metalwork, and timbers). There would be no physical disturbance of the estuary bed which could mobilise contaminants in sediment (including no requirement for a jack-up barge or coffer dam). The existing Environmental Permit for discharge to the River Dee would be complied with. NRW confirmed via email exchange dated 27 January 2025 that they are content with this arrangement. The response read that, "*as there will no longer be any in-river working (and thus no disturbance of the sediment), we are content that there wouldn't be any need to carry out the baseline water quality surveys that we advised in our PEIR consultation response (dated 18/11/24)*".
NRW	'*Paragraph 13.3.9: we note that determination of any contamination of the sediment in the Water Connection Corridor is planned to inform the ES. No conclusions relating to the*	As per the above comment, there are no longer any works proposed in the River Dee aside from minor modifications comprising installation of new

Consultee	Summary of Comment	Response
	significance of impacts on the marine environment should be drawn without these data. Any scenarios considered should not be deemed to be "worst-case" if an assumption of no contamination and no impact is made. www.naturalresourceswales.gov.uk www.cyfoethnaturiolcymru.gov.uk Page 21 of 36'	2 mm eel screens on existing inlets (with minor repairs to surface concrete, metalwork, and timbers). There would be no physical disturbance of the estuary bed which could mobilise contaminants in sediment (including no requirement for a jack-up barge or coffer dam). NRW have confirmed (27/01/25) that baseline water quality monitoring of the River Dee is not required.
NRW	'*Paragraphs 13.6.2 and 13.6.64: much of the proposed mitigation of the adverse impacts is predicated on the content of an as-yet unformed CEMP. Since the CEMP and WMP are not available for review, the assertion that the "good practice measures" will be applied, appropriate and effective is currently assumptive with insufficient justification. As such, we cannot currently agree with the conclusions of negligible impact and/or not significant as the impacts have not been adequately assessed and the mitigation has not been either determined or evaluated.*'	A **Framework CEMP** (**EN010166/APP/6.5**) is included within the DCO Application which outlines the control measures for mitigating water quality impacts. This would be developed into a detailed CEMP post consent as a requirement of the DCO. The detailed CEMP, secured by a DCO requirement, would be supported by a Water Management Plan to be submitted post consent but prior to construction.
NRW	'*Paragraph 13.6.23: we agree that further assessment will be necessary to determine whether the effects of mobilisation of contaminants from disturbed soil are likely to be significant or if they can be mitigated through embedded and good practice measures. The presence and concentration of any contaminants should be assessed, and the results used to inform both the level of risk to the marine environment, and the efficacy of any mitigation measures proposed.*'	This chapter includes an assessment of impacts on water quality including from site runoff that may contain sediments and potentially contaminants from chemical spills and leaks. This would primarily be mitigated through measures outlined in the **Framework CEMP** (**EN010166/APP/6.5**) and summarised within this chapter. A preliminary ground investigation including for determination of contamination was undertaken in January-March 2025. Refer to **Chapter 14: Geology and Ground**

Consultee	Summary of Comment	Response
		Conditions (**EN010166/APP/6.2.14**) for the contaminated land assessment.
NRW	'*Paragraph 13.6.36: we note that the installation of a cofferdam is being considered as "temporary", along with its effects. However, the impacts of this installation may not be "temporary". For the purposes of the ES, "temporary" should be defined for both the installation and the effects. It should be made clear in the ES that in the absence of a final design for this aspect of the works, the impacts cannot adequately be predicted or assessed, and so should not be assumed to be temporary without appropriate mitigation.*'	The use of a cofferdam is no longer required for the Proposed Development and so no longer requires assessment.
NRW	'*Paragraph 13.6.68: we note that there is no proposal to change the characteristics (operating temperatures and discharges) of the thermal plume from the cooling water. The lack of proposed assessment of the plume impacts is being justified by this assertion. If the design envelope of the proposal changes, manifesting a change in the characteristics of the thermal plume or the impacts of the plume change beyond the current situation, an impact assessment through thermal plume modelling would be needed.*'	The comment is noted. The existing Environmental Permit for discharge to the River Dee would be complied with. NRW confirmed via email exchange dated 27 January 2025 that they are content with this arrangement.
NRW	'*Section 1.2.34 - Table 4: Results of water quality sampling undertaken by NRW for the River Dee (2014-2024): the Environmental Quality Standards (EQS) reported for comparative purposes and assessment in the ES should be site-specific, accounting for the background baseline dissolved organic carbon concentration of the estuary waters. We also recommend that the Predicted No-Effect Concentration is used for clarity and to avoid any requirement to compare the EQS with likely ecological response.*	NRW have been engaged further on this matter. There are no longer any works proposed in the River Dee aside from minor modifications comprising installation of new 2 mm eel screens on existing inlets (with minor repairs to surface concrete, metalwork, and timbers). There would be no physical disturbance of the estuary bed which could mobilise contaminants in sediment (including no requirement for a jack-up barge or

Consultee	Summary of Comment	Response
	Section 1.2.32 - Table 4: Results of water quality sampling undertaken by NRW for the River Dee (2014-2024): we note that the water quality data referred to relate to the sampling points at Johnson's Hole and the Powergen Buoyage Point. These were established for monitoring the impacts of industrial discharge from: Deeside Power station; Shotton Paper Mill; Tata Steel Limited and Shotton Works so are not suitable for deriving baseline conditions for water quality in the estuary. The data provided in the PEIR also lack any consideration of organic contaminant concentration (e.g. PAH, OCP, PBDE, VOC, organotins, alkylphenols). *Data should be collected to establish the water quality baseline conditions in the estuary. Sample points should be established beyond any mixing zones of existing discharge points and analysis determinants should include any contaminants that may either be discharged during the operation of the proposed development, disturbed from the sediment during either the construction or operational phases of, or released into the estuary accidentally. We would welcome further engagement to establish a monitoring programme appropriate for defining baseline environmental conditions.*'	coffer dam). The existing Environmental Permit for discharge to the River Dee would be complied with. NRW confirmed via email exchange dated 27 January 2025 that they are content with this arrangement. The response read that, "*as there will no longer be any in-river working (and thus no disturbance of the sediment), we are content that there wouldn't be any need to carry out the baseline water quality surveys that we advised in our PEIR consultation response (dated 18/11/24)*".
NRW	'*Paragraph 1.4.18: consideration should be given to the impacts of any additional in estuary surface water outfall infrastructure required for surface water drainage. The effects of the construction and operation of this infrastructure should be assessed.*'	No construction is required for surface water outfalls within the River Dee. The only work for surface water outfalls would be for Old Rockcliffe Brook (Kelsterton Brook), and the potential effects on this watercourse are assessed within this chapter. Full drainage details are given in **Appendix 13-D: Outline Drainage Strategy**

Consultee	Summary of Comment	Response
		(**EN010166/APP/6.4**).
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 (ref. Section 2.1.2) 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 the WFD Assessment included as **Appendix 13-B: Water Framework Directive Report** (**EN010166/APP/6.4**).
NRW	'*Paragraph 1.2.3 refers only to "downstream water features". 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 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.*'	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. Refer to **Figure 13-1: Surface Water Features** (**EN010166/APP/6.4**) for the Study Area for the Water Environment assessment, which is also described in more detail in Section 13.4.
NRW	'*Section 4.2.1, Table 5 – Screening of the Proposed Development's Activities against WFD Quality Elements: 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 WFD Quality Elements. Refer to **Appendix 13-B: Water Framework Directive Assessment** (**EN010166/APP/6.4**).

Consultee	Summary of Comment	Response
NRW	'*Although there is no anticipated change to the extent or magnitude of the existing environmental pressure, the discharge of chemicals in the cooling waters should be scoped in for assessment. We note that there is unlikely to be any change to the chemical composition of the discharged cooling water, but changes to the hydrology and morphology of the Water Connection Corridor may affect how these pressures manifest in the estuarine environment.*'	There are no longer any works in the River Dee aside from minor modifications comprising installation of new 2 mm eel screens on existing inlets (with minor repairs to surface concrete, metalwork, and timbers). No works to the discharge location are proposed and so no changes to the hydrology and morphology of the estuary are anticipated. The existing Environmental Permit for discharge to the River Dee would be complied with. NRW confirmed via email exchange dated 27 January 2025 that they are content with this arrangement. Nonetheless, an assessment of the cooling water discharge is provided within Section 13.6.
NRW	'*The down-tide ZoI overlaps with the Shellfish Waters Protected Area: Dee (West). The potential for adverse effects from chemical contaminants (including but not limited to heavy metals) that are either discharged, remobilised or accidentally spilt during construction activities should therefore be assessed.*'	An assessment of potential impacts to water quality (and by extension their associated protected areas) is provided within this chapter (see Section 13.6) for the construction, operation and decommissioning phases.
NRW	'***Flood Risk*** *Flood risk from the Tidal Dee is likely to be significant, as evidenced by past hydraulic modelling studies upstream of the site.* *Flood risk is a major component of the scope of the EIA and at this preliminary stage requires hydraulic modelling to inform the Flood Consequences Assessment (FCA), which should be completed to inform the DCO application. We would welcome further engagement regarding these aspects.*'	Hydraulic modeling has been undertaken in consultation with NRW. Refer **to Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) for full details.

Consultee	Summary of Comment	Response
NRW	'*Some elements of work will require a Marine Licence, and others will require a Flood Risk Activity Permit (FRAP), depending on the proposed location, methods and design.*'	Noted. The requirement for permits and consents is considered within this chapter (Section 13.5) and within the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**), where these are not disapplied through the DCO.
NRW	'*We recommend that the Flintshire Lead Local Flood Authority (LLFA) are included in any consultation on the FCA and proposed surface water attenuation/SuDS Approval Body approvals, given the potential impact on tributaries of the Dee.*'	Initial engagement with the FCC LLFA regarding the Drainage Strategy was undertaken in June 2024 and April 2025, with feedback taken into account in development of **Appendix 13-D: Outline Drainage Strategy** (**EN010166/APP/6.4**).
NRW	'*The DCO application proposes highly vulnerable development (power station). Our Flood Risk Map confirms the development site to be located partially within Zone C1 (and Zone B) of the Development Advice Map (DAM) contained in Technical Advice Note (TAN) 15: Development and Flood Risk (2004). The Flood Map for Planning (FMfP) identifies the application site to be at risk of flooding and most of it falls within Flood Zone 3 (Sea). The entire site is located along the coastline of the Tidal Dee.* *The documents submitted correctly identify the location of the constituent parts of the site within the relevant flood zones according to the DAM and FMfP. Paragraphs 13.6.25 to 13.6.32 and 13.6.85 to 13.6.91 of Chapter 13 identify a range of flood risks associated with the construction and operational phases respectively. A preliminary FCA is included with the submitted documents (Appendix 13-C). The FCA introduces the relevant policy and identifies relevant sources of flood risk.*	Hydraulic modelling has been undertaken in consultation with NRW and is detailed in **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).

Consultee	Summary of Comment	Response
	No substantial assessment of flood risks has been provided because of ongoing hydraulic flood risk modelling work. Discussions concerning the modelling approach were held with NRW on 7 May 2024, and a modelling method statement was submitted to NRW on 4 September 2024. The method statement was reviewed by NRW and returned to AECOM on 3 October 2024. Our comments should be addressed, and the modelling work completed to inform the flood risk to the proposed development.'	
NRW	'*The flood risk modelling study will need to examine the existing flood risk to the site (baseline) and the flood risk to the proposed development in the design event i.e., the 0.5% (1 in 200 year) Annual Exceedance Probability (AEP) tidal event with appropriate breach/overtopping analysis and allowance for climate change over the lifetime of the development (see comment no. 131 below). We would welcome the opportunity to review this model for its use in the FCA.*'	Hydraulic modelling has been undertaken in consultation with NRW, design events and climate change allowances have been agreed. Refer to **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).
NRW	'*We note that the operational lifetime of the proposed development would be 30 years. WG current guidance assumes that 75 years of climate change should be considered Climate change allowances and flood consequence assessments | GOV.WALES. The FCA (paragraph 1.3.35) states that sea level rise estimates from 2100 will be used to assess the impacts of climate change, in line with that guidance.*'	Climate change allowances in line with current guidance have been used to assess the impacts of the proposed development. Refer to **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).
NRW	'*The design/method of construction and proposed mitigation, including land raising (as mentioned in Chapter 13, paragraph 13.5.60) must also be included in the FCA. To meet the requirements of TAN15 A1.14 for new Highly Vulnerable Development (HVD), it must be demonstrated that the*	The FCA includes proposed mitigation measures that are required. Refer to **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).

Consultee	Summary of Comment	Response
	development can be designed to be flood free in the design event. It must also be demonstrated that the proposed development does not negatively impact flood risk elsewhere (A1.12).'	
NRW	*'Appendix 13-A (Water Environment Baseline Survey and Methodology Report) discusses drainage but does not appear to address SuDS within the operational site drainage strategy. Operational drainage is particularly important at this site given the nature of the water environment, including the presence of shallow groundwater, and the potential for heightened contamination risks to the ground and groundwater during the site's operational life. Any drainage strategy, whilst meeting climate change stormwater predictions/flows, must also be designed, as much as possible, to remove the possibility of chemicals/contaminants, existing or operational, affecting the local water environment.'*	Noted. The **Outline Surface Water Drainage Strategy** is included as **Appendix 13-D** (**EN010166/APP/6.4**), and its suitability for protecting the water environment is assessed within this chapter. A SuDS approach is included in this strategy.
NRW	***'Flood Risk Activity Permit*** *The site is located close to the river Dee, which is a main river. Flood Risk Activity Permits (FRAP) (under the Environmental Permitting (England & Wales) Regulations 2016) will be required for some aspects of the proposed development, as identified in Chapter 13, paragraph 13.5.24. A FRAP may also be required if access to an NRW-maintained flood risk management asset is likely to be affected.* *Details of the FRAP application process, including timescales, can be found on our website: Natural Resources Wales / Apply for a flood risk activity permit (FRAP)*	Noted. The requirement for permits and consents is also considered within this chapter (Section 13.5) and within the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**), where these cannot be disapplied through the DCO.

Consultee	Summary of Comment	Response
	Details of what to include with a FRAP application can also be found online: Natural Resources Wales / Flood risk activity permit application (FRAP): Information you will need to provide *Any work in or near the affected ordinary watercourses and tributaries of the Dee would need an Ordinary Watercourse Consent (OWC) from the Lead Local Flood Authority (LLFA). This includes any works that may affect access to LLFA-managed assets.*'	
Welsh Water	'*It appears the application does not propose to connect to the public sewerage system, and therefore Dwr Cymru Welsh Water has no objections in principle. However, should circumstances change and a connection to the public sewerage system/public sewage treatment works is preferred we must be reconsulted on this application.*'	It remains the case that connection to the public sewerage system is not proposed, with connection prevented by the location of the railway line. 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 practice is then to treat sewage on site and discharge treated sewage waters with main cooling water purge discharge to the River Dee under the conditions of the environmental permit. Due to sub-optimal operation of one of the existing systems, the septic tank is instead currently emptied periodically by a specialist contractor (approximately once per six-month period). It is proposed 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

Consultee	Summary of Comment	Response
		water purge discharge (in accordance with the existing permit) or to be removed by specialist contractor.
Welsh Water	'*It appears the application proposes to continue utilising the existing water supply at a proposed usage of approximately 80 m^3/hr, and therefore Dwr Cymru Welsh Water has no objections in principle.*'	This comment is noted.
FCC	'*The submitted environmental statement will need to have regard for Planning Policy Wales (PPW) (edition 12, 2024) and any relevant legislation and guidance such as relevant Technical Advice Notes that is in force/adopted in Wales. Also the application should have regard to the respective and relevant policies within the Flintshire Local Development Plan (LDP) adopted by the Council on 24 January 2023.*'	Details of the legislation, policy and guidance taken into account in the development of this impact assessment is introduced in Section 13.1 of this chapter, with further detail given in **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**). This includes PPW, TAN15 and the Flintshire LDP.

Table 13-4: Targeted Consultation

Consultee	Summary of Comment	Response
Flint Town Council	**Mitigation, Monitoring, and Compensation**: The Council expects: • Transparent, accountable mitigation strategies for all identified environmental risks—including noise and vibration (e.g., from pile driving) in relation to nearby Listed Buildings; • Clear summaries of these assessments for public understanding; Full details of compensation mechanisms available to adversely affected residents and businesses, including: • How compensation will be calculated, • Who will administer the scheme, • How the public will be made aware of it. Additionally, the Council requests: • Clarification on how often the project's environmental performance will be reviewed, and • How local residents will be kept informed of those findings.	Details of all mitigation and monitoring proposed is included within the **Commitments Register** (**EN010166/APP/6.10**).

Table 13-5: Additional Relevant Engagement

Consultee and date	Nature of Engagement	Summary of Response	How and where addressed
NRW 11 April 2024	A data request for water quality, water resources, hydrology, flood risk and groundwater data.	NRW provided links to online data sources for hydrology and groundwater data, and provided email addresses to request additional data.	Data has been utilised in the baseline.
NRW 9 May 2024	Additional data request for surface water and groundwater quality data and details of groundwater levels.	NRW provided available water quality data for surface water, no data available for groundwater levels or quality.	Data has been utilised in the baseline.
NRW 7 May 2024	A meeting was held with NRW on the 7th May 2024 to discuss the technical approach to hydraulic modelling to be undertaken to support the FCA, following on from the scoping opinion (see **Appendix 1-B: Scoping Opinion** (**EN010166/APP/6.4**)) and PINS advice. The existing NRW models and the approach recommended by the Applicant was discussed.	Agreement in principle between NRW and the Applicant, a method statement is to be provided by the Applicant prior to hydraulic modelling taking place. Further engagement to take place (as detailed below).	A method statement was developed by the Applicant for approval by NRW. Refer to the **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).
Environment Agency 12 April 2024	A data request for water quality, hydrology, flood risk and groundwater data.	Environment Agency state that they do not hold any information within the Study Area.	N/A
Environment Agency 27 March 2025	A meeting was held to discuss the Scoping Opinion response.	The Environment Agency confirmed that a Flood Risk Assessment for England was not required, and that the FCA covering the Proposed	**Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) fulfills the requirements with regard to flood risk assessment. The requirement

Consultee and date	Nature of Engagement	Summary of Response	How and where addressed
		Development would be sufficient. However, it was noted that if temporary mobile cranes are used to lift materials over flood defences then pre- and post-work condition assessments of the defences would be needed. It was also noted that any works for the Water Connection Corridor would require a FRAP.	for permits and consents is considered within this chapter (Section 13.5) and within the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**), where these are not disapplied through the DCO.
NRW 4 September 2024	Submission of Hydraulic Modelling method statement to NRW for comment.	NRW provided comments via email on 3 October 2024. These were considered as part of the ongoing modelling work at that time.	NRW's comments were incorporated into the hydraulic modelling methodology.
NRW 16 October 2024	Email exchange with NRW regarding wave overtopping requirements.	NRW confirmed on 17 October 2024 that they do not hold wave data for the site or wider Dee Estuary. They also confirmed that wave overtopping is unlikely to be a significant risk, and that still water level overtopping (and associated breach) is the dominant risk.	The hydraulic modelling and flood risk assessment have been informed by NRW's confirmation that still water level overtopping is the primary risk.
NRW 27 Jan 2025	Email exchange in response to statutory consultation responses. Clarification was sought regarding the extent of water quality baseline monitoring required given that no works are	NRW confirmed that given the changes to the Proposed Development they are content that there would not be any need	Additional water quality baseline monitoring for the River Dee has not been carried out as NRW

Consultee and date	Nature of Engagement	Summary of Response	How and where addressed
	required in the Dee Estuary that could cause disturbance of the bed (e.g. no coffer dam requirement) and that there would be no change to the existing Environmental Permit conditions.	to carry out the baseline water quality surveys that were advised in their PEIR consultation response (dated 18/11/24). NRW confirmed that given the cooling water and treated foul wastewater (sewage) would be discharged to the estuary within the limits of the existing permit, and that the process wastewater (acid wash and ammonia stripping process water) would be taken offsite by tanker, they were content and advised that the relevant details should be submitted with the DCO and permitting applications. It was also advised that drainage from the Proposed Development should still be considered.	confirmed this was no longer a requirement. As recommended, drainage from the Proposed Development has been considered. The **Outline Surface Water Drainage Strategy** is included as **Appendix 13-D** (**EN010166/APP/6.4**), and water quality impacts from operational drainage have been assessed within this chapter.
NRW 26 Feb 2025	A meeting was held with NRW on 27 February 2025 to discuss the completed hydraulic modelling and calibration / verification outputs	Agreement that the results indicate the model is over estimating water levels at Connah's Quay and because it verifies well at Mostyn Docks and Chester this is not a major concern. Glasswalling in the 1D only reach upstream of the model is not a concern and likely	Refer **to Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) for full details.

Consultee and date	Nature of Engagement	Summary of Response	How and where addressed
		a conservative estimate for this assessment.	
NRW 8 May 2025	NRW's review of the hydraulic model received.	NRW provided hydraulic model review comments for the Baseline model and hydraulic modelling report. Hydraulic model was not considered acceptable. The main issues were clarification needed on climate change year used for the tidal estimates, use of levee markers for Flood Modeller cross-sections, set-up of the model defences in the vicinity of the site, application of North Wales Tidal Defence Survey and no breach assessment undertaken	Refer **to Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) for full details.
NRW 21 May 2025	Meeting with NRW to agree undefended and proposed modelling approaches on 21/05/25	NRW were presented with the hydraulic modelling approach addressing review comments. The approach covered the climate change scenarios, undefended scenario, breach analysis levee markers, manning's roughness and comparison with previous results. The methodology was agreed in principle by NRW in	Refer **to Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) for full details.

Consultee and date	Nature of Engagement	Summary of Response	How and where addressed
		lieu of receiving the hydraulic model, hydraulic modelling report and FCA. It was agreed that the undefended scenario would remove the need to undertake breach modelling at the Site.	
FCC 12 April 2024, 8 May 2024, 17 July 2024	A data request was sent for water resources (private water supplies (PWS)) and flood risk data.	FCC responded on 8 May 2024 to confirm that they hold no flood risk data. FCC provided details of PWS within the Study Area on 22 July 2024.	Data has been utilised in the baseline (**Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**)).
FCC 7 August 2024	Request for any hydraulic models of Ordinary Watercourses within the area.	No response received. However, other similar requests were made, and FCC confirmed that no flood risk data was available.	No hydraulic models for Ordinary Watercourses were obtained, and flood risk assessment proceeded based on available data sources. Nonetheless, the scope of the hydraulic modelling has been determined in consultation with NRW.
FCC and SuDS Approval Body 6 June 2024	A meeting was held with FCC and the SuDS Approval Body on 6 June 2024. This covered existing surface water drainage arrangements and flood risk, FCC SuDS requirements, the proposed surface water drainage strategy and the need for further pre-application engagement.	Requirements of FCC and the SuDS Approval Body were outlined and initial feedback provided, which was taken into account in the subsequent development of the **Appendix 13-D Outline Surface Water**	Feedback from this meeting was taken into account in the initial development of **Appendix 13-D Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**), which has been assessed in this chapter in terms of impacts to the water environment.

Consultee and date	Nature of Engagement	Summary of Response	How and where addressed
		Drainage Strategy (**EN010166/APP/6.4**).	
FCC and SuDS Approval Body 14 April 2025	A meeting was held with FCC and the SuDS Approval Body on 14 April 2025. The proposed surface water drainage strategy was presented and the associated hydraulic modelling explained. Firewater runoff and diversion of the Oakenholt Brook culvert were also discussed.	The drainage strategy principles were agreed in principle, and it was confirmed that the pollution hazard level classification for the Proposed Development would be 'high'. Detailed strategy for firewater runoff to be developed post-DCO application. Further investigation was to be undertaken regarding asset levels and condition of the Oakenholt Brook culvert.	Feedback from this meeting was taken into account in the further development of **Appendix 13-D Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**), which has been assessed in this chapter in terms of impacts to the water environment.

Scope of the Assessment

13.2.7 Following the scoping process that has been undertaken, the scope of the assessment considered in this chapter is as follows for the construction, operation and decommissioning phases of the Proposed Development.

13.2.8 More detail on the key elements of the Proposed Development is provided in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**).

Construction and Decommissioning Phase

Surface Water

13.2.9 During the construction and decommissioning phase, the potential impacts to surface water scoped into this assessment are as follows:

- potential temporary impacts on surface water quality due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals, or through uncontrolled site run-off;
- potential temporary impacts to surface water quality through mobilisation of contamination following disturbance of contaminated ground or groundwater (also considered in **Chapter 14: Geology and Ground Conditions** (**EN010166/APP/6.2.14**));
- potential impacts to water levels and water quality associated with works within the River Dee (also considered within **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**));
- potential impacts on any surface water abstractions and other water resources in terms of quality or quantity;
- potential morphological impacts to water features associated with construction or decommissioning activities (also considered within **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**));
- water quality impacts on receiving watercourses from foul drainage from construction compounds and welfare facilities; and
- potential impact upon receiving watercourses as a result of hydrostatic testing of the Repurposed and Proposed CO_2 Connection Corridors.

Groundwater

13.2.10 During the construction and decommissioning phase, the potential impacts to groundwater scoped into this assessment are as follows:

- potential temporary impacts on groundwater quality due to deposition or spillage of oils, fuels, or other construction chemicals, or through uncontrolled site run-off;
- potential temporary impacts on groundwater quality through mobilisation of contamination following disturbance of contaminated ground or groundwater (see **Chapter 14: Geology and Ground Conditions** (**EN010166/APP/6.2.14**));
- potential impacts on groundwater level, flow and quality as a result of abstraction and discharge associated with potential dewatering; and

- potential impact on groundwater levels, flow and quality due to excavation and sub-surface structures; and there is the potential for reduction in infiltration to groundwater due to the construction of worksites, stockpiles and roads which could temporarily reduce groundwater levels.

Flood Risk

13.2.11 During the construction and decommissioning phase, the potential impacts to flood risk scoped into this assessment are as follows:

- potential impacts to water conveyance or groundwater flow where proposed construction activities cross watercourses during construction and decommissioning (above and below ground);
- potential for temporary loss of floodplain storage and/or impact on flood flow conveyance due to construction works within Zones C1 and Zone B (including potentially the functional floodplain) could lead to the displacement of tidal and fluvial floodwater during construction and decommissioning (above ground), this could include works associated with land raising and any construction within the Tidal floodplain; and
- potential changes to surface water drainage characteristics due to activities during construction and decommissioning, or changes to ground levels or construction / decommissioning drainage.

Operational Phase

Surface Water

13.2.12 During the operational phase, the potential impacts to surface water scoped into this assessment are as follows:

- potential water quality impacts on the River Dee and Old Rockcliffe Brook that receive surface water run-off, cooling water or treated effluent discharges from the Proposed Development;
- potential water quality impacts on the River Dee and other surface water features from the discharge of contaminated run-off or as a result of chemical spills (e.g. from the chemical storage area or fire water runoff if needed) and subsequent water quality impacts;
- potential hydromorphological impacts to freshwater features, including changes to physical form (for example scour or culverting), hydraulic processes and sediment dynamics (for example constriction of flows, flood plain or culverting); and
- potential impacts on surface water abstractions and water resources for other users.

Groundwater

13.2.13 During the operational phase, the potential impacts to groundwater scoped into this assessment are as follows:

- potential impact on groundwater levels and flow due to new permanent sub-surface structures;

- potential for new pathways. Contaminants may migrate to non-contaminated soils, geology, and groundwater via the foundations of structures;
- contamination of groundwater as a result of chemical spills in the chemical storage area and its subsequent run-off;
- potential impact on recharge rates to the underlying aquifers due to the introduction of impermeable surfaces; and
- potential reduction in recharge to underlying aquifers due to the land raising.

Flood Risk

13.2.14 During the operational phase, the potential impacts to flood risk scoped into this assessment are as follows:

- the potential impact of the Proposed Development on all sources of flood risk; and
- potential impact of land raising, above ground structures, and below ground structures on flood risk, including changes to flow paths, levels, and groundwater flooding, which could increase flood risk to the surrounding areas.

Matters Scoped Out of the Assessment

13.2.15 The following aspects have not been considered within the scope of the assessment in this chapter:

- morphological changes to the River Dee are not considered within the scope of this assessment, as there are no longer any works in the River Dee aside from minor modifications comprising installation of new 2 mm eel screens on existing inlets (with minor repairs to surface concrete, metalwork, and timbers). No works to the discharge location are proposed and so no changes to the hydrology and morphology of the estuary would occur;
- potential water quality impacts to surface water and groundwater associated with the delivery of AILs to the Main Development Area. It is anticipated that AILs would be delivered to the Main Development Area via road, while other AILs would need to be transported by vessel to nearby ports and transferred onto abnormal load transport trailers. The works associated with the delivery of these AILs would only be of a very minor nature (e.g. vegetation clearance along the AIL routes or relocation of lighting posts) as outlined in **Appendix 5-A: Environmental Screening of Accommodation Works (EN010166/APP/6.4)**. As such, there would be no significant effect to the Water Environment from these activities, and therefore, the Accommodation Work Areas are scoped out of the assessment and are also scoped out of further consideration within this chapter;
- water quality impacts to surface and groundwater associated with the Electrical Connection Corridor due to its minimal impact on the water environment. Construction works within the corridor are expected to be very limited and primarily involve minor activities such 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 scoped out and are not considered any further within this chapter; and

- it is understood that the Repurposed CO_2 Connection Corridor pipeline infrastructure is in a suitable condition for re-use without additional construction works. On this basis, works relating to the Repurposed CO_2 Connection Corridor can be scoped out of the assessment.

13.3 Assessment Methodology

13.3.1 The assessment methodology used to undertake this impact assessment is contained in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**). The methodology is summarised below for ease of reading.

13.3.2 The classification and significance of effects has been determined using the principles of the guidance and the criteria set out in Design Manual for Roads and Bridges (DMRB) LA 113 Road Drainage and the Water Environment (Ref 13-52) adapted to take account of hydromorphology. Although these assessment criteria were developed for road infrastructure projects, this method is suitable for use on any development project, and it provides a robust and well tested method for predicting the significance of effects.

13.3.3 A WFD assessment has been prepared for the Proposed Development. This is presented within **Appendix 13-B: Water Framework Directive Report** (**EN010166/APP/6.4**). The overreaching aim of the WFD is to protect and enhance watercourses.

13.3.4 The significance of effects of the construction, operation and decommissioning stages to the water environment has been assessed based on a source-pathway-receptor approach.

Impact Assessment

13.3.5 In accordance with the stage of the methodology, there are three stages to the assessment of effects on the water environment, which are as follows:

- **identification of receptors.** Each identified receptor is assigned a level of importance (classed as negligible, low, medium, high or very high) based on a combination of attributes (such as the size of the watercourse, WFD designation, water supply and other uses, biodiversity, and recreation etc.) and on receptors to flood risk based on the vulnerability of the receptor to flooding. The importance of a hydrological receptor is largely determined by its quality, rarity, and scale. The criteria are listed in full in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**), Table 14;
- **Identification of potential impacts.** The magnitude of potential and residual impact (or change) (classed as negligible, low, medium, or large adverse / beneficial) is determined based on the criteria listed in **Appendix 13-A: Water Baseline and Methodology**

(**EN010166/APP/6.4**), Table 15, and assessors' professional judgement; and

- **Assessment of the significance of effects**. This is typically a function of the importance of a receptor and magnitude of the impact, with overall significance of the effect on the receptor being determined using the matrix in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**), Table 16. The significance of each identified effect (both potential and residual) is classed as negligible, minor, moderate or major and either beneficial or adverse significance. Major or moderate effects are deemed to be 'significant' for the purposes of the EIA, in accordance with standard EIA practice. Minor and negligible effects are deemed to be 'not significant'. If appropriate, additional mitigation is proposed, as set out in Section 13.7, where significant adverse effects are predicted, to limit or remove any adverse significant effects of the Proposed Development. A precautionary approach to the assessment has been undertaken so that where uncertainty currently exists, a reasonable worst-case assessment has been made with regard to a particular effect's significance on the water environment.

13.3.6 All the receptor categories identified below have been assessed within the Study Area as described in paragraph 13.4.3 below. The potential receptors associated with the Proposed Development have been identified to include:

- surface watercourses (including WFD designated, Main Rivers, and Ordinary Watercourses (including drains), estuary and coastal water bodies);
- groundwater bodies;
- water resources, including reservoirs, water abstractions, foul drainage and water supply; and
- flood risk receptors (including people, property and infrastructure).

Rochdale Envelope

13.3.7 The setting of design parameters using the Rochdale Envelope approach is described in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**). The maximum parameters for the principal components of the Proposed Development are set out in the **Design Principles Document** (**EN010166/APP/7.8**) and are illustrated on the **Works Plans** (**EN010166/APP/2.4**) and the **Parameter Plans** (**EN010166/APP/2.5**). These parameters, together with assumptions regarding the future plans for the existing Connah's Quay Power Station set out in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**) have been used to inform the representative worst-case scenario that has been assessed in this chapter, in order to provide a robust assessment of the impacts and likely significance of environmental effects of the Proposed Development at its current stage of design.

Assessment Assumptions and Limitations

13.3.8 Limitations and assumptions that apply to this chapter are detailed below:

- the assessment has been undertaken using available data sources listed in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**), which are assumed to be an accurate representation of the water environment for the Study Area at the time of writing. It is also based on understanding of flow pathways as observed during the survey and site walkovers. Assumptions have been made regarding flow pathways for inaccessible and culverted sections of watercourses, based on Ordnance Survey (OS) mapping. There may also be minor field drains (likely ephemeral if present) that are unmapped and which were not observed on the site visit; and
- no surface water quality monitoring was undertaken, given that NRW holds water quality data for the receiving waterbodies. Furthermore, the importance of water features has been determined from a holistic review of water body features and so does not solely rely on water quality. This is due to the principle that by law no controlled water may be polluted (i.e. no matter what the baseline water quality is there should be no pollution to the environment resulting from the Proposed Development (including from operational discharges)). Furthermore, pre-construction monitoring of potentially affected watercourses would be required and is detailed later in this chapter.

13.3.9 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 the Principal Contractor(s). This would be outlined in the final CEMP(s) 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**); and
- 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**).

13.3.10 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, and discharged within the existing permit temperature and water quality limits. Any additional conditions would be agreed with NRW;
- 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 under the conditions of the environmental permit. Due to sub-optimal operation of one of the existing systems, the septic tank is instead currently emptied periodically by a specialist contractor (approximately once per six-month period). It is proposed 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 accordance with the existing permit) or to be removed by specialist contractor; 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).

13.3.11 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 treated and filled. It is assumed

that all underground infrastructure would remain in-situ, with connection and access points being sealed / disconnected; and

- any removal contractor would have a legal obligation to undertake decommissioning and demolition in accordance with the prevailing legislation at that time.

13.3.12 Given the above assumptions, this assessment presents a reasonable worst-case approach.

13.4 Baseline Conditions and Study Area

13.4.1 The baseline conditions and Study Area are described in full in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**). This section summarises the baseline physical characteristics and water features for the Study Area. Refer to **Figures 13-1** to **13-8:** (**EN010166/APP/6.3**) throughout.

13.4.2 The data sources used to define the baseline are contained in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**), and include publicly available data sources, data requests to NRW, the Environment Agency, and FCC, and a site walkover undertaken on 26 March 2024.

Study Area

13.4.3 The Study Area has been defined to include water environment features that may be at risk from possible direct and indirect impacts that might arise from the Proposed Development, as well as to consider existing flood risk. The Study Area is 1 km from the Order limits (excluding the Accommodation Work Areas which have been scoped out) as shown on **Figure 13-1: Surface Water Features** (**EN010166/APP/6.3**).

13.4.4 Since watercourses flow and impacts may propagate downstream, where relevant, the Study Area should also consider a wider Study Area based on professional judgement. However, in this case due to the proximity of the Order limits to the River Dee, and the size of this water feature, it is considered the ultimate downstream receptor for this assessment.

13.4.5 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 Study Area 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 (i.e. the River Dee is the ultimate receptor and is within 1 km of the Order limits), and so therefore a reduced 1 km Study Area has been considered only, including upstream to the national tidal limit where necessary for fluvial watercourses that are not tidally locked.

13.4.6 Tidal influences have been assessed in detail (see **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**)). While the tidal excursion near the entrance of the River Dee can reach up to 10 km during the highest astronomical tide, freshwater inflows drive partial mixing with saline water, creating a density-driven circulation. This results in a net seaward flow at the surface and a landward flow near the estuary bed. Given the reduced tidal volume, partial mixing, and salinity gradient, there is no realistic pathway for significant tidal influence to carry effects upstream. Therefore, while

downstream receptors have been considered, no impacts on upstream receptors within the estuary are anticipated.

13.4.7 As flood risk can also impact upstream and downstream of water features, the FCA considers a wider Study Area, where relevant. Further information is provided in **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**).

Topography and land use

13.4.8 The Main Development Area is located north-west of Connah's Quay in Flintshire, north-east Wales. It is immediately south-east of the Dee Transitional WFD water body. The Main Development Area has flat, low-lying coastal topography with typical ground levels ranging between approximately 6 to 8 m Above Ordnance Datum (AOD).

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

13.4.10 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.

13.4.11 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).

13.4.12 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 Order limits to the west, and the River Dee to the north including peripheral floodplain/marshland. The C&IEA is constrained by the River Dee to the north and east, a National Grid substation and existing Connah's Quay Power Station to the north-west with the remainder surrounded by built-up land, including the residential areas of Kelsterton and Golftyn to the south-west.

Rainfall

13.4.13 The nearest weather station on the Met Office website (Ref 13-53) with historical data is located at Hawarden (Flintshire), approximately 6.9 km west southeast of Connah's Quay eastern extent of the Main Development Area, at NGR SJ 31262 65824. Based on the average climate data (for the period 1991 to 2020 (as the most recent data available)) for this weather station, it is estimated that the Main Development Area experiences an average of 728.74 mm of rainfall per year, with it raining more than 1 mm on around 136 days per year. This is relatively low level of rainfall comparative to the rest of Wales. The wettest period occurs in autumn and early winter, and driest in

early spring, as shown in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**).

Surface Water Features

13.4.14 The NRW Water Watch Wales Map Gallery website (Ref 13-54) confirms that the Order limits are contained within the Dee Estuary WFD Operational Catchment, within the Dee Management Catchment.

13.4.15 The Study Area includes two WFD water bodies, including one transitional WFD water body, and one groundwater body. The transitional water body is the Dee (N. Wales) (WFD ID: GB531106708200) which has an overall WFD status of moderate. The groundwater body is the Dee Carboniferous Coal Measures (WFD ID:GB41102G204800), which has an overall status of poor. They are discussed further within **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**) and **Appendix 13-B: Water Framework Directive Report** (**EN010166/APP/6.4**).

13.4.16 A summary list of all of the surface water features presented within the Study Area is provided in **Table 13-6** and shown in **Figure 13-1 Surface Water Features (EN010166/APP/6.3)**, with further information provided in **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**). Surface water features have been identified from OS mapping (Ref 13-55) and the NRW Water Watch Wales Map Gallery website (Ref 13-54), and supported by observations taken on the site walkover.

Table 13-6: Surface water features within the Study Area

Surface water feature	Description
River Dee / Dee Estuary	The Dee Estuary is located adjacent to the Proposed Development, with the Water Connection Corridor partly within the estuary, and is the final receptor for all site drainage. The Dee Estuary is the estuary of the River Dee which drains a catchment area of approximately 1,800 km^2. The River Dee is a Main River, and a WFD water body. The nearest NRW gauging station (Dee at Chester Suspension Bridge (gauging station reference 067033)) shows an annual mean flow of 34.1 m^3/s. The flow that is exceeded 95% of the time (Q95) is 5.13 m^3/s for gauged mean daily flow for 1994 – 2013. The next nearest upstream gauging station is the Dee at Ironbridge (gauging station reference 067027), and this has an annual mean flow of 37.8 m^3/s. The Q95 is 9.7 m^3/s for gauged mean daily flow for 1994 – 2022 (see **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**)). There is a continuous area of low-lying marshland and tidal mudflats between the Proposed Development and the main river channel. The estuary is designated as a Ramsar site, a Special Area of Conservation (SAC) and Special Protection Area (SPA), a Site of Special Scientific Interest (SSSI) and a Shellfish Water Protection Area. Water quality information has been provided by NRW for the River Dee / Dee Estuary at four locations (see **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**)), which indicates that there are detections of heavy metals. There are a number of flow gauges on the fluvial River Dee (see **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**)), which show that the average annual mean freshwater flow is 37.78 m^3/s (Dee at Ironbridge). Further information on the Dee Estuary / River Dee and coastal processes is provided in **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**).
Kelsterton Brook	This ordinary watercourse is a tributary of the River Dee. It rises south of the Study Area at Mole Road and flows in a northerly direction towards the Main Development Area. It is culverted beneath the existing Connah's Quay Power Station site and receives surface water discharge from the existing site and this would remain the case from the Proposed Development. The watercourse was observed to have a natural morphology upstream of the existing power station site, however the lower reaches are diverted and culverted prior to discharge to the estuary.

Surface water feature	Description
	There are named watercourses to the east of Kelsterton Brook, which may be tributaries (Golftyn Drain, Coleg Drain and Top-y-fron Dingle) or which may coalesce and be culverted beneath the eastern extent of the Proposed Development site, north of Golftyn. It is not clear as to the exact course of these watercourses based on available mapping, and so for the assessment they are considered as part of the Kelsterton Brook catchment. NRW hold no water quality or flow data for Kelsterton Brook.
Old Rockcliffe Brook	This ordinary watercourse originates 1.6 km south of the Main Development Area. The watercourse flows in a northerly direction to Chester Road, where it enters a culvert. North of the road there is a confluence with Kelsterton Brook and a small tributary, following which the three are culverted beneath the existing power station site as described above for Kelsterton Brook. NRW hold no water quality or flow data for Old Rockcliffe Brook.
Lead Brook/ Northop Brook including Oakenholt Reservoir	Lead Brook is an ordinary watercourse that flows south to north through the Study Area and is a tributary of the River Dee. The brook rises as Northop Brook to the south of Northop and flows in a northerly direction to become Lead Brook. Upstream of Oakenholt, the watercourse is impounded to form a small reservoir, called Oakenholt Reservoir which supplies water for commercial purposes as well as supporting angling. Downstream of the reservoir, the 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. The Repurposed CO_2 Connection Corridor intersects the Lead Brook in the culverted section (NGR SJ 26271 71670) adjacent to the Main Development Area boundary upstream of the A548 culvert. NRW have a water quality station in the tidal reaches of the watercourse, which indicates it is a well oxygenated water body with low concentrations of dissolved metals (see **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**)). NRW hold no flow data for Lead Brook.
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 River Dee. Tributaries of Pentre Brook (Allt-Goch Brook and an unnamed tributary) are crossed by the Repurposed CO_2 Connection Corridor and the Proposed CO_2 Connection Corridor.

Surface water feature	Description
	NRW hold no water quality or flow data for Pentre Brook.
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. North of the railway line, the watercourse flows into the culvert to the southern side of Rockcliffe Lane. This watercourse has been named Oakenholt Brook for the purposes of the assessment. NRW hold no water quality or flow data for Oakenholt Brook.
Allt-Goch Brook and tributary	Two unnamed ordinary watercourses of Pentre Brook 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. These watercourses flow through a new housing development, including a park, and are culverted beneath many roads and the railway line. The main channel has been named Allt-Goch Brook due to its vicinity to Allt-Goch Lane. NRW hold no water quality or flow data for Allt-Goch Brook or its tributary.
Unnamed streams south of Main Development Area	Various small unnamed watercourses are located within the Study Area.

Hydromorphology

River Dee

13.4.17 The Shoreline Management Plan (SMP) (Ref 13-57) describes the mouth of the River Dee estuary as being characterised by several channels and sandbanks. It states that much of the Welsh bank of the estuary has industrial and commercial activities at the shoreline, including factories and power stations, as well as the railway line and roads. The extensive inter-tidal flats, and the waterfowl that use them, are protected with numerous environmental conservation designations.

13.4.18 The existing Connah's Quay Power Station sits on an area of reclaimed land which was previously an expanse of clay-silt-sand-based alluvium deposits. Expansive sandbars were prominent at the site between 1885 to1900, with a single-thread meandering channel, before entering the Irish sea. The main channel of the River Dee which flows in from the east-side of the estuary, is also heavily modified, exhibiting a canalised and regular planform upstream of Connah's Quay with mapping indicting this to be the case as far back as the 1860's.

13.4.19 The estuary is macro-tidal where a mean spring tidal range at Hilbre Island at the far west of the estuary is recorded at 7.6 m and is restricted to 3.4 m by Connah's Quay due to the entering river flow. Flood tidal currents are stronger than ebbing tides which promotes the accretion of sediments within the estuary. The estuary is considered to be a major sink for both mud and sand, with the key source of sediment the onshore movement of sediment from the Irish Sea.

13.4.20 Further information on the River Dee and coastal processes is provided in **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**) and in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**).

Surface Watercourses

13.4.21 All of the surface watercourses in **Table 13-6** were visited during the site walkover to observe their morphology. Each watercourse is described in **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**). Generally, the watercourses were observed to have three distinct morphological reaches. Upstream of Chester Road and the railway, the watercourses were generally small and flowing within incised channels, with natural gravel beds and woodland or agricultural land on the banks. All watercourses are then culverted beneath Chester Road and the railway, as well as other local roads and for Kelsterton Brook and Old Rockcliffe Brook, beneath the existing Connah's Quay Power Station. Downstream of these culverts the watercourses flow through channels across the River Dee tidal zone, through incised channels through agricultural areas or via meandering channels through the saltmarsh, prior to discharging to the River Dee.

Groundwater Features

13.4.22 Existing baseline information is detailed within **Appendix 13-A: Water Environment Baseline Survey and Methodology Report**

(**EN010166/APP/6.4**). This includes details regarding bedrock and superficial geology, and aquifer status. Further information on the hydrogeological aspects of the Proposed Development are detailed within **Appendix 13E: Hydrogeological Assessment** (**EN010166/APP/6.4**). This section provides a high-level summary of the hydrogeological baseline.

13.4.23 The Proposed Development Site is underlain by superficial aquifers designated as Secondary Undifferentiated Aquifers defined as ‘’*layers previously designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type*’.

13.4.24 The Proposed Development Site is predominantly underlain by bedrock aquifers designated as Secondary A Aquifer, defined as ‘permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.’

13.4.25 Groundwater levels within the Main Development Area have been monitored on three occasions following the most recent GI undertaken in 2025 (see **Appendix 14-A: Geo-Environmental Desk Based Assessment** (**EN010166/APP/6.4)**). Groundwater levels within the superficial deposits have been recorded between 1.0 m bgl and 4.2 m bgl. Groundwater flow within the Made Ground and superficial deposits is likely to be controlled by the presence of low permeability clays, silts and ash. Groundwater flow may occur, and be perched, in areas of higher permeability for example where sand/gravel/cobbles/bricks may be present. Overall, groundwater flow is to the north-east towards the River Dee.

13.4.26 The bedrock aquifer is confined and exhibits artesian conditions to the south-east of the Main Development Area within the construction laydown area (**Appendix 14-A: Geo-Environmental Desk Based Assessment** (**EN010166/APP/6.4)**). The potentiometric surface (‘groundwater level’) of the confined aquifer has been recorded between 0.46 m bgl and 3.16m bgl. Groundwater flow within the aquifer is to the east and is likely to be influenced by the presence of fractures within the bedrock.

Water Resources

13.4.27 This section summarises information on water resources, including active permitted discharges, licensed water abstractions, and past environmental pollution incidents. The information contained was provided by NRW and obtained via publicly available data sources, and by FCC in the case of PWS. Full details are provided in **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**).

13.4.28 There are no Source Protection Zones within the Study Area.

13.4.29 There are no Nitrate Vulnerable Zones (NVZ) within the Study Area.

13.4.30 The Dee Carboniferous Coal Measures groundwater body is classified as a groundwater Drinking Water Protected Area (Ref 13-54).

13.4.31 There are 16 active permitted discharges within the Study Area. Locations are shown within **Figure 13-6: Water Resources** (**EN010166/APP/6.3**) and detailed further within **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**). The majority of the

consented discharges come from sewage effluent from pumping stations and combined sewer overflows whilst the remainder originate from trade effluent from industrial areas and sewage from a domestic landfill site.

13.4.32 Data provided by NRW indicates that there are four licenced water abstractions within the Study Area. Locations are shown within **Figure 13-6: Water Resources** (**EN010166/APP/6.3**) and listed within **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**). All four abstractions are related to surface water, and no groundwater abstractions have been identified within 1 km of the Main Development Area.

13.4.33 Three of the abstractions relate to industrial, commercial, and public services, including two abstractions for Essity UK Limited (paper production) abstracting from Lead Brook and Pentre Brook, an impoundment of the coastal Pentre Brook by Delyn Borough Council, and an abstraction from the tidal River Dee for the production of energy which is licenced to the Applicant (and used by the existing Connah's Quay Power Station currently and would continue through the operation of the Proposed Development).

13.4.34 PWS details have been provided by FCC. The data provided shows four PWSs within the Study Area; three of these are groundwater fed (well, spring or borehole), and the fourth is a PWS (Wales) Regulation 8 supply, which is for the onward distribution of mains water. Details are given within **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**) and locations are shown in **Figure 13-6: Water Resources** (**EN010166/APP/6.3**). The FCC data also includes a list of 23 properties which are served by the PWSs that were identified in the Study Area.

13.4.35 One past environmental pollution incident of Category 3 (Minor) was identified within the Study Area within the last 20 years. Details are given within **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**) and the location shown in **Figure 13-6: Water Resources** (**EN010166/APP/6.3**).

Statutory Designated Sites and ecology

13.4.36 A proportion of the Water Connection Corridor encroaches upon and crosses the Dee Estuary (Aber Dyfrdwy) which is a Ramsar site, a wetland designated as being of international importance under the Ramsar Convention, SPA which is a complex of discrete coastal and wetland habitats, SAC as designated under the Conservation of Habitats and Species Regulations 2017, a Shellfish Water Protection Area (2022) (Ref 13-58) and an SSSI under the Wildlife and Countryside Act 1981 (Ref 13-10).

13.4.37 The Dee Estuary and River Dee and Bala Lake SAC is an important breeding, sheltering and nursery area for many coastal migratory fish species, including those which are listed as Species of Principal Importance (SOPI), as well as non-migratory fish populations. Annex II species in the estuary include River lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*). Full details regarding marine ecology within the Order limits are provided in **Chapter 12: Marine Ecology** (**EN010166/APP/6.2.12**).

13.4.38 The Water Connection Corridor is partially surrounded by a Groundwater Dependent Terrestrial Ecosystem (GWDTE). The GWDTE is classified as the Dee Estuary / Aber Afon Dyfrdwy; the GWDTE covers the same areas as the Dee Estuary SSSI.

13.4.39 Full details regarding freshwater ecology within the Order limits (excluding the Accommodation Work Areas) are provided in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**). Generally, protected or notable species are not present in the tributaries of the River Dee. The exception is Lead Brook which supports European eel (*Anguilla anguilla*), Atlantic salmon (*Salmo salar*), and brown/sea trout (*Salmo trutta*).

Flood Risk

13.4.40 The Main Development Area, Electrical Connection Corridor, C&IEA, Water Connection Corridor and the Repurposed CO_2 Connection Corridor are all entirely or partially situated on the south bank of the River Dee. These areas of the Proposed Development Site are potentially at risk from fluvial, tidal and, to a lesser extent, surface water flooding.

13.4.41 Further details of baseline flood risk (including definitions of flood zones) are contained in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**) and **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**). A summary of flood risk is provided in **Table 13-7**.

Table 13-7: Proposed Development area flood risk summary

Source	Flood Risk Summary
Tidal	Tidal sources include the sea and estuaries. The NRW Flood Map for Planning (Ref 13-59) shows that parts of the Order limits are located within areas of tidal Flood Zone 3 (see **Figure 13-7: Flood Map for Planning (Rivers and Seas)**(**EN010166/APP/6.3**)). NRW define Flood Zone 3 as areas with greater than 1 in 200 (0.5%) chance of flooding in a given year, including climate change. NRW provided a hydraulic model for the River Dee, but this did not include the Proposed Development Site in the 1D-2D model extent. Therefore, to better define flood risk associated with the Proposed Development Site, hydraulic modelling has been undertaken, the details of which are given in **Appendix 13-C: Flood Consequences Assessment (EN010166/APP/6.4)**. The scope of the modelling was agreed with NRW. The maximum modelled flood extent during the 1 in 200 year (0.5% AEP) plus 2074 climate change event shows that flooding is generally confined to the river channel and little out of bank flooding is present. No inundation is present for the Main Development Area. A small area of the northern section of the Repurposed CO_2 Connection Corridor is shown to be inundated with depths reaching up to 1.1 m. Small areas of inundation are also present in the C&IEA with depths reaching up to 0.6 m. The Water Connection Corridor encroaches upon the River Dee and is located within the flood extent. Flood extents encroach onto small parts of the Main Development Area during the 1 in 1000 year (0.1% AEP) plus 2074 climate change event. Overall, the baseline tidal flood risk varies from low to high across the Order limits.

Source	Flood Risk Summary
Fluvial	Fluvial flooding occurs when a river exceeds its capacity following sustained or intensive rainfall. **Figure 13-7: Flood Map for Planning (Rivers and Seas) (EN010166/APP/6.3)**, indicates the majority of the Proposed Development Site is in fluvial Flood Zone 1 (areas with less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year). However, part of the Water Connection Corridor and Repurposed CO_2 Connection Corridor are located within fluvial Flood Zone 3 (areas with a greater than 1 in 100 (1%) chance of flooding in a given year, including climate change). **Appendix 13-C: Flood Consequences Assessment (EN010166/APP/6.4)** displays the maximum modelled flood extent during the 1 in 100 year (1% AEP) plus 45% climate change event which shows that the only area of the Proposed Development Site located within the flood extent is the Water Connection Corridor. Overall, the baseline fluvial flood risk varies from low to high across the Order limits.
Surface Water	Overland flow routes form when the infiltration capacity of the ground surface is exceeded during rainfall events and surface water runoff is generated. This is exacerbated when low permeability soils and/or geology are experienced or where there are large areas of impermeable surfacing. According to the NRW FMfP (Ref 13-59), the majority of the Proposed Development Site is shown to be in Flood Zone 1 for surface water flooding (areas with less than 1 in 1000 (0.1%) chance of flooding from surface water in a given year, including the effects of climate change) as shown in **Figure 13-8: Surface Water Flood Risk** (**EN010166/APP/6.3**). The existing internal roadways at the Connah's Quay Power Station are shown to be located within Flood Zones 2 (areas with 1 in 1000 (0.1%) to 1 in 100 (1%) chance of flooding from surface water in a given year, including the effects of climate change) and Flood Zone 3 (areas with more than 1 in 100 (1%) chance of flooding from surface water in a given year, including the effects of climate change) from

Source	Flood Risk Summary
	surface water flooding. There are other small, isolated areas of Flood Zones 2 and 3 within the Main Development Area. Overall, the baseline surface water flood risk varies from low to high across the Order limits.
Groundwater	Groundwater flooding occurs when water levels in the ground rise above the ground surface. The geology dictates where this type of flooding takes place; it is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). The **Flood Consequences Assessment** (**Appendix 13-C** (**EN010166/APP/6.4**)) indicates that soils at the Main Development Area, the C&IEA, the Electrical Connection Corridor and the onshore section of the Water Connection Corridor are indicated to be 'Loamy and clayey soils of coastal flats with naturally high groundwater'. Soils at the Repurposed and Proposed CO_2 Connection Corridors are indicated to be 'Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils,' with the exception of the north-west to north-east portion of the Repurposed CO_2 Connection Corridor which is mapped as 'Loamy and clayey soils of coastal flats with naturally high groundwater'. 'Freely draining slightly acid loamy soils' are also mapped immediately south-east of the Repurposed CO_2 Connection Corridor. British Geological Survey Borehole Records Viewer indicate groundwater levels at the Proposed Development location, with five available records within, or within close proximity to, the Proposed Development Site with groundwater depth between 1 and 4 m below ground level (mbgl). See Table 8 within **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) for full details of depths and locations. A Preliminary Ground Investigation Report was produced in April 2025, and details groundwater levels recorded on 5 visits between January and March 2025. Table 9 within **Appendix 13-C: FCA** (**EN010166/APP/6.4**) provides full details of depths and locations. In summary, the data indicates shallow groundwater present in the Main Development Area (0.13-3 m bgl), near to the Repurposed CO_2 Connection Corridor (0.5 m bgl) and near to the Electrical Connection Corridor (1.03 m bgl).

Source	Flood Risk Summary
	The **Flood Consequences Assessment** (**Appendix 13-C** (**EN010166/APP/6.4**)) therefore concludes that there is a medium risk of groundwater flooding within the Order limits.
Sewers	Sewer flooding can occur because of infrastructure failure, for example blocked sewers or failed pumping stations. It can also occur when combined sewer systems surcharge due to the volume or intensity of rainfall exceeding the capacity of the sewer, or if the system becomes blocked by debris or sediment. According to the Flintshire Strategic FCA (Ref 13-41), there have been no sewer flooding incidents at the Proposed Development location from 1990 – 2016. Based on this information the baseline sewer flood risk is considered to be low.
Artificial Sources	Artificial flood risk sources include raised channels such as canals, or storage features such as ponds and reservoirs. The NRW FMfP (Ref 13-59) has been reviewed and shows a small part of the western side of the Main Development Area, the Water Connection Corridor and the northern part of the Repurposed CO_2 Connection Corridor to be at risk of flooding from reservoirs. The consequences from a reservoir failure could be severe, however, NRW note that this is a worst-case prediction; reservoirs are maintained to a very high standard and are extremely unlikely to fail. Based on this information, the baseline flood risk from artificial sources is considered to be low.

Future Baseline

13.4.42 The future baseline scenarios are set out in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**), and further detail is provided in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**).

13.4.43 As a standard approach, the future baseline considers the existing Connah's Quay Power Station as operational in the event that the Proposed Development does not go forward. Therefore, the Proposed Development is assessed against the operation of the existing Connah's Quay Power Station.

13.4.44 The future baseline has been determined qualitatively by considering the possibility of changes in the attributes that are considered when deciding the importance of water bodies in the Study Area.

Construction and Operation

13.4.45 As outlined in **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**), construction of the Proposed Development could, subject to securing the necessary development consent, start as early as Quarter Q4 2026. However, considering that the DCO would allow construction to commence up to five years from the date of consent, construction activities may commence as late as Q4 2031 (depending on market needs and financing).

Surface Water

13.4.46 It is likely that through new legislative requirements and more stringent planning policy and regulation, the water environment's health would broadly continue to improve, notwithstanding some very topical issues at the time of writing (e.g. sewerage discharges and microplastics etc.). There are, however, significant challenges, such as adapting to climate change, making it difficult to forecast these changes with certainty.

13.4.47 The Dee Estuary, as detailed within the Tidal Dee Catchment Action Plan 2022 (Ref 13-60), is said to be pursuing a number of initiatives that are in the development phase, or have begun, in order to meet the vision that *'…the Dee estuary is clean and full of wildlife, enjoyed by people and sustainably managed'.* As such, there is likely to be an improvement over current conditions due to interventions that are being implemented or have already been implemented. This includes i) Dee Blue Recovery which aims to work with farmers across the Dee Catchment (England only) to identify sources of pollution and implement interventions, training local community groups on water quality, invertebrate analysis and chemical monitoring using data analysis; ii) Dee Dairy Project which will work with farmers to reduce agricultural pollution; iii) Dee Invasive Non-native Species Project, a catchment-wide scheme to control and monitor INNS within the Dee Catchment; and iv) Natural Capital and Ecosystems Services Project, relating to the assessment of blue carbon and potential to increase carbon stores.

13.4.48 Overall, the current receptor importance criteria presented in this chapter are based on the presence or not of various attributes (e.g. water body size, WFD designation, ecological designations etc.) rather than current or future

water quality, and these attributes are unlikely to change in future. Therefore, no significant changes to current baseline conditions are predicted for the future baseline in absence of the Proposed Development.

Groundwater

13.4.49 No significant changes to the current baseline condition are predicted for the future baseline for the same reasons as outlined above for surface water. The rise in groundwater level in coastal areas due to rising sea levels may extend saline intrusion.

13.4.50 Changes in groundwater abstractions by other users could affect the groundwater flow regime and climate change could further influence the future baseline conditions, due to changes to the rainfall regime, recharge, groundwater levels and flow. However, these changes are long-term and are not predictable at this stage.

Flood Risk

13.4.51 Climate change is predicted to alter both future tidal, fluvial and surface water flood risk and this has been taken into account within the FCA (**Appendix 13-C: Flood Consequences Assessment** ((**EN010166/APP/6.4**)). Climate change resilience is accounted for, accommodating current government climate change projections, including peak river flow allowances, sea level allowances and peak rainfall intensity allowances.

Water Resources

13.4.52 Population growth and increased development may result in increased pressure upon surface water features, people, property, and infrastructure for water supply. Therefore, water abstraction and discharges volumes from other users may increase overtime. However, considering the operational life of the Proposed Development, the increased pressure is unlikely to result in a considerable change to the baseline.

Decommissioning

13.4.53 It is considered that continued environmental improvements, tighter regulation at both national, regional and local scales, and environmental enhancements would lead to a gradual improvement over current baseline conditions in terms of water quality by the time of decommissioning.

13.4.54 Climate change has the potential to significantly impact on drainage and flood risk by the time of decommissioning, for example through increased storm intensity and changes in future rainfall patterns. The future baseline for drainage and flood risk inherently reflects the climate change projections required by NRW and so this future baseline is captured within the assessment where required.

Importance of receptors

13.4.55 **Table 13-8** provides a summary of the surface water and groundwater features that may be impacted by the Proposed Development, a description of their attributes, and states the initial importance of the water features as used in this impact assessment. Importance is based on the criteria

presented in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**), Table 15. Please note that separate importance classifications are provided for water quality and morphological aspects of waterbodies as it is not always appropriate to have the same rating (e.g. a water feature may be heavily modified or even artificial and thus have a low morphology importance, but the water quality may be high by virtue of supporting protected species or other important potable or socio-economic and recreational uses).

Floodplain Sensitivity for Impact Assessment

13.4.56 For the construction assessment, the key receptor in terms of all forms of flood risk are the construction workers present on the Proposed Development Site who are considered to be of **Very High** sensitivity. The receptors in the wider study area are partly industrial, including essential infrastructure which is of **Very High** sensitivity. There is agricultural land to the south and west which is classified as less vulnerable and so is of **Medium** sensitivity, and residential areas to the southeast of the study area which are classed as more vulnerable development and are of **High** sensitivity. The area immediately north of the Proposed Development Site bordering the estuary is water compatible and therefore of **Low** sensitivity in flood risk terms. It is considered that the risk to surrounding residential, commercial and ecological receptors is no greater than in the baseline scenario for the construction phase.

13.4.57 For the operational assessment, the importance is based on understanding of the receptors present within areas at risk of flooding (i.e. the Proposed Development Site and other associated infrastructure) and the existing risk of flooding to the wider study area from all sources. It has been shown that much of the Proposed Development Site is within Flood Zone 3 for tidal flooding, based on NRW mapping. However, further modelling has been undertaken and indicates that for the 1 in 200 year (0.5% AEP) plus 2074 climate change event that flooding is generally confined to the river channel and little out of bank flooding is present. No inundation is present for the Main Development Area. A small area of the northern section of the Repurposed CO_2 Connection Corridor is shown to be inundated with depths reaching up to 1.1 m. Small areas of inundation are also present in the C&IEA with depths reaching up to 0.6 m. The Water Connection Corridor encroaches upon the River Dee and is located within the flood extent. Overall, it has been assessed that the Main Development Area is at a 'low' risk of flooding from tidal sources. However, the section of the Repurposed CO_2 Connection Corridor, Water Connection Corridor and C&IEA are at 'high' risk of tidal flooding. In EIA terms these areas are of Very High sensitivity to tidal flooding due to Proposed Development being essential infrastructure.

13.4.58 With regard to fluvial flooding, the majority of the Proposed Development Site is in fluvial Flood Zone 1 (areas with less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year). However, part of the Water Connection Corridor and Repurposed CO_2 Connection Corridor are located within fluvial Flood Zone 3 (areas with a greater than 1 in 100 (1%) chance of flooding in a given year, including climate change). Fluvial flood risk therefore varies from low to high. In EIA terms, these areas are again of

Very High sensitivity to fluvial flooding due to the Proposed Development being essential infrastructure.

13.4.59 The criteria described in the classification of importance (as outlined in Table 14 of **Appendix 13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**)) do not provide examples of sensitivity for other forms of flood risk and so the sensitivity is based on the existing baseline risk described earlier in this chapter. For the purpose of this assessment the sensitivity of non-tidal/fluvial forms of flood risk is as follows:

- surface water flood risk – mainly Low sensitivity, with localised areas of Medium to Very High sensitivity (refer to **Figure 13-8: Surface Water Flood Risk (EN010166/APP/6.3)**);
- flooding from groundwater – Medium sensitivity;
- flooding from sewers – Low sensitivity; and
- flooding from artificial sources – Low sensitivity.

Table 13-8: Importance of receptors

Water feature	Importance			
	Surface Water	Hydromorphology	Groundwater	Flood Risk
River Dee and Estuary	Very High Importance on the basis of being a WFD designated water body, Q95 > 1.0 m^3/s, a Ramsar Site, SSSI, SAC and SPA and GWDTE.	High Importance on the basis of the presence of well-developed salt marsh, however with bank modifications and catchment development pressures. However, note that the hydromorphology of the River Dee is being assessed within **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**).	High Importance given the Dee Estuary/ Aber Afon Dyfrdwy is a GWDTE.	High importance: Given that there are residential properties within the tidal floodplain, which is more vulnerable development.
Kelsterton Brook	Medium Importance on the basis that it is detailed in the Digital River Network but not having a WFD classification and not supporting any known abstractions or protected species.	Medium Importance on the basis that although there is substantial modification through the culverted reach, there are some natural features upstream of Chester Road and downstream of the existing Connah's Quay Power Station.	Not applicable	High importance: Given that there are residential properties within the surface water and small watercourse floodplain, which is more vulnerable development.
Lead Brook/ Northop Brook including Oakenholt Reservoir	High Importance on the basis that although it is not a WFD classification, it supports Oakenholt Reservoir, which provides the water supply for a papermill and supports a fishing club. It also supports protected species.	Medium Importance on the basis that there are signs of modifications and culverted sections, however with some natural features.	Not applicable	Medium importance: Given that the fluvial floodplain is associated with agricultural land and industrial properties, which is less vulnerable development.
Old Rockcliffe Brook	Medium Importance on the basis that it is detailed in the Digital River Network but not	Medium Importance on the basis that although there is substantial modification through the culverted reach, there are	Not applicable	Medium importance: Given that the surface water and small

Water feature	Importance			
	Surface Water	Hydromorphology	Groundwater	Flood Risk
	having a WFD classification and not supporting any known abstractions.	some natural features upstream of Chester Road and downstream of the existing Connah's Quay Power Station.		watercourse floodplain is associated with agricultural land and industrial properties, which is less vulnerable development.
Pentre Brook	High Importance on the basis that although it is not classified under the WFD, it supports a water abstraction for industrial use.	Medium Importance on the basis that there are some natural features, although culverted in sections.	Not applicable	High importance: Given that there are residential properties within the surface water and small watercourse floodplain, which is more vulnerable development.
Allt-Goch and tributary	Medium Importance on the basis that it is detailed in the Digital River Network but not having a WFD classification and not supporting any known abstractions.	Medium Importance on the basis that there are some natural features, although culverted in sections.	Not applicable	High importance: Given that there are residential properties within the surface water and small watercourse floodplain, which is more vulnerable development.
Oakenholt Brook	Medium Importance on the basis that it is detailed in the Digital River Network but not having a WFD classification and not supporting any known abstractions.	Medium Importance on the basis that there are some natural features, although culverted in sections.	Not applicable	Medium importance: Given that the surface water and small watercourse floodplain is associated with agricultural land and industrial properties,

Water feature	Importance			
	Surface Water	Hydromorphology	Groundwater	Flood Risk
				which is less vulnerable development.
Other unnamed streams, drains and ponds	Low importance on the basis that these are likely to comprise agricultural drainage ditches, with minimal economic or social uses.	Low importance on the basis that these are likely to comprise artificial or heavily modified channels.	Not applicable	Medium importance: Surrounding land use is generally agricultural, therefore less vulnerable development.
Superficial Secondary undifferentiated aquifer (tidal flat deposits, till, head)	Not applicable	Not applicable	Low Importance on the basis that it is unproductive strata.	Not applicable
Superficial Secondary A aquifer (glaciofluvial)	Not applicable	Not applicable	Medium Importance on the basis that it is a secondary aquifer. Unknown whether it supports public water supplies or GWDTE.	Low importance: Localised areas, generally underlying agricultural land, low potential for groundwater flooding.
Bedrock Secondary A aquifer	N/A – surface water importance criteria do not apply to groundwater bodies	N/A – hydromorphology importance criteria do not apply to groundwater bodies	Medium Importance on the basis that it is a secondary aquifer. Unknown whether it supports public	High importance: Underlying majority of Study Area, including residential properties (more vulnerable development).

Water feature	Importance			
	Surface Water	Hydromorphology	Groundwater	Flood Risk
			water supplies or GWDTE.	
Bedrock Secondary Undifferentiated	N/A – surface water importance criteria do not apply to groundwater bodies	N/A – hydromorphology importance criteria do not apply to groundwater bodies	Low Importance on the basis that it is unproductive strata	Low importance: Unproductive strata, therefore low storage capacity and very low risk of groundwater flooding.

13.5 Development Design and Embedded Mitigation

13.5.1 The Proposed Development has been designed, as far as possible, to avoid or minimise impacts and effects on water environment and flood risk through the process of design development, and by embedding measures into the design of the Proposed Development.

Construction Phase

13.5.2 The description of the Proposed Development and construction methodologies is provided in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**)**.** Standard and good practice construction management measures that would be put in place to manage potential impacts on the water environment during the construction phase are summarised below together with further details with regards to the management of water pollution risks, potential for physical damage to water features, and the management of construction flood risk.

Construction Environmental Management Plan

13.5.3 All construction works would be undertaken in accordance with the **Framework CEMP** (**EN010166/APP/6.5**), which would be updated to a final CEMP for construction (post consent). The **Framework CEMP** (**EN010166/APP/6.5**) refers to key issues, principles for managing pollution risk, relevant good practice guidance, and secondary consent requirements. The submission, approval, and implementation of the final CEMP(s) would be secured by a Requirement of the DCO.

13.5.4 A Water Management Plan (WMP) would be annexed to the final CEMP(s) which would outline the mitigation measures necessary to avoid, prevent and reduce adverse effects where possible upon the local surface water (and groundwater) environment during construction. The WMP would also include an outline of responsibilities with regard to water management, required water quality monitoring, pollution prevention measures, training requirements for construction workers with regard to the water environment, an outline of likely relevant permissions and consents required, and a Pollution Incident and Response Plan.

13.5.5 The **Framework CEMP** (**EN010166/APP/6.5**) ensures all potential impacts and residual effects are considered and addressed as far as practicable, in keeping with available good practice. The principles of the mitigation measures set out at this stage are the minimum standards that the Contractor would implement. However, it is acknowledged that for some issues, there are multiple ways in which they may be addressed. In addition, the methods of dealing with pollutant risk would need to be continually reviewed and adapted as construction works progress in response to different types of work, weather conditions and locations of work. A final CEMP(s) would be developed by the contractor and would be generally in accordance with **the Framework CEMP** (**EN010166/APP/6.5**).

13.5.6 With regards to the water environment and flood risk, the **Framework CEMP** (**EN010166/APP/6.5**) includes:

- controlling and minimizing the risk of pollution to surface waters and groundwater by managing construction site runoff and the risk of chemical spillage;
- measures to control the storage, handling and disposal of potentially polluting substances during construction;
- the management of activities within floodplains including storing materials outside of the floodplain as far as reasonably practicable, production of a Flood Risk Management Plan (FRMP) with floodplain control measures and contingency actions, and measures to safeguard safety of staff during construction from increases in flood risk on-site due to climate change;
- management of water removed from excavations including the risk from groundwater flooding through appropriate working practices (during excavations) such as having adequate plans and equipment in place for de-watering to enable safe and dry working environments, but also any risk to the flow regime or quality of any relevant, nearby water feature; and
- appropriate method and mitigation measures when undertaking works within, under and adjacent to water features including managing any risk of physical damage to water features.

Pollution Prevention Guidance

13.5.7 Good practice advice on the management of construction works to avoid, minimise and reduce environmental impacts is available in the following documents, and their use is secured within the **Framework CEMP** (**EN010166/APP/6.5**):

- Guidance for Pollution Prevention (GPP) 1: Understanding your environmental responsibilities – good environmental practices (Ref 13-59);
- GPP 2: Above ground oil storage (Ref 13-61);
- GPP 3: Use and design of oil separators in surface water drainage systems (Ref 13-63);
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (Ref 13-64);
- GPP 5: Works and maintenance in or near water (Ref 13-64);
- GPP 6: Working on construction and demolition sites (Ref 13-66);
- GPP 8: Safe storage and disposal of used oils (Ref 13-67);
- GPP 13: Vehicle: washing and cleaning (Ref 13-68);
- GPP19: Vehicle: Service and Repair (Ref 13-69);
- GPP 20: Dewatering underground duct and chambers (Ref 13-70);
- GPP 21: Pollution Incidents Response Plans (Ref 13-71);
- GPP 22: Dealing with spills (Ref 13-72);
- GPP 26: Safe storage – drums and intermediate bulk containers (Ref 13-73); and

- GPP 27: Installation, decommissioning and removal of underground storage tanks (Ref 13-74).

13.5.8 Additional good practice guidance for mitigation to protect the water environment can be found in the following Construction Industries Research and Information Association (CIRIA) documents and British Standards Institute Documents:

- British Standard Institute BS8582 Code of Practice for Surface Water Management of Development Sites (Ref 13-75);
- Welsh Government, Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems (Ref 13-86);
- CIRIA C811 – Environmental good practice on site guide (Ref 13-76);
- CIRIA C753F The SuDS Manual (Ref 13-77);
- CIRIA C750 Groundwater Control: Design and Practice (Ref 13-78);
- CIRIA C648D Control of Water Pollution from Linear Construction Projects (Ref 13-79);
- CIRIA C532 Control of water pollution from construction sites – Guidance for consultants and contractors (Ref 13-80);
- CIRIA C736 Containment systems for prevention of pollution (Ref 13-81); and
- CIRIA C744 Coastal and Marine Environmental Site Guide (2nd Edition) (Ref 13-82).

Management of Surface Water Runoff during Construction

13.5.9 Measures to manage fine sediment in surface water runoff are included in the **Framework CEMP** (**EN010166/APP/6.5**). Where possible, earthworks would be undertaken during the drier months of the year. Periods of wet weather would be avoided, if possible, 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. A Drainage Management Strategy would include temporary drainage systems developed to prevent runoff contaminated fine particulates from entering surface water without treatment. Mitigation measures would be implemented related to excavations, exposed ground and stockpiles to prevent uncontrolled release of sediment from the Main Development Area. Further measures to manage construction run off would include buffers around water features. The Contractor would continually monitor the need for these measures depending on the nature of the works being undertaken, the weather conditions, and the performance of sustainable drainage systems installed. These measures are secured within the **Framework CEMP** (**EN010166/APP/6.5**).

Management of Construction Chemical Spillage Risk

13.5.10 Measures would be implemented to manage the risk of accidental spillages on the Proposed Development Site and potential conveyance to nearby water features via surface runoff and land drains. These measures relating to

control of spillages and leaks are outlined in the **Framework CEMP** (**EN010166/APP/6.5**).

13.5.11 Measures would be in accordance with prevailing pollution prevention legislation in the Control of Substances Hazardous to Health Regulations 2002 (COSHH) (Ref 13-23) and Control of Pollution (Oil Storage) (Wales) 2016 (Ref 13-83) and following good practice guidelines. They would include details on how fuel and other chemicals would be stored and used, equipment and plant cleaning, as well as how leaks and spillages would be prevented or remediated if required. This would also include the implementation of a Pollution Prevention and Emergency Response Plan secured through the **Framework CEMP** (**EN010166/APP/6.5**). In addition, any site welfare facilities would be appropriately managed.

Management of Flood Risk

13.5.12 The Order limits are partially located within the fluvial floodplains. For areas of potential flood risk, construction flood mitigation measures would be applied to reduce the risk to construction site and workers. The standard construction methods and mitigation are described in the **Framework CEMP** (**EN010166/APP/6.5**) (including the need for the Contractor to produce an Emergency Response Plan).

13.5.13 Examples of flood control measures which would be implemented in the CEMP and, where relevant in project specific DEMP secured through DCO requirements include:

- construction materials to be stored outside of the 1 in 200 year (0.5% AEP) extent for areas at tidal flood risk and outside of the 1 in 100 year (1% AEP) extent for areas at fluvial flood risk. If areas located within Flood Zone 3 are to be utilised for the storage of construction materials, this would be done in accordance with the applicable flood risk activity regulations, if required;
- welfare facilities and staff car park would be located outside of the modelled tidal 1 in 200 year (0.5% AEP) extent plus 2074 climate change extent, see FCA (**Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**));
- connectivity would be maintained between the floodplain and the adjacent watercourses;
- during the construction phase, the Contractor would monitor the weather forecasts daily, and review the weekly and monthly weather forecasts each week, and plan works accordingly. For example, works in the channel of any watercourses would be avoided or halted were there to be a significant risk of high flows or flooding; and
- the construction laydown area site office and supervisor would be notified of any potential flood occurring by use of the Floodline Warning Service or equivalent service.

13.5.14 These measures are secured via the **Framework CEMP** (**EN010166/APP/6.5**).

13.5.15 The Emergency Response Plan would provide details of the response to an impending flood and include:

- a 24-hour availability and ability to mobilise staff in the event of a flood warning;
- the removal of all plant, machinery and material capable of being mobilised in a flood for the duration of any holiday close down period where there is a forecast risk that the Proposed Development Site may be flooded;
- details of the evacuation and site closedown procedures. Small parts of the B5129 experience flooding during the 1 in 200 year (0.5% AEP) plus 2074 climate change event where the road crosses the River Dee (see **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**)), therefore, evacuation should be via Church Street through Connah's Quay;
- arrangements for removing any potentially hazardous material and implementing more stringent protection measures;
- if water is encountered during below ground construction, suitable de-watering methods would be used. Any groundwater dewatering required in excess of the exemption thresholds would be undertaken in line with the requirements of NRW (under the Water Resources Act 1991 (Ref 13-21)) and the Environmental Permitting Regulations 2016 (Ref 13-17); and
- safe egress and exits are to be maintained at all times when working in excavations. When working in excavations a banksman is to be present at all times.

13.5.16 These requirements are secured through the **Framework CEMP** (**EN010166/APP/6.5**).

Water Quality Monitoring

13.5.17 During construction of the Proposed Development, it is proposed to undertake a surface water quality monitoring programme to ensure that mitigation measures are operating as planned and preventing pollution. This is standard practice for construction works of this type, and full details would be outlined in the WMP (also refer to the **Framework CEMP** (**EN010166/APP/6.5**) for further details). The purpose of the monitoring programme would also be to ensure pollution is identified as quickly as possible and appropriate action is taken in line with the Pollution Prevention Plan (to be outlined within the WMP).

13.5.18 The water quality monitoring programme would be developed by the Principal Contractor(s) and would also reflect any requirements of secondary environmental permits / licences for works affecting, or for temporary discharges to, watercourses within the Proposed Development Site.

Ground Investigations and Dewatering

13.5.19 An understanding of groundwater levels and flow in relevant areas of the Main Development Area has been obtained from the preliminary ground investigation and monitoring to inform 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**).

13.5.20 A 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 in which drawdown impacts are likely. This is discussed further in **Appendix 13E: Hydrogeological Assessment** (**EN010166/APP/6.4**).

13.5.21 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 works and, where required, sufficient proposals to treat the water prior to controlled discharge. Any such assessment 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 arising 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**).

13.5.22 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 (Ref 13-18). 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 (Ref 13-14). Water would never be pumped directly to a watercourse or be allowed to directly enter a watercourse.

Soil and Groundwater Pollution Control Mitigation

13.5.23 Piled foundations are anticipated to be required for certain components of the Proposed Development, such as the absorber stack, HRSG, and turbine hall. The final design and methodology for piling would be determined during the detailed design stage (post consent), following the completion of the site-specific preliminary ground investigation.

13.5.24 To prevent potential contamination of the bedrock and superficial aquifers during piling operations, 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.

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

13.5.26 A Site Waste Management Plan would be developed, in accordance with the **Framework Site Waste Management Plan,** which forms part of the **Framework CEMP (EN010166/APP/6.5**), to manage and outline measures to control earthworks given the risk of historical contamination. This would include pre-construction condition surveys 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.

Water Connection Corridor: Infrastructure Refurbishment

13.5.27 The works within the Water Connection Corridor would focus on refurbishing and upgrading the existing Connah's Quay Power Station cooling water infrastructure. The Proposed Development would utilise the existing cooling water abstraction and discharge infrastructure at the River Dee, which currently serves the existing Connah's Quay Power Station. Minor modifications and refurbishment at the intake would be undertaken to meet current legislative requirements, including the Eels (England and Wales) Regulations 2009 (Ref 13-20).

13.5.28 Refurbishment and upgrades to the existing intake structure would be undertaken by competent experienced personal (which may include divers) and a support boat and/or barge, or similar, and foot-only access via the saltmarsh itself over an estimated three- to five-month period. Such work may include boat or shore-led pre-works surveys along the River Dee, including diving operations where required. Eel screen upgrade works would comprise the removal of one existing 3 mm screen and the installation of one new 2 mm screen on each of the existing 28 intakes to mitigate impacts on aquatic ecology and to comply with the Eels (England and Wales) Regulations 2009 (Ref 13-20), in addition to minor repairs to surface concrete, metalwork, and timbers.

13.5.29 Works within the Water Connection Corridor would not require interaction with the riverbed. All materials and plant (if required; it is expected that the majority of works within the Water Connection Corridor would require hand tools only) would be stored within the support barge and a working area would be established using scaffolding attached to the existing protection structure. Works would be undertaken at each of the seven intake pipes (each supporting existing four inlet baskets) in turn with a temporary seal or temporary blanking plate on the intake to allow for continued operation of the existing Connah's Quay Power Station during construction within the Water Connection Corridor.

13.5.30 Following discussions with NRW, it has been confirmed that the Proposed Development would require a Marine Licence for these works. Further details on this are provided in **Consents and Agreement Position Statement** (**EN010166/APP/3.3**).

13.5.31 A FRAP would be required for any permanent or temporary works in, over, under or within 16 m of a tidal main river, or within 16 m of any flood defence structure on that river, or within a flood plain. All relevant permits and consents would be sought from NRW where necessary as detailed in the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**).

Proposed CO_2 Connection Corridor

13.5.32 It is anticipated that the Proposed CO_2 Connection pipeline (approximately 610 mm diameter) would be constructed using open cut excavation methods (pipeline would be buried at a minimum of 1.2 m bgl, and so the trench would extend slightly below this). Excavated spoil would be stored adjacent to the trench whilst the pipeline is laid, before reinstatement using appropriate backfill material. Any surplus suitable excavated material would be reused within the Construction and Operation Area, where practicable. Topsoil would be removed and stored separately to the subsoil in accordance with the measures set out in the **Framework CEMP** (**EN010166/APP/6.5**). There would be no storage of materials within 20 m of any open watercourse or within any NRW Flood Mapping for Planning (FMfP) (Ref 13-59) mapped surface water or fluvial floodplain (fluvial Flood Zone 2 and 3). Refer to **Figure 13-7: Flood Map for Planning (Rivers and Seas)** (**EN010166/APP/6.3**) for the river/fluvial floodplain and **Figure 13-8: Surface Water Flood Risk** for the risk from surface water flooding.

13.5.33 There are no mapped watercourses within the Proposed CO_2 Connection Corridor, and no evidence of any watercourses observed during the site walkover. However, there may be some minor field ditches not seen on the site visit due to being obscured within hedgerows (ephemeral if present) that could potentially be crossed by the pipeline. The location and condition of any hedgerow or field ditches or drains would be confirmed through a Pre-Works Surface Water Feature Survey prior to construction. If ditches/drains are identified that need to be crossed, then work would be undertaken in dry conditions where possible in line with good practice. Crossings would be as close to perpendicular as possible to the watercourse in order to be as short as possible and new field drainage would be installed.

13.5.34 It is proposed that all water features would be protected by a buffer zone. No works would be permitted within the buffer zone and no vegetation cleared. The exceptions are where construction work is required within a watercourse channel. This would include works to the new/existing outfalls on Old Rockcliffe Brook and the abstraction intake infrastructure at the River Dee, works to the culverts beneath the CQLCP Abated Generating Station and potentially any crossings of field diches/drains to convey pipelines or for access. This is secured via the **Framework CEMP** (**EN010166/APP/6.5**).

13.5.35 For any field ditches (assumed less than approximately 5 m wide from bank top to bank top) the buffer zone would be 10 m from the centre line of the watercourse.

13.5.36 Allt-Goch Tributary is located along the western boundary of the Proposed CO_2 Corridor. A buffer of at least 10 m from this watercourse would be maintained, with no storage of materials within the mapped floodplain.

13.5.37 Along the pipeline route within the Proposed CO_2 Connection Corridor, the ground would be reinstated with stored topsoil and subsoil following trenching, within the same year as construction should weather conditions allow. Restoration activities would include reseeding of pastureland and reinstatement of field boundaries.

13.5.38 All relevant permits and consents would be sought from NRW, SAB and the LLFA, where necessary, as detailed in the **Consents and Agreement Position Statement** (**EN010166/APP/3.3**).

Main Development Area: Surface Water Outfall

13.5.39 Works may be required to, or in the immediate vicinity of, the Existing Surface Water Outfall adjacent to the Main Development Area at Old Rockcliffe Brook. Construction of a new permanent outfall structure for surface water drainage discharge from the Main Development Area (the Proposed Surface Water Outfall) would be undertaken adjacent to the Existing Surface Water Outfall. Based on provisional model results, the pipe size for the new outfall would be approximately 1200 mm diameter.

13.5.40 The Proposed Surface Water Outfall would connect to and be downstream of a surface water drainage network within the Main Development Area as detailed in **Appendix 13-D: Outline Surface Water Drainage Strategy (EN010166/APP/6.4),** and later in this section. A 10 m area around the existing artificial structure (the Surface Water Outfall Area) has been included to allow for access and works if required, including the footprint of the Proposed Surface Water Outfall. Excavation may be required during the installation of the Proposed Surface Water Outfall, but this would be limited to areas to the edge of the saltmarsh and outside of the existing mudflat habitat.

13.5.41 It is expected that the Proposed Surface Water Outfall would be installed into an extension of the existing headwall via trenchless construction methods or with open excavation. Materials storage and location of plant would to be limited to the area between the existing headwall and the existing access road to the northern side of the existing Connah's Quay Power Station fence line or the access road itself within the Surface Water Outfall Area, or would otherwise be undertaken from within the Main Development Area. Any large plant required for the lifting of trench support panels etc such as cranes and/or long reach excavators would be located on the access road to the northern side of the existing Connah's Quay Power Station fence line. Excavation would be carried out by either hand or use of mini diggers positioned as described above for plant. Backfilling operations would be carried out in 300 mm layers to ensure adequate compaction is achieved. Minimising the contact patch of the motorised plant would be a requirement in plant selection. This is secured via the **Framework CEMP** (**EN010166/APP/6.5**).

13.5.42 Any works associated with the outfall would incorporate good practice construction guidance as outlined in the **Framework CEMP** (**EN010166/APP/6.5**). The outfall would be in line with the channel in order to maintain the flow route and avoid erosion or changes in channel form. Prefabricated headwalls would be used for all outfalls where possible, to avoid the need for potentially polluting activities adjacent to watercourses (e.g. pouring wet concrete close to the watercourse).

Main Development Area: Culverted Watercourses

13.5.43 Works to divert existing culverted watercourses (Oakenholt Brook and tributaries) within the footprint of the CQLCP Abated Generating Station form part of the Proposed Development within the Main Development Area.

13.5.44 Where the diversions are required, the new culvert would be constructed offline from the watercourse where possible, with flow to be transferred once complete. This would avoid long periods of damming and over pumping which could cause a greater temporary flood risk (e.g. pump failure, insufficient capacity etc). Water would then be transferred (under license) to the diverted section. Once the watercourse is connected, silt fences, geotextile matting, or straw bales would be used initially to capture mobilised sediments until the watercourse has returned to a settled state and thereby reduce risks of downstream water quality impacts. Water quality monitoring would also be undertaken prior to, during, and following on from the construction activity to ensure any spillages or other pollution is identified.

13.5.45 The diverted culverts would be designed appropriately to maintain connectivity along watercourses for aquatic species. All culverts to convey watercourses would be set 150 mm below bed level to allow sedimentation and a naturalised bed to form, which would maintain longitudinal connectivity for fish and other aquatic fauna should they be present.

Laydown Areas / Construction Compounds

13.5.46 Impacts relating to the handling, movement and temporary storage of soils, that would be disturbed for temporary laydown, would be managed in accordance with the measures detailed in the **Framework CEMP** (**EN010166/APP/6.5**). These include for temporary drainage systems that would be designed to provide suitable protection measures for watercourses including a suitable stand-off distance.

13.5.47 Five laydown areas ('A' to 'E') are required during construction to enable equipment and material storage, placement of site offices, batch concrete facilities, welfare facilities and car parking, environmental / waste handling areas and vehicle wheel wash area(s). **Figure 5-3: Construction Areas** (**EN010166/APP/6.3**) shows the maximum extents of the five construction laydown areas within the Main Development Area and in the C&IEA. The laydown areas would be levelled to provide an even surface and underlain by semi-permeable surfacing and secured by security fencing and gates as appropriate.

13.5.48 As described in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**), areas of land south-west of the CQLCP Abated Generating Station would be permanently cleared of vegetation for use as laydown and temporary compounds for contractors during operation of the Proposed Development (the 'Maintenance Laydown Area'). It is expected that this clearance would be undertaken during enabling works for the Proposed Development. Therefore, in both the Phased and Simultaneous Construction scenarios these areas would be used for parking, contractor compounds, material storage, and fabrication. The final arrangement of the laydown areas required would be developed by the appointed Principal Contractor(s) and would consider the relevant constraints with regard to the water environment.

13.5.49 New areas of hardstanding associated with all the compounds would require regular inspections of the drainage system associated with the new facilities (as well as before and after storm events) so that site runoff is adequately managed.

13.5.50 Storage areas for hazardous or potentially polluting materials would be located in a separate secure, and where appropriate bunded, area. Material data sheets would be available for all these materials and the COSHH assessments kept within the relevant risk assessment for the task.

Earthworks

13.5.51 Earthworks would be required to reprofile areas of the Main Development Area, to produce a level platform, excavate foundations, and/ or remove surplus material or remediate any contaminated soils across the Main Development Area. Earthworks would also be required for the installation of the Proposed CO_2 Connection, in the form of excavations using open cut methods. Limited earthworks in areas outside of saltmarsh and mudflat habitats would be required for the installation of the Proposed Surface Water Outfall.

13.5.52 As far as reasonably practicable, a material cut and fill balance would be used to minimise waste arisings. However, given the anticipated ground conditions, it is anticipated that some import / export of materials are likely to be necessary to provide a suitable foundation platform for the CQLCP Abated Generating Station. The approach to cut and fill would be aligned with the waste hierarchy and best practice guidance, including CL:AIRE Definition of Waste: Code of Practice (DoWCop), as described in **Chapter 23: Waste and Materials** (**EN010166/APP/6.2.23**).

13.5.53 Ground raising would be required to increase ground levels in order that critical equipment and infrastructure are designed to remain safe in future climate change scenarios described in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**). Hydraulic modelling studies that informed **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**) have identified that the minimum required platform level is 7.7 m AOD.

13.5.54 All works would be undertaken in accordance with the **Framework CEMP** (**EN010166/APP/6.5**).

Operation Phase

13.5.55 The description of the Proposed Development (**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**)) sets out design elements proposed to manage potential adverse impacts on the water environment during operation. This section provides a summary of these design elements as well as other relevant regulatory controls.

Cooling Water Abstraction and Discharge

13.5.56 The operation of the Proposed Development would be regulated by a permit(s) granted by NRW in accordance with the Environmental Permitting (England and Wales) Regulations 2016 (Ref 13-17). The permit limits the volume and concentration of the main cooling water purge discharge to the River Dee from the Proposed Development. The 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 (European Commission, 2016) (Ref

13-85). Furthermore, cooling water would be monitored prior to discharge in compliance with the conditions of the relevant permit.

13.5.57 The Applicant proposes to maintain the permitted abstraction and discharge parameters in relation to cooling water. Minor modifications to the abstraction structure made during construction (as described earlier in Section 13.5) would ensure compliance with the Eels (England and Wales) Regulations 2009 (Ref 13-20). As is currently the case, it is anticipated that abstraction would be intermittent and limited to no more than three hours abstraction per tide around high water (one hour before and two hours after, but only when the water level at Summer's Jetty is higher than 0.8 m AOD (Above Ordnance Datum)). Current abstraction limits are shown in **Table 13-9**. The general design philosophy equipment would adjust cooling water flow to maintain ~15°C temperature rise across exchangers.

Table 13-9: Existing Permit Limits (24/67/10/124/V004)

Maximum Abstraction (Limit)	Value
Instantaneous (m^3/s)	3.04
Hourly (ML/hr)	11
Per High Tide (ML)	33
Annually (ML)	24,090

13.5.58 Purge discharge would also be consistent with the existing site operation, discharging for no more than three hours commencing on the ebb tide one hour after high water. This periodic abstraction and discharge requires storage capacity for make-up and purge water via holding ponds within the Main Development Area. The existing Connah's Quay Power Station cooling water make-up and purge tanks would be utilised with upgrades to existing pumps and associated infrastructure within the Main Development Area, as required. New cooling water supply and purge infrastructure (either above or below ground) would then be constructed to link into the proposed cooling towers and CCP.

13.5.59 The cooling water discharge would be consistent with the operation of the existing Connah's Quay Power Station in terms of temperature and water quality, and would comply with the existing Environmental Permit limits. Existing discharge data monitored for permit compliance is presented in the **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**) alongside the permit limits. Permit limits are also summarised in **Table 13-10**.

Table 13-10: Existing Permit Limits (EPR/NP3037AF)

Parameter	Limit	Reference Period	Monitoring Frequency
Flow	2.5 m^3/s	Instantaneous	Continuous
Maximum temperature	25°C		

Parameter	Limit	Reference Period	Monitoring Frequency
Maximum temperature difference (April-October)	13°C		
Maximum temperature difference (November-March)	13°C		
Salinity	60 g/l		
pH maximum	9		
pH minimum	6		
Residual chlorite dioxide	1 mg/l		
Residual chlorite ion	1 mg/l (absolute limit)		
Residual chlorite ion	0.5 mg/l	Average	
Total Residual Oxidant	0.2 mg/l	Instantaneous	
Oil and grease	20 mg/l		

13.5.60 The capacity of the outfall and intake structures, and the rate of cooling water discharge into the estuary, would be the same as for the existing Connah's Quay Power Station. As such, there would be no change associated with scour and erosion at the point of discharge into the River Dee.

Process Wastewater

13.5.61 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.

13.5.62 These would be collected for either off-site treatment and disposal at a suitable licenced waste facility or alternatively treated on site to meet environmental quality standards (EQS) (e.g. for ammonia and other substances) in an on-site wastewater treatment plant before being

discharged to the River Dee via the purge pond. The discharge would be regulated by NRW through the Environmental Permit required for the operation of the Proposed Development. A Water Quality Risk Assessment for process water discharges would be undertaken if discharge to the River Dee is required. This is secured through **Appendix 4-A: Operation and Maintenance Mitigation Register** (**EN010166/APP/6.4**).

13.5.63 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 existing Environmental Permit (i.e. amine).

Surface Water Drainage Strategy

13.5.64 The **Outline Surface Water Drainage Strategy** (**Appendix 13-D** (**EN010166/APP/6.4**)) indicates that infiltrating to ground at the Main Development Area is considered unviable. The next option in the discharge hierarchy is to drain the site to the nearest watercourse/s, and this approach is adopted by the Proposed Development. The nearest watercourses are Old Rockcliffe Brook and Oakenholt Brook. The Oakenholt Brook culvert passes through the Main Development Area and has the potential to serve as a surface water outfall. An asset levels and condition (i.e. CCTV) survey of the culvert would be undertaken to confirm whether a new connection to the culvert is feasible. However, this is considered unlikely and so as a worst-case for the purposes of this assessment, a single discharge to Old Rockcliffe Brook is currently assumed, alongside the Existing Surface Water Outfall and the Old Rockcliffe Brook culvert outfall. A single outfall solution for the Main Development Area has the benefit of minimising the loss of qualifying habitat features (including mud flats and salt meadows) of the Dee Estuary / Aber Dyfrdwy SAC.

13.5.65 The Main Development Area comprises both field and industrial areas, and it has been modelled to determine the proposed flow rates and velocities which would discharge to Old Rockcliffe Brook adjacent to the site. Unrestricted flow rates to the watercourse have been permitted by the SuDS Approval Body for both free draining and tidal lock conditions.

13.5.66 Initial interception and attenuation of surface water runoff would be provided by SuDS measures. These 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 the parking and nearby 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 vortex separators would be provided within each drainage catchment to encourage the removal of 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. There would be a penstock immediately upstream of the new outfall.

13.5.67 At detailed design stage, the potential reuse of attenuated surface water volumes in site related processes shall also be considered.

13.5.68 The Oakenholt Brook culvert is expected to be diverted to accommodate the drainage requirements, as previously outlined. An asset levels and condition (i.e. CCTV) survey of the culvert would be undertaken, and if diversion is required, a simple catchment assessment would be undertaken to demonstrate no adverse impact. Daylighting (i.e. de-culverting) of the watercourse, whilst environmentally desirable, is not achievable within the Main Development Area due to survey showing the culvert to be very deep, thus requiring an open watercourse to need significant width beyond the available space limitations.

13.5.69 A surface water drainage scheme has been developed in accordance with these drainage principles and is shown in drawing ref. CQLCP-ACM-XX-XX-DR-D-10-0501 included in Appendix F within the **Outline Surface Water Drainage Strategy** (**Appendix 13-D** (**EN010166/APP/6.4**)).

13.5.70 To assess the performance of the proposed surface water network, provisional hydraulic modelling has been undertaken, including for appropriate climate change allowances and tidal lock scenarios (see **Outline Surface Water Drainage Strategy** (**Appendix 13-D** (**EN010166/APP/6.4**) for full details). On the basis that the design life of the proposed infrastructure is limited to 30 years, the proposed attenuation has been designed for the 20% climate change allowance, which is the upper estimate value for projection between 2040-2069.

13.5.71 Approximate drainage discharge rate and velocity at the 1 in 1 year return period would be 420 l/s and 0.9 m/s, respectively. For the 1 in 30 year + 40% climate change these values increase to 874 l/s discharge rate and 1.1 l/s velocity, and at the 1 in 100 year + 40% climate change these would be 1,047 l/s discharge rate and 1.2 m/s velocity. Velocities are not considered high enough to cause scour erosion around the outfall to Old Rockcliffe Brook.

13.5.72 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 via the purge pond and cooling water outfall under a permit from NRW.

13.5.73 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 and drainage freely to the water environment. Subject to water quality testing, uncontaminated runoff would be released by opening the penstocks. If the water is found to be contaminated the runoff would be pumped out for treatment and disposal at a suitable waste facility.

13.5.74 The surface water drainage system is likely to remain a standalone private network, whereby none of the piped or SuDS features would be offered (to the sewerage undertaker or the SuDS Approval Body) for adoption and the operation and maintenance would l be the responsibility of the site owner.

13.5.75 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. The Detailed Drainage Strategy would also outline the final details of firewater management and drainage and it would include an appropriate water quality risk assessment to ensure that final SuDS treatment trains provide the necessary level of water quality treatment.

13.5.76 It is also proposed that a Surface Water Maintenance and Management Plan (SWMMP) would be prepared and implemented by the future the undertaker (post DCO consent). This would detail the requirements of access and frequency for maintaining all drainage systems proposed on the Proposed Development Site. The maintenance and management plan 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.

13.5.77 The SWMMP would describe the roles and responsibilities with regard to water management, water quality monitoring, pollution prevention measures, training and testing requirements.

13.5.78 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 13-77). Maintenance of proprietary treatment systems would be in accordance with the manufacturers requirements. Furthermore, it is expected that interceptors used would be fitted with silt/ oil alarms to alert operators when they require emptying, but if not they would be checked regularly.

Domestic and Sanitary Effluent

13.5.79 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 under the conditions of the environmental permit. Due to sub-optimal operation of one of the existing systems, the septic tank is instead 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 accordance with the existing permit) 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**).

Potable / Towns Water

13.5.80 Works to tie the Proposed Development into the existing towns water pipelines within the existing Connah's Quay Power Station site and connections to fire and raw water storage tanks form part of the Proposed Development within the Main Development Area.

De-Mineralised Water

13.5.81 A water supply from Welsh Water would be used to provide make up water to the steam / water cycle. This water would be treated in a new demineralisation plant to removed dissolved solids, prior to entering the steam / water cycle. There would be on-site storage of demineralised water produced in the demineralisation plant. The demineralisation plant and storage would be located within the extent of the CQLCP Abated Generation Station.

Chemical and Material Storage

13.5.82 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 CO_2 stream)); and
- cooling tower chemicals (biocides, anti-scalants, bio-dispersants, corrosion inhibitors).

13.5.83 Other chemicals required for routine cleaning, maintenance and emergency firefighting uses would also be used or stored on site.

13.5.84 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. Many impact avoidance measures implemented during the construction phase would also remain for the Proposed Development's operational phase and would be maintained through the site operator's Environmental Management System (EMS). This is secured through the requirement for an Operational and Maintenance Environmental Management Plan (OMEMP), which would be in general accordance with **Appendix 4-A: Operation and Maintenance Mitigation Register** (**EN010166/APP/6.4**).

13.5.85 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 (Ref 13-85) and COMAH (Ref 13-86) regimes.

13.5.86 A site Emergency Response Plan (prepared for Regulation 9 of the COMAH Regulations (Ref 13-86)) 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. This is secured through the requirement for an OMEMP, in general accordance with **Appendix 4-A: Operation and Maintenance Mitigation Register** (**EN010166/APP/6.4**).

Flood Risk Mitigation Measures

13.5.87 Although the hydraulic modeling results show that during the 1 in 200 year (0.5% AEP) plus 2074 climate change event the Main Development Area is free from flooding, in consultation with NRW it has been agreed to raise the Main Development Area 600 mm above the maximum water level in the River Dee during the design flood event level as a conservative approach. The level in the River Dee during the 1 in 200 year (0.5% AEP) plus 2074 climate change event is 6.8 m AOD and therefore the levels of the Main Development Area would be 7.4 m AOD. To provide additional resilience, critical infrastructure within the Main Development Area buildings would be raised 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 River Dee. This is secured via the **Design Principles Document** (**EN010166/APP/7.8**).

13.5.88 To mitigate the risk of groundwater flooding during operation, any vulnerable equipment would be raised 300 mm above proposed ground levels and any infrastructure within the Repurposed CO_2 Connection Corridor and Electrical Connection Corridor would be designed to prevent water ingress.

Decommissioning Phase

13.5.89 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 River Dee and all buried assets of the Proposed Development would be left in-situ and the associated pipework treated and filled. Any removal contractor would have a legal obligation to consider decommissioning and removal under the Construction (Design and Management) Regulations 2015 (Ref 13-89), or the equivalent prevailing legislation at that time.

13.5.90 It is anticipated that timescales for decommissioning and removal of the Proposed Development could be similar to, or slightly shorter than, its construction and would require provision of office accommodation and welfare facilities.

13.5.91 A DEMP would be produced at the time of decommissioning, pursuant to a Requirement of the DCO. 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 with regard to the water environment, accounting for potential future changes to baseline conditions. This would include procedure on how surface water drainage should be managed during decommissioning and removal.

Permits and Consents

13.5.92 As outlined above, the operation of the Proposed Development would be regulated by an Environmental Permit(s) granted by NRW in accordance with the Environmental Permitting (England and Wales) Regulations 2016 (Ref 13-17).

13.5.93 Following discussion with NRW, it has been confirmed that the Proposed Development would require a Marine Licence under the Marine and Coastal Access Act 2009 (Ref 13-87) for the 'in-river works' for the Water Connection Corridor. Works carried out in the Water Connection Corridor below mean high-water spring tides (MHWS) includes the replacement of eel screens on the abstraction intakes.

13.5.94 Various other water-related permissions may be required. These permissions may include:

- land drainage consent(s) from NRW under section 23 of the Land Drainage Act 1991 (Ref 13-8) for works affecting the flow in ordinary watercourses (e.g. culvert diversions beneath the Main Development Area);
- flood risk activity permit(s) from NRW under the Environmental Permitting Regulations (England and Wales) 2016 (Ref 13-17) for works within 16 m of a tidal main river;
- water activity permit(s) from NRW under the Environmental Permitting Regulations (England and Wales) 2016 (Ref 13-17) for temporary construction and permanent operational discharges;
- trade effluent consent from Dŵr Cymru Welsh Water under the Water Industry Act 1991 (Ref 13-88) for the purposes of discharging trade effluent to the public sewer from welfare facilities during construction;
- full or temporary water abstraction/transfer licence(s) under section 24 of the Water Resources Act (England and Wales) 1991 (Ref 13-21) if more than 20 m^3/d of water is to be dewatered / over-pumped and exemptions do not apply – see further detail below; and
- temporary water impoundment licence under section 25 of the Water Resources Act (England and Wales) 1991 (Ref 13-21) in connection with the laying of pipelines if there is a need to impound the flow of any watercourse to facilitate construction works.

13.5.95 There is the potential for the need for either full or temporary water abstraction licence(s) from NRW for the abstraction of water from excavations where groundwater may be encountered, other than where exemptions apply. A full licence is required when more than 20 m^3/day of water may need to be abstracted for more than 28 days. A temporary licence is applicable where the abstraction is less than 28 days. Where less than 20 m^3 /day of water needs to be abstracted, no licence is required. However, in all circumstances it may be necessary to obtain a water activity permit(s)

from NRW to discharge the water to ground or a watercourse if the water is considered to be 'unclean'. Future ground investigation would investigate the quality of water to ensure that it is appropriate for discharge.

13.5.96 Further details are provided in the **Consents and Agreements Position Statement** (**EN010166/APP/3.3**).

13.6 Assessment of Likely Impacts and Effects

13.6.1 Taking into account the embedded mitigation measures as detailed in Section 13.5 above, the potential impacts and effects of the Proposed Development have been assessed using the methodology as detailed in **Appendix 13-A: Water Baseline and Methodology** (**EN010166/APP/6.4**).

Construction Phase

13.6.2 Where construction is 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. There may also be indirect effects to downstream receptors, as spills or contaminated water can propagate along the initial receiving watercourse. In this case the downstream receptor is the Dee (N. Wales) transitional WFD water body as all watercourses within the Study Area are tributaries of this.

Main Development Area: demolition works, construction works, construction compounds

13.6.3 During construction of the Main Development Area (including demolition of the existing facilities) there is a risk that runoff containing fine sediment could impact water quality, morphology, and aquatic ecosystems. An increase in turbidity due to the presence of fine sediment can have direct physical impacts on aquatic organisms and reduce light availability preventing photosynthesis by aquatic plants leading to reduced dissolved oxygen levels. Fine sediments may also be deposited smothering plants, the bed, and morphological features. The sediment particles can also be a vector for the conveyance of chemical pollutants, with hydrocarbons known to have a strong affinity to sediment. Overall, excess fine sediment may lead to negative impacts on local fluvial hydromorphology, ecological and physio-chemical water quality.

13.6.4 The construction could result in surface water quality impacts associated with discharge containing the spillage of oils, fuels and other construction chemicals which may propagate into the water feature and affect physio-chemical water quality elements. These impacts may be exacerbated by the increase in impermeable area of the compound and newly constructed areas, thereby increasing run-off rates.

13.6.5 Demolition of the existing facilities on the Main Development Area would occur before construction begins. Activities such as disassembling above-ground buildings and plant, managing waste, and handling piles of construction materials during the demolition phase 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 as outlined above.

13.6.6 Any existing culverted watercourses and land drainage systems would need to be identified so that they are not affected during the works. Protective measures would be implemented to seal off pathways, preventing potentially contaminated water from flowing into nearby water bodies. Vegetation clearance and remedial works would also be required at the Main Development Area prior to the construction of the new development.

13.6.7 The Main Development Area construction requires earthworks, including re-profiling and land raising, foundation excavation, and removal of surplus materials. Remediation of soils maybe necessary if contaminants are encountered. To protect critical infrastructure from flood risk, targeted areas within the Main Development Area are currently anticipated to be raised to 7.7 m AOD, comprising a ground level of 7.4 m AOD and finished floor level of 7.7 m AOD. It is also expected that sections of the Proposed Development Site may include some earthworks associated with the reprofiling and excavations for foundation purposes and the construction of the drainage features and the carrier pipes.

13.6.8 Works are required to divert existing culvert sections of Oakenholt Brook within the footprint of the CQLCP Abated Generating Station. This would be subject to detailed design post consent but would create potential for sediment mobilisation and spillages directly to the watercourse. Where the diversions are required, these would be constructed offline from the watercourse where possible. Once the watercourse is connected on completion of the culvert, silt fences, geotextile matting, or straw bales would be used initially to capture mobilised sediments until the watercourse has returned to a settled state.

13.6.9 Construction of the Proposed Surface Water Outfall would require some works close to and within immediate receiving watercourses, namely Old Rockcliffe Brook shortly upstream of the River Dee. There would be potential for conveyance of spills and fine sediment during any works to these outfalls. All water features that are potentially impacted ultimately discharge to the River Dee, where there is potential for a cumulative impact in terms of fine sediment and chemical impacts on water quality, although the size and dynamic nature of the River Dee would provide some potential for dilution and dispersal of any pollutants.

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

13.6.11 During the demolition and construction works, existing surface flow paths may be disrupted and altered due to site clearance, earthworks, and excavation work. The exposure and compaction of bare ground and the construction of new embankments and impermeable surfaces may increase the rates and volume of runoff and increase the risk of surface water flooding. Fine sediment in runoff or other material and debris could enter

nearby water features, potentially clogging or overwhelming existing drainage systems and increasing flood risk downstream.

13.6.12 The construction of compounds and laydown areas can be considered a part of the 'Pre-construction Phase'. Proposed laydowns are required for temporary storage during construction of the new integrated power generation and carbon capture 'Trains' and would be located within the Main Development Area and C&IEA (see **Figure 5-3: Construction Areas** (**EN010166/APP/6.3**)). Construction compounds would include the delivery and storage of pipes, equipment, and other materials and would be located within the Main Development Area (west compound) and C&IEA (east compound). The construction laydown areas, compounds, parking areas, and other areas of temporary hardstanding would include concrete surfaces, soil stage and waste handling. The construction of temporary construction laydown areas, parking areas, and other areas of hardstanding have the potential to increase surface water runoff and result in increased flood risk to offsite receptors. The impacts associated with the removal of soil and use of heavy machinery has the potential to cause a reduction in water quality through sediment disturbances if washed down into watercourses.

13.6.13 The construction of the Trains may also include piling foundations on the Main Development Area with the potential to intercept groundwater. This may impact groundwater level, flow, and quality. Full details regarding excavation depth and method for the Proposed Development Site are not known at this stage but would be determined at detailed design following a FWRA (see Section 13.5).

13.6.14 The above discussion indicates that the Main Development Area and C&IEA area include works that may impact on the following receptors. Locations are shown within **Figure 13-1: Surface Water Features** (**EN010166/APP/6.3**):

- River Dee;
- Kelsterton Brook / Old Rockcliffe Brook;
- Lead Brook;
- Oakenholt Brook;
- Groundwater receptors; and
- Flood risk receptors.

13.6.15 There may be impact associated with the construction of the Main Development Area to: surface water quality and quantity of all of above named surface watercourses, freshwater hydromorphology of Old Rockcliffe Brook for the proposed surface water outfall and Oakenholt Brook for proposed culvert diversion; groundwater quality and quantity; and flood risk.

Potential impacts on surface water quality

Construction site runoff and fine sediment

13.6.16 All works would take into account good practice measures as described in Section 13.5 including the **Framework CEMP** (**EN010166/APP/6.5**) and associated WMP, so that appropriate fine sediment control is in place during construction works.

13.6.17 The magnitude of change on Kelsterton Brook (Medium Importance), Old Rockcliffe Brook (Medium Importance) and Oakenholt Brook (Medium Importance) are considered to be low adverse taking into account good practice construction approaches but noting that they require direct works within the watercourse (i.e. outfall construction or culvert diversion). Low magnitude impact on receptors of Medium Importance would result in a **minor adverse** effect, which is considered **not significant**.

13.6.18 The magnitude of change on Lead Brook (High Importance) is considered to be negligible given that no direct works are required to the watercourse and taking into account good practice that would manage works to the upstream tributary. This would result in a **negligible** effect which is considered to be **not significant**.

13.6.19 The magnitude of change to the River Dee (Very High Importance) would be negligible taking into account good practice, given that the extent of direct works required are minimal (e.g. no new structures are needed and only modification to abstraction inlets using hand tools predominantly), and taking into account good practice construction techniques. This may result in a **negligible** effect which is considered to be **not significant**.

Risk from chemical spillages

13.6.20 The magnitude of change on Kelsterton Brook (Medium Importance), Old Rockcliffe Brook (Medium Importance) and Oakenholt Brook (Medium Importance) is considered to be low adverse taking into account good practice construction approaches but noting that they require direct works within the watercourse (i.e. outfall construction or culvert diversion). This may result in a **minor adverse** effect on these watercourses, which is considered **not significant**.

13.6.21 The magnitude of change on Lead Brook (High Importance) is considered to be negligible, given that no direct works are required to the watercourse and taking into account good practice that would manage works to the upstream tributary. This would result in a **negligible** effect which is considered to be **not significant**.

13.6.22 The magnitude of change to the River Dee (Very High Importance) would be negligible taking into account good practice, given that the extent of direct works required are minimal (e.g. no new structures are needed and only modification to abstraction inlets using hand tools predominantly), and taking into account good practice construction techniques. This may result in a **negligible** effect which is considered to be **not significant**.

Potential impacts on hydromorphology

13.6.23 The existing Connah's Quay Power Station surface water outfall (the 'Existing Surface Water Outfall') is located to the eastern side of the Rockcliffe culvert on Old Rockcliffe Brook shortly upstream of the main River Dee channel. Construction of a new permanent outfall structure for surface water drainage discharge from the Main Development Area (the 'Proposed Surface Water Outfall') would be undertaken adjacent to the Existing Surface Water Outfall. The Proposed Surface Water Outfall would connect to and be downstream of a surface water drainage network within the Main Development Area as detailed in **Appendix 13-D: Outline Drainage**

Strategy (**EN010166/APP/6.4**). A 10 m area around the existing artificial structure (the Surface Water Outfall Area) has been included to allow for access and works if required, including the footprint of the Proposed Surface Water Outfall.

13.6.24 Excavation may be required during the installation of the Proposed Surface Water Outfall but this would be limited to areas to the edge of the saltmarsh and outside of the existing mudflat habitat. Materials storage and location of plant would to be limited to the area between the existing headwall and the existing access road to the northern side of the existing Connah's Quay Power Station fence line or this access road itself within the Surface Water Outfall Area, or would otherwise be undertaken from within the Main Development Area. Any large plant required for the lifting of trench support panels etc such as cranes and/or long reach excavators would be located on the access road to the northern side of the existing Connah's Quay Power Station fence line. Excavation would be carried out by either hand or use of mini diggers positioned as described above for plant. Backfilling operations would be carried out in 300 mm layers to ensure adequate compaction is achieved. Minimising the contact patch of the motorised plant would be a requirement in plant selection.

13.6.25 All works associated with construction of the Proposed Surface Water Outfall would incorporate good practice construction guidance throughout as described in section 13.5. The Proposed Surface Water Outfall would be aligned with the Old Rockcliffe Brook channel in order to maintain the flow route and avoid erosion or changes in channel form.

13.6.26 Overall, there would be a localised but permanent low adverse impact to Old Rockcliffe Brook from construction of the Proposed Surface Water Outfall. This watercourse is of medium importance for morphology. As such, the morphological effect is **minor adverse** (**not significant**).

13.6.27 The potential for hydromorphological impact from the diversion of the culvert of Oakenholt Brook beneath the CQLCP Abated Generating Station is limited during construction. This is on the basis that the works would be undertaken offline from the watercourse, until connection of the flow to the new channel is made upon completion. Appropriate sediment management measures would be in place upon connection of the new culvert (see Section 13.5), and so the magnitude of impact would be negligible from any mobilised sediment on this medium importance receptor (for morphology), resulting in a **negligible** effect (**not significant**).

Potential impacts on flood risk

Tidal and fluvial flood risk

13.6.28 There is a risk of displacing floodwater and changing flood flow conveyance routes during construction within the floodplain and the storage of materials.

13.6.29 The main flood risk to the Main Development Area is associated with the River Dee tidal floodplain. The estuary's shallow channels and sandbanks amplify tidal effects, concentrating water flow with significant tidal variations.

13.6.30 Hydraulic modelling undertaken for the Proposed Development Site displays the maximum modelled flood extent during the 1 in 200 year (0.5% AEP)

plus 2074 climate change event which shows that flooding is generally confined to the river channel and little out of bank flooding is present. No inundation is present for the Main Development Area. Therefore, no displacement of the floodplain would occur because of the proposed land raising which could consequently increase flood risk to third parties.

13.6.31 With regard to the construction laydown areas, the eastern construction laydown area is partially located within the 1 in 200 year (0.5% AEP) plus 2074 climate change flood extent, however the welfare facilities and staff car park proposed in this area would be located outside of the 1 in 200 year (0.5% AEP) plus 2074 climate change flood extent.

13.6.32 There are not anticipated to be any significant encroachments to the floodplain of Lead Brook or Oakenholt Brook during construction, as these are generally confined to the channel in the area of the Main Development Area. Kelsterton Brook and Old Rockcliffe Brook are both culverted beneath the existing site and have extensive mapped floodplains (surface water and minor watercourse). Therefore, construction has in principle the potential to result in changes to the upstream floodplain

13.6.33 Nonetheless, with the implementation of standard construction methods and mitigation as described in Section 13.5, any residual risk relating to tidal or fluvial flooding can be effectively managed through a variety of measures, for example by monitoring weather forecasts and NRW flood warnings, by undertaking works close to watercourses during periods of dry weather, by ensuring an adequate temporary drainage system is in place and maintained throughout the construction phase and avoiding stockpiling material on floodplains. An Emergency Response Plan would also be in place and is secured via the CEMP (see **Framework CEMP (EN010166/APP/6.5**)).

13.6.34 As such, the magnitude of flooding from these sources during construction, both on site and to off-site receptors, is considered to be negligible once the mitigation is taken into account. When considering the construction workers on site who are a very high importance receptor, this gives a **negligible** effect **(not significant)**.

13.6.35 When considering agricultural land uses surrounding the site (medium importance for flood risk), residential land (high importance), industry (very high importance) and the water compatible habitats (low importance) this results in a **negligible** effect **(not significant)** in all cases.

Surface water flood risk

13.6.36 The Main Development Area would in general be at a low risk from surface water flooding, although in some areas associated with watercourses there are areas of medium and high risk as outlined in the baseline and **Appendix 13-C: Flood Consequences Assessment** (**EN010166/APP/6.4**). However, during the works, existing surface flow paths may be disrupted and altered due to site clearance, earthworks, and excavation work. The exposure and compaction of bare ground and the construction of new embankments and impermeable surfaces may increase the rates and volume of runoff and increase the risk from surface water flooding. However, with the implementation of standard construction methods including a temporary drainage system and mitigation measures (see Section 13.5), this risk can be effectively managed. As such, the impact of flooding from these sources

on very high importance construction workers is considered to be negligible, resulting in a **negligible** effect **(not significant)**. For off-site agricultural land uses (medium importance for flood risk), residential land (high importance), industry (very high importance) and water compatible habitats (low importance) this results in a **negligible** effect **(not significant)** in all cases.

Groundwater flood risk

13.6.37 The Main Development is considered to be at medium risk of flooding from groundwater sources. Open excavations in some locations may be prone to becoming inundated by groundwater. However, with the implementation of the measures outlined in the detailed CEMP and WMP (to be produced post consent), the proposed dewatering scheme and Water Management Plan (refer to Section 9.5), a negligible magnitude of impact is predicted to very high importance construction workers, resulting in a **negligible** effect (**not significant**). Similarly, there would be negligible impact to off-site land uses (industrial, agricultural, residential and water compatible habitat) resulting in a **negligible** effect **(not significant)** in all cases.

Artificial sources / sewer flood risk

13.6.38 The Proposed Development Site is at low risk of flooding from sewers and other artificial sources, including reservoirs. With the implementation of measures that would be outlined in the Detailed CEMP and WMP and other flood risk mitigation as outlined in Section 13.5, flooding from these sources is considered to be negligible to construction workers and all off-site land uses, resulting in a **negligible** effect **(not significant)** in all cases.

Water Connection Corridor

13.6.39 The cooling water for the Proposed Development would be abstracted and discharged to the River Dee within the Water Connection Corridor. The Proposed Development would utilise the existing cooling water abstraction and discharge infrastructure with minor modifications and refurbishment at the intake to meet current legislative requirements, including The Eels (England and Wales) Regulations 2009 ('Eels Regulations') (Ref 13-20).

Water Connection Infrastucture Refurbishment

Potential impacts on surface water quality

13.6.40 Works would be undertaken at each of the seven intake pipes (each supporting four existing inlet baskets) in turn with a temporary seal on the intake to allow for continued operation of the existing Connah's Quay Power Station during works within the Water Connection Corridor.

13.6.41 The works would not require interaction with the riverbed and no intrusive works, such as dredging, are anticipated. All materials and plant (if required; it is expected that the majority of works within the Water Connection Corridor would require hand tools only) would be stored within the support barge and a working area would be established using scaffolding attached to the existing protection structure. The use of hand tools and the absence of intrusive works results in very low potential for sediment suspension or the mobilization of sediment-bound contaminants to occur.

13.6.42 Nonetheless, there may be potential for spillages during the works or from the support barge. There may also be potential for temporary and localised increases in sediment should any be disturbed within or immediately adjacent to the inlet infrastructure.

13.6.43 Taking into account good practice measures as set out in Section 13.5, the potential for water quality deterioration would be mitigated. Given the nature of the works, the magnitude of impact on the River Dee (Very High Importance) is considered to be negligible. This would result in a **negligible** effect, which is **not significant.**

Potential impacts on hydromorphology

13.6.44 The construction works would primarily involve refurbishment and minor repairs to the existing infrastructure, with no disturbance to the riverbed or flow regime. As no new infrastructure is being installed within the Water Connection Corridor and the works would not obstruct or restrict natural flow of the River Dee, there are considered to be no significant hydromorphological impacts on the River Dee. As such, there would be **no change** (**not significant**).

Potential impacts on flood risk

13.6.45 The construction works within the Water Connection Corridor is within the River Dee flood extent but would not result in any obstruction or restriction to the channel width of the water body. No alteration to the natural flow regime or channel capacity is anticipated, and the wetted width of the river would remain unaffected.

13.6.46 As no works are anticipated to impact the flow of the river, there would be no increase in flooding risk to upstream or downstream receptors on the River Dee. Flooding risk during construction is expected to align with baseline conditions for all sources. Mitigation measures, as outlined in Section 13.5 and the final CEMP (and WMP post consent), would further minimise any potential impacts during construction on workers and other on-site or off-site receptors.

13.6.47 On this basis, the potential for increased flooding risk to construction workers, or to off-site areas, is considered a negligible impact, resulting a **negligible** effect (**not significant)** in all cases.

Proposed CO_2 Connection Corridor construction

13.6.48 During construction of the Proposed CO_2 Connection Corridor, excavation, open cut trenching methods (to provide a depth of cover, minimum of 1.2 m from top of crown), and backfilling activities could disturb soil and sediment. Some vegetation clearance may also be required. The ground would be reinstated after construction. Construction works would generally be contained within a fenced work area, which is expected to occupy a 27 m-wide area around the pipeline and within the Proposed CO_2 Connection Corridor. Further information on the construction methods for the Proposed CO_2 Connection Corridor is set out within **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**).

13.6.49 The construction of the Proposed CO_2 Connection Corridor could impact the following receptors:

- Potential indirect impacts to Allt-Goch Brook and its tributaries, which border the Proposed CO_2 Connection Corridor.
- Potential indirect impacts to Pentre Brook (or tributaries) could receive runoff from construction although they are not directly intersected;
- Potential direct impacts to any unnamed ephemeral ditches or drains which are crossed, or indirect impacts where features are within close proximity to the Proposed CO_2 Connection Corridor; and
- Potential indirect impacts to the River Dee, as the ultimate downstream receptor of all impacts.

Potential impacts on surface water quality

13.6.50 There would be potential for conveyance of fine sediment to nearby water features through uncontrolled runoff during the construction and maintenance works if appropriate drainage mitigation is not adopted. Accidental spills or leaks during construction or operation could adversely affect water quality and there is potential for deposition of silt and sediments in watercourses if not mitigated.

13.6.51 Aside from where any crossings of any very small, ephemeral field ditches are identified as being required (based on further survey and following vegetation clearance), a buffer of at least 10 m from all other watercourses would be maintained, with no storage of materials within the mapped floodplain (see Section 13.5). While ephemeral field ditch crossings are not known to be required, should the need be identified following further site survey then any works to cross these would be undertaken when conditions are dry where possible to avoid sediment disturbance and potential for water pollution. If this was not possible, flow would be flumed or over-pumped to create a dry working environment. Once the watercourse is reinstated, silt fences, geotextile matting, or straw bales should be used initially to capture mobilised sediments until the watercourse has returned to a settled state and any banks re-vegetated.

13.6.52 Taking into account embedded mitigation and good practice, the magnitude of change to Allt-Groch Brook and tributary (Medium Importance) is considered low adverse, resulting in a **minor adverse** effect, which is considered **not significant**.

13.6.53 Given embedded mitigation, the magnitude of impact to Pentre Brook (High Importance) and the River Dee (Very High Importance) downstream is considered negligible, taking into account the distance downstream from the works, and standard mitigation reflecting good practice as described in Section 13.5. Therefore, the potential effect is predicted to be **negligible** which is **not significant**.

13.6.54 For any unnamed ephemeral ditches (low importance) that require crossing and would therefore be subject to direct works, there would be low adverse impact given the mitigation, resulting in a minor adverse effect, which is not significant. Those not directly crossed would have a **negligible** magnitude of impact, resulting in a negligible effect (**not significant**).

Potential impacts on hydromorphology

13.6.55 There is the potential for the construction of the Proposed CO_2 Connection Corridors to alter the hydromorphology of Allt-Goch Brook and its tributary (medium importance). While no crossings are being considered directly to these watercourses, temporary alterations to surface drainage patterns or crossings of upstream field ditches could lead to sediment mobilisation and input to these channels.

13.6.56 Given the mitigation measures outlined in Section 13.5, notably the **Framework CEMP** (**EN010166/APP/6.5**) and associated WMP to control sediment mobilisation and runoff, the potential changes of hydromorphology would be a negligible impact, resulting in a **negligible** effect (**not significant**) to Allt-Goch Brook and its tributary.

13.6.57 There may be crossings required to ephemeral field ditches (e.g. within hedgerows) if shown to be required during further site survey. For these ephemeral ditches, works should be carried out in the drier months to reduce the risk of pollution propagating downstream. Infrastructure would be buried at sufficient depth to prevent exposure (minimum 1.5 m below the bed). These requirements would be detailed in the WMP (secured via the **Framework CEMP** (**EN010166/APP/6.5**)).

13.6.58 There would unavoidably be short term, temporary adverse impacts to the bed and banks of affected field ditches (low importance). These impacts would be very localised and short in duration, with the channels reinstated.

13.6.59 Despite the mitigation measures, a temporary medium adverse magnitude of impact to morphology is considered appropriate as a worst-case scenario. Full recovery of the channel of these ditches would be expected within two to five years. For these low importance field ditches (in terms of morphology) this results in a **minor adverse** effect (**not significant**).

Potential impacts on flood risk

13.6.60 The Proposed CO_2 Connection Corridor is located in Flood Zone 1 for tidal and fluvial flood risk and so is at low risk of flooding from these sources. However, there is the potential for the construction of the Proposed CO_2 Connection Corridor to alter the flood risk of Allt-Goch Brook and its tributary and Lead Brook, due to pipeline installation within their catchments, with associated site clearance, earthworks and excavation works. This could potentially change flow and surface water runoff pathways. There may also be potential to encounter high groundwater during excavations, thus raising the risk of groundwater flooding. The risk associated with artificial infrastructure and sewers is low.

13.6.61 It is considered that the low risk of flooding to the Proposed CO_2 Connection Corridor (and medium risk with regard to groundwater) can be effectively managed through the implementation of standard construction methods and mitigation measures (Section 13.5), including those outlined in the **Framework CEMP** (**EN010166/APP/6.5),** WMP, as well as an appropriate dewatering scheme. As such, the impact of flooding from all sources on very high importance construction works is considered to be a negligible impact, which equates to a **negligible** effect (**not significant)**. Similarly, there would be negligible impacts to off-site receptors (including industrial, agricultural

residential receptors), resulting in a **negligible** effect (**not significant**) in all cases.

Potential impacts on groundwater across all construction activities

13.6.62 The Bowland Shale Formation Secondary undifferentiated aquifer (low importance) is located on the periphery of the Study Area and would not be impacted by the Proposed Development. The magnitude of impact for all potential impacts on the Bowland Shale Formation is **no change** which is considered **not significant** and is not discussed further in this section.

13.6.63 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 risk can be managed through the implementation of good practice mitigation measures as described in Section 13.5. Therefore, the magnitude of impact on the receptors of low (Secondary undifferentiated aquifers) and medium (Secondary A aquifers) importance is negligible resulting in a **negligible** significance of effect, which is considered to be **not significant**.

13.6.64 During the construction phase, should excavation require dewatering, there is the potential to impact groundwater flow and quantity by locally and temporarily reducing groundwater levels and altering flow direction. Discharge of abstracted water could also have an impact on groundwater quality. An environmental permit would be obtained should discharge of abstracted water be required, therefore the magnitude of impact on the receptors of low importance (Secondary undifferentiated aquifers) is negligible resulting in a **negligible** significance of effect which is considered to be **not significant**. The magnitude of impact on the receptors of medium importance (Secondary A aquifers) is low adverse resulting in a **minor adverse** significance which is considered to be **not significant**.

13.6.65 Subsurface structures such as supports for excavations could potentially have an effect on groundwater flow and quantity by impeding groundwater flow, causing groundwater mounding on the upgradient side of the structure and reduced groundwater levels on the downgradient side of the structure. This would depend on the structure orientation and depth in relation to groundwater levels and flow direction. On the basis of current understanding, the magnitude of impact on the receptors of low importance (Secondary undifferentiated aquifers) is negligible resulting in a **negligible** significance of effect which is considered to be **not significant**. The magnitude of impact on the receptors of medium importance (Secondary A aquifers) is low adverse resulting in a **minor adverse** significance which is considered to be **not significant**.

13.6.66 During construction, the presence of work sites, stockpiles and roads could temporarily reduce infiltration to the underlying aquifers and therefore locally lower groundwater levels. Reduced infiltration is likely to occur over the short term within a small area of the wider recharge catchment, with runoff likely to find its way to the perimeter areas which are less compacted and allow infiltration to take place. Therefore, the magnitude of impact on the receptors of low (Secondary undifferentiated aquifers) and medium importance (Secondary A aquifers) is negligible resulting in a **negligible** significance of effect which is considered to be **not significant**.

13.6.67 The Dee Estuary/ Aber Afon Dyfrdwy GWDTE is supported by baseflow from a large catchment. The area of the Proposed Development Site in relation to the catchment supporting the GWTDE is insignificant and therefore the activities and potential impacts arising during the construction phase are likely to have a negligible magnitude of impact on the receptor of high importance resulting in a **negligible** significance of effect which is considered to be **not significant**.

Operation Phase

13.6.68 The operation of the Proposed Development has the potential to impact on water quality, hydrology, groundwater, hydromorphology and flood risk due to the presence of structures in and adjacent to water features, and operational activities and discharges.

Water quality impacts

Cooling water discharges

13.6.69 There is the potential for impacts to the River Dee from any increase in temperatures associated with the cooling water discharge. If water is not sufficiently cooled it could create a thermal barrier to fish passage and have other environmental consequences on the estuary and the designated coastal nature conservation sites in terms of ecosystem dynamics and assemblages. Water quality impacts may also arise from the heat in the discharged cooling water or if discharged water contains chemicals in significant concentrations. The potential impacts of the discharge are influenced by the discharge rate, time (in relation to the tidal cycle), total volume, and temperature as well as the location of the outfall.

13.6.70 The Proposed Development is being designed in order to ensure that the cooling water would be discharged to the River Dee under the current Environmental Permit limits for the existing Connah's Quay Power Station, which are deemed suitable by NRW and would not result in significant adverse effects to the River Dee. The Proposed Development would remain within permitted operational temperatures, volumes and water quality limits in accordance with this permit (see **Table 13-9** and **13-10**). The outfall location is not being changed with the discharge infrastructure not being altered. Furthermore, the discharge to the River Dee would be monitored in accordance with the conditions of the Environmental Permit to ensure compliance with the permit.

13.6.71 Given that the cooling water discharge would remain within the existing permitted conditions, which have been agreed as acceptable, the magnitude of impact to the water temperature and quality within the River Dee (Very High Importance) is expected to be negligible. This would have a **negligible** effect which is considered **not significant**.

Process water discharges

13.6.72 Process water discharges from the Proposed Development would include neutralised effluent streams from the demineralisation plant, blowdown from the CCP and CCGT, treated effluent from the CCP, and potentially contaminated surface water runoff from process areas. The likely quality of

this effluent at the point of its generation (i.e. prior to mitigation or on-site treatment) is not known at this stage of the design.

13.6.73 Process wastewater from the Proposed Development would be transferred by vacuum truck to a registered waste contractor or alternatively treated to meet required standards in an on-site wastewater treatment plant, prior to discharge to the River Dee. In the latter case, the discharge would be regulated by NRW through the Environmental Permit required for the operation of the Proposed Development. This may be subject to a Permit Variation if taken forward, during which supporting studies would need to be undertaken to demonstrate that there would be no likely significant effects and that the operation is WFD compliant

13.6.74 It is anticipated that the wastewater environmental regulatory emission limit values (ELVs) that apply within the Environmental Permit would be in-line with the target BAT Associated Emission Levels (AELs) from wastewater treatment plants treating effluent from chemicals sites, or processes as identified within the BAT Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector (Ref 13-85) and its associated BAT Conclusions document. If the project Environmental Risk Assessment (post consent) shows that significant effects would occur with the plant discharging at the BAT-AEL concentrations, tighter emission limits would subsequently be applied.

13.6.75 Given that any discharge to the environment of process wastewater would be from an on-site wastewater treatment plant in line with permit conditions that ensure no significant adverse effects, then a negligible impact is predicted on water quality of the River Dee (Very High Importance) provided that appropriate management and maintenance of the plant is delivered. This would give a **negligible** effect, which is **not significant**. The provision of wastewater treatment would be secured through **Appendix 4-A: Operation and Maintenance Mitigation Register** (**EN010166/APP/6.4**). Alternatively, if it is not possible to provide adequate on site treatment and so it is decided that process water is treated offsite by a contractor, then there would be no change to the River Dee, and regulatory controls would ensure no offsite impacts, which in any case would be the responsibility of the waste contractor.

Foul water discharges

13.6.76 Foul water contains pollutants, such as organic matter, nutrients, harmful chemicals, bacteria and sanitary waste. When discharged, it can contaminate water bodies, affect water quality and aquatic ecosystems. Excessive nutrients from foul water can lead to eutrophication. This disrupts the balance of ecosystems, leading to oxygen depletion in the water column or the excessive growth of agal mats over inter-tidal mudflats.

13.6.77 There is no existing public sewage connection for grey and black wastewater export from the Main Development Area, due to the presence of the railway line preventing connection to the public sewer. Currently, black and grey wastewater (i.e. non-cooling and non-process wastewater) from the existing Connah's Quay Power Station is 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 the main

cooling water purge discharge to the River Dee under the conditions of the environmental permit. However, due to sub-optimal operation of the existing systems, the septic tank system is currently emptied periodically by a specialist contractor (approximately once per six-month period).

13.6.78 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 the main cooling water purge discharge (in accordance with the existing permit) or to be removed by specialist contractors as required.

13.6.79 In the case of a discharge to the River Dee, the discharge would continue to be regulated by NRW through the Environmental Permit required for the operation of the Proposed Development. This may be subject to a Permit Variation if taken forward, during which supporting studies would need to be undertaken to demonstrate that there would be no likely significant effects and that it is WFD compliant.

13.6.80 Given that the system would operate in accordance with the existing situation and regulated by the Environmental Permit, then there would be a negligible impact provided that appropriate management and maintenance of the plant is delivered. For the very high importance River Dee this results in a **negligible** effect (**not significant**). Alternatively, if foul water is removed from the site by a specialist contractor then there would be no change to the River Dee, and regulatory controls would ensure no offsite impacts, which in any case would be the responsibility of the waste contractor.

Surface water runoff

13.6.81 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. This could lead to chronic adverse impacts on the receiving watercourses in terms of their physicochemical and ecological status, although it should be noted that there is a large capacity for dilution and dispersal in the River Dee. There is also a risk that a significant chemical spillage, fire-fighting runoff or pollution incident occurs on the Site and is discharged to Old Rockcliffe Brook (and subsequently the River Fee) via the Proposed Surface Water Outfall.

13.6.82 The provisional drainage arrangements propose to attenuate surface water runoff and contain chemical spillages from the operational Proposed Development, whilst minimising flood risk to the Proposed Development and surrounding areas. As outlined in Section 13.5 and **Appendix 13-D: Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**), a new surface water drainage network and management system would be provided for the Main Development Site that would provide interception, conveyance and treatment of surface water runoff from buildings and hard standing. This would be separate to foul systems for welfare facilities and process wastewater generated by the operation of the Proposed Development.

13.6.83 Discharges to the surface water drainage system would include stormwater from roadways and access area drainage, parking areas, roof drainage, landscape areas and walkways. Pervious / permeable paving is to be used across car park areas, enabling rainwater to infiltrate into the sub-base and discharge in a controlled manner to the site drainage system. Filter drains and/or grassed swales would be used to provide initial treatment of road and building drainage. Attenuation tanks would be used, but these do not provide a water quality treatment benefit. However, there would also be vortex separators (or other proprietary treatment) within each drainage catchment, providing further treatment prior to discharge to Old Rockcliffe Brook.

13.6.84 On a provisional basis, the SuDS Manual's Simple Index Approach (SIA) (Ref 13-74) has been applied to demonstrate the suitability of the SuDS treatment trains within the outline surface water drainage design. The Detailed Surface Water Drainage Strategy, to be produced post consent as a DCO Requirement, would include an appropriate additional water quality risk assessment to ensure that sufficient treatment is incorporated into the final design.

13.6.85 The High Pollution Hazard Index has been adopted to assess runoff from the Proposed Development Site, as this is described in the SuDS Manual (CIRIA, 2015a) as, '*Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites, trunk roads and motorway*'. It is thus deemed the most appropriate hazard index available for the majority of the Main Development Site (and is the most precautionary available).

13.6.86 For the parking areas the Medium Hazard Index has been adopted as this is described as, '*Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways*'. This is considered suitably precautionary for parking areas.

13.6.87 **Table 13-11** shows the pollutant hazard index score for different pollutants (total suspended solids, metals and hydrocarbons) for the High and Medium Pollution Hazard Level, as outlined in the SuDS Manual (Ref 13-74). It also shows the Mitigation Index for each of the proposed SuDS in the treatment train. To achieve a pass the total Mitigation Index (for all parts of the SuDS treatment train) must meet or surpass the Pollution Hazard Index. Under the Simple Index Approach the effectivity of the second treatment train is considered to be 50% compared to the first.

13.6.88 The SIA analysis in **Table 13-11** indicates that the proposed SuDS mitigation for parking areas provides sufficient treatment for pollutants, and so no adverse effects from surface water runoff would be expected to the water quality of Old Rockcliffe Brook (or the River Dee downstream) as a result of the Proposed Development. For the high pollution hazard areas of the Main Development Area an indicative treatment of swales has been shown, which alone is insufficient to pass the assessment. However, further SuDS (e.g. filter drains) and proprietary treatments would be adopted for each drainage catchment. Proprietary treatment systems (e.g. vortex separators) are not considered within the SIA as the performance varies between available

products. As such, once combined with additional SuDS and/or proprietary treatments sufficient treatment would be expected to be delivered. This would be confirmed through further assessment in the Detailed Surface Water Drainage Strategy (post consent). Further treatment would be incorporated where necessary depending on the outcome of the analysis.

Table 13-11: Simple Index Approach Assessment for Surface Water Runoff from Car Park and General Site

Relevant Road catchments	Treatment Train		Pollutant Category	Pollutant Hazard Indices for 'High Risk' and 'Medium Risk' land uses	Treatment Train (Mitigation Indices)				
					1	2	3	Outcome	Comment
Car Park Area (Medium Pollutant Hazard Risk)	A	Permeable Paving>Swale>Attenuation Tank>Outfall	TSS	**0.7**	0.7	0.25		**0.95**	According to the SIA method this treatment train would provide adequate treatment for all categories of pollutants. It is important that both SuDS and proprietary measures are well maintained to ensure the most efficient operation for the lifetime of their installation, and this would be achieved through the proposed Surface Water Maintenance and Management Plan.
			Metals	**0.6**	0.6	0.3		**0.90**	
			Hydrocarbons	**0.7**	0.7	0.3		**1.00**[4]	
General Site (High Pollutant Hazard Risk)	B	Swale>Vortex Separator>Attenuation Tank>Outfall	TSS	**0.8**	0.5			**0.5**	Proprietary treatment systems (e.g. vortex separators) are not considered within the SIA as the performance varies between available products. As such the current mitigation index is based on the example of a swales only. Swales alone are insufficient to provide the required treatment. However, once combined with additional SuDS and/or proprietary treatments sufficient treatment would be expected to be provided.
			Metals	**0.8**	0.6			**0.6**	
			Hydrocarbons	**0.9**	0.6			**0.6**	

Relevant Road catchments	Treatment Train	Pollutant Category	Pollutant Hazard Indices for 'High Risk' and 'Medium Risk' land uses	Treatment Train (Mitigation Indices)				
				1	2	3	Outcome	Comment

Note 1 After the first treatment train component the performance of subsequent treatment trains are reduced by 50% as per C753 The SuDS Manual 2nd eds (Ref 13-74) guidance.

Note 2 It is assumed that all SuDS would be designed following best practice guidance contained in the C753 The Suds Manual 2nd eds (Ref 13-74). Where there are limitations to the design of a SuDS feature it may be appropriate to reduce the treatment performance applied. For this reason a treatment 'buffer' should be provided.

Note 3 The performance of each SuDS type as part of the treatment train would need to be reviewed as the design is further developed. Management and maintenance requirements need to be confirmed to ensure SuDS are maintained fully operational for the lifetime of the proposed development.

Note 4 Although a result of '1.0' is shown in practice 100% treatment is not likely. However, a management train providing this score would provide a high degree of treatment.

Outcome Legend

Pollution index	>	Mitigation Index
Pollution index	< by 0.1 or =	Mitigation Index
Pollution index	< by more than 0.1	Mitigation Index

13.6.89 As outlined in Section 13.5, the surface water drainage system for areas of site drainage that may contain chemical pollutants from minor leaks and spills will be separated from the main 'clean' surface water drainage system. Any runoff from areas where chemical spillages may occur and so may contain potentially contaminated water, will be collected either for off-site disposal by a suitably registered contractor, or sent for on-site treatment prior to discharge.

13.6.90 The firewater strategy for the Main Development Area is to be developed post-DCO consent, and is secured through the requirement for a Detailed Outline Water Drainage Strategy, generally in accordance with **Appendix 13-D: Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**).

13.6.91 Water quality monitoring would be regularly undertaken by the undertaker to confirm the quality of any water in bunded areas, sumps or tanks to ensure that it is suitable for discharge, or otherwise is taken by tanker for off-site disposal at a suitably permitted wastewater facility.

13.6.92 A Surface Water Maintenance and Management Plan would be prepared during the detailed design phase to describe the requirements for access and frequency for maintaining drainage infrastructure on the Proposed Development Site.

13.6.93 Overall, a negligible impact is expected to water quality of Old Rockcliffe Brook and the River Dee given the implementation of a Detailed Surface Water Drainage Strategy, which would be developed post consent, and required to be generally in accordance with **Appendix 13-D: Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**). This would include further water quality checks and would meet SuDS Approval Body and local policy requirements. Measures would also be included for dealing with spillages and firewater (including water quality monitoring). Should any adverse water quality impacts be observed during operation, then mitigation would be implemented. Old Rockcliffe Brook is a medium importance water body for water quality, while the River Dee is a very high importance water body, and on this basis the negligible impact results in a **negligible effect** in both cases (**not significant**).

Hydromorphological impacts

Main Development Area

13.6.94 As cooling water is abstracted and discharged there is the potential for localised scour and erosion of the seabed in the River Dee. The extent of erosion and sediment mobility would be influenced by tidal flow. However, as the permitted abstraction and discharge volumes are unchanged from the existing development, there would be no anticipated change against the baseline in terms of the extent of localised scour and erosion. The assessment of hydromorphological impacts to the River Dee has been considered within **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**).

13.6.95 A new surface water drainage outfall on Old Rockcliffe Brook (adjacent to the existing outfall) draining the Main Development Area has the potential to alter the natural flow patterns of the watercourse, leading to changes in flow velocity and volume. This in turn could affect the watercourse morphology.

However, operationally the new outfall would replace the existing flows from the existing outfall. It would be appropriately sited in order to minimise impacts on flow patterns in the receiving watercourse (as outlined in Section 13.5). Given this appropriate design, the morphological impact from the new outfall is considered to be of low adverse magnitude, which for Old Rockcliffe Brook (Medium Importance) results in a **minor adverse** effect (**not significant**).

13.6.96 The diversion of the existing culverts of Oakenholt Brook within the footprint of the CQLCP Abated Generating Station forms part of the Proposed Development within the Main Development Area. This would essentially be a like for like replacement in that the watercourse would remain in culvert beneath the Main Development Area but would be redirected to accommodate the Proposed Development. Morphologically, there may be some opportunity to introduce more environmentally sensitive design to allow natural substrate and ecological continuity through the reach. This would be considered at the detailed design stage. Given that the affected area beneath the Main Development Area is already in culvert and would remain so, any impact is considered to be no worse than low adverse in magnitude from a morphological perspective. For Oakenholt Brook (Medium Importance for morphology) this results in a **minor adverse** effect (**not significant**).

Proposed CO_2 Pipelines

13.6.97 All works for the Proposed CO_2 Connection Corridor are expected to be buried or have minimal footprint, located away from known watercourses. Therefore, no impacts to the hydromorphology of All-Groch Brook (Medium Importance) and tributaries and Lead Brook (Medium Importance) are expected. Should field ditches be identified that require crossing then the pipeline would be buried to a sufficient depth below the base of the watercourse (>1.5 m) to ensure no impact to the bed or flow pathways of the watercourse at the operational stage, at which point any open cut excavation would have been reinstated. As such the magnitude of impact is negligible for any field ditches (Low Importance), resulting in a **negligible** effect, which is **not significant**.

Potential impacts on groundwater

13.6.98 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. The magnitude of impact on the receptors of low importance (Secondary undifferentiated aquifers) is negligible resulting in a **negligible** significance of effect, which is considered to be **not significant**. The magnitude of impact on the receptors of medium importance (Secondary A aquifers) is low **adverse** resulting in a **minor adverse** significance of effect, which is also considered to be **not significant**. Potential for new pathways could be created along foundations of structures or along utilities which could result in contaminants (such as leaks and spills) migrating and entering groundwater. The magnitude of impact on the receptors of low (Secondary undifferentiated aquifers) and medium (Secondary A aquifers)

importance is negligible, resulting in a **negligible** effect, which is considered to be **not significant**.

13.6.99 Contamination of groundwater as a result of chemical spills in the chemical storage area and its subsequent run-off may occur. With embedded mitigation in place as described in Section 13.5, the magnitude of impact on the receptors of low (Secondary undifferentiated aquifers) and medium (Secondary A aquifers) importance is negligible, resulting in a **negligible** effect, which is considered to be **not significant**.

13.6.100 The land raising required for managing tidal flood risk to the Proposed Development Site would increase the distance between the underlying groundwater aquifers and the ground surface, which can increase recharge time to aquifers. The material used in raising the land can influence the recharge rate to the underlying aquifer. The effects are likely to occur within a small area of the wider area catchment therefore, the magnitude of impact on the receptors of low (Secondary undifferentiated aquifers) and medium (Secondary A aquifers) importance is negligible resulting in a **negligible** significance of effect which is considered to be **not significant**.

Flood Risk impacts

Tidal Flood Risk

13.6.101 The **Flood Consequences Assessment** (**Appendix 13-C** (**EN010166/APP/6.4**)) presents hydraulic modelling undertaken to better understand tidal flood risk to the Proposed Development Site. Figure 13C-1 of **Appendix 13-C Flood Consequences Assessment** (**EN010166/APP/6.4**) displays the maximum modelled flood extent during the 1 in 200 year (0.5% AEP) plus 2074 climate change event which shows that flooding is generally confined to the river channel and little out of bank flooding is present. No inundation is present for the Main Development Area. A small area of the northern section of the Repurposed CO_2 Connection Corridor is shown to be inundated with depths reaching up to 1.1 m. However, the infrastructure associated with this corridor would be buried and therefore would not be impacted by above ground flood sources. Small areas of inundation are also present in the C&IEA with depths reaching up to 0.6 m. However, during operation this area would be an ecological enhancement area with planting and would therefore be suitable to be in an area where flooding could occur. The Water Connection Corridor encroaches upon the River Dee and is located within the flood extent. However, no new development is proposed in this area (aside from the placement of a new outfall for surface water drainage) and the works being undertaken would be to upgrade existing infrastructure.

13.6.102 TAN15 states that during extreme flood events there is recognition that it may not be possible to keep all development flood free. However, it is imperative that in these circumstances flooding does not endanger life, therefore it needs to be demonstrated that conditions within the development during an extreme event (1 in 1000 year (0.1% AEP) plus climate change) would be tolerable. TAN15 notes that the tolerable conditions for highly vulnerable development during the 1 in 1000 year (0.1% AEP) plus climate change event includes a maximum flood depth of 600 mm and a maximum velocity of flood waters of 0.15 m/s. Although flood extents encroach onto

small parts of the Main Development Area during the 1 in 1000 year (0.1% AEP) plus 2074 climate change event, there is no new development proposed within these areas and therefore the Proposed Development meets the tolerable conditions.

13.6.103 Despite being free from flooding during the 1 in 200 year (0.5% AEP) plus 2074 climate change event, it has been agreed in consultation with NRW to raise the Main Development Area 600 mm above the maximum water level in the River Dee during the design flood event level as a conservative approach. The level in the River Dee during the 1 in 200 year (0.5% AEP) plus 2074 climate change event is 6.8 m AOD and therefore the levels of the Main Development Area would be 7.4 m AOD. To provide additional resilience, critical infrastructure within the Main Development Area buildings would be raised 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 River Dee.

13.6.104 Overall, the tidal flood risk to the Proposed Development Site is considered to be low during operation as the Main Development Area is located outside of the modelled design flood event extent and it would be raised to provide additional resilience.

13.6.105 With regard to tidal flood risk resulting from the development, the proposed land raising on the Main Development Area would result in no displacement of the floodplain (being free from flooding at the (0.5% AEP plus 2074 climate change event) and so would not consequently increase tidal flood risk to third parties (including surrounding agricultural, residential, industrial and water compatible habitat areas). The magnitude of impact is therefore negligible, which results in a **negligible** effect (**not significant**) to all potential receptors.

Fluvial Flood Risk

13.6.106 The majority of the Proposed Development is in fluvial Flood Zone 1. However, part of the Water Connection Corridor and Repurposed CO_2 Connection Corridor are located within fluvial Flood Zone 3.

13.6.107 Figure 13C-2 of this **Appendix 13-C Flood Consequences Assessment** (**EN010166/APP/6.4**) displays the maximum modelled flood extent during the 1 in 100 year (1% AEP) plus 45% climate change event which shows that the only element of the Proposed Development Site located within the flood extent is the Water Connection Corridor. No new development is proposed in this area aside from an upgrade to existing infrastructure.

13.6.108 As such, the fluvial flood risk to the Proposed Development Site is considered to be low during operation as elements of the Proposed Development located within the modelled design flood event extent would be buried and therefore not impacted by above ground flood sources. In addition, and as described for tidal flooding, land raising would provide additional resilience.

13.6.109 Overall, fluvial flood risk would result in a negligible impact to the Proposed Development, and from the Proposed Development. This results in a **negligible** effect (**not significant**) to all potential receptors.

Surface Water Flood Risk

13.6.110 Increased precipitation which can impact the frequency and duration of flooding for all sources (e.g. tidal, fluvial, surface water, artificial sources, groundwater, and infrastructure) could lead to flooding on or off-site. An increase in impermeable area within the Main Development Area, may increase the rate and volume of surface water runoff to the receiving surface water receptors of Old Rockcliffe Brook and the River Dee and off-site flood risk receptors.

13.6.111 According to the NRW FMfP (Ref 13-59), the majority of the Proposed Development Site is shown to be in Flood Zone 1 for surface water flooding (areas with less than 1 in 1000 (0.1%) chance of flooding from surface water in a given year, including the effects of climate change) as shown in **Figure 13-8 Surface Water Flood Risk** (**EN010166/APP/6.3**).

13.6.112 The existing internal roadways at the Connah's Quay Power Station are shown to be located within Flood Zones 2 (areas with 1 in 1000 (0.1%) to 1 in 100 (1%) chance of flooding from surface water in a given year, including the effects of climate change) and Flood Zone 3 (areas with more than 1 in 100 (1%) chance of flooding from surface water in a given year, including the effects of climate change) from surface water flooding. There are other small, isolated areas of Flood Zones 2 and 3 within the Main Development Area.

13.6.113 A Detailed Surface Water Drainage Strategy would be prepared for the Proposed Development (as a Requirement of the draft DCO, generally in accordance with **Appendix 13-D: Outline Surface Water Drainage Strategy** (**EN010166/APP/6.4**)) which covers the use of SuDS, site discharge rates, attenuation and surface water management and maintenance. These principles are outlined in Section 13.5. Given the implementation of this proposed strategy, surface water from the Proposed Development Site would be carefully managed, treated and directed to the River Dee via Old Rockclife Brook. Given this increased management of surface water runoff from the development there would likely be a reduction in the surface water flood risk in comparison to existing conditions where the drainage arrangements are dated. Furthermore, to mitigate the risk of surface water flooding during operation, any vulnerable equipment would be raised 300 mm above proposed ground levels.

13.6.114 On this basis, surface water flood risk would result in a negligible impact to the Proposed Development Site, and from the Proposed Development. This results in a **negligible** effect (**not significant**) to all potential receptors.

Groundwater Flood Risk

13.6.115 Based on the available baseline information (see Section 13.4), the groundwater flood risk to the Proposed Development Site is considered to be medium during operation due to shallow groundwater identified during groundwater investigations.

13.6.116 Permanent subsurface structures such as foundations, piles and pipelines could potentially have an impact on groundwater flows and groundwater flooding. However, the volume of groundwater which could be displaced because of the subsurface structures would be minimal in comparison to the large expansive groundwater body. Therefore, there is not considered to be

any increase in groundwater flood risk because of the Proposed Development. Nonetheless, to mitigate the risk of groundwater flooding during operation, any vulnerable equipment would be raised 300 mm above proposed ground levels and any infrastructure within the Repurposed CO_2 Connection Corridor and Electrical Connection Corridor would be designed to prevent water ingress.

13.6.117 On this basis, groundwater flood risk would result in a negligible impact to the Proposed Development Site, and from the Proposed Development. This results in a **negligible** effect (**not significant**) to all potential receptors.

Sewer / Artificial Source Flood Risk

13.6.118 Flooding from drains, sewers and surface waters are normally interconnected. Insufficient or reduced drainage capacity within the sewer network can result in drainage capacity being exceeded causing extensive surface water flooding. Likewise, increased volumes of surface water can overload sewers and drains, causing the drainage network to backup and surcharge causing surface water flooding. All new pipes to be installed for the Proposed Development would be appropriately sized to accommodate their calculated capacity requirements. The impact of climate change on expected flows would be accommodated in the design of drainage infrastructure. With regard to reservoirs, a small part of the western side of the Main Development Area, the Water Connection Corridor and the northern part of the Repurposed CO_2 Connection Corridor are risk of flooding from reservoirs. However, reservoirs are required to be maintained to be very high standard and that chance of failure is considered very unlikely.

13.6.119 Based on the available baseline information (see Section 13.4) and the **Flood Consequences Assessment** (**Appendix 13-C** (**EN010166/APP/6.4**)), the flood risk to the Proposed Development Site, and from the Proposed Development is considered negligible from sewers and artificial sources during operation. This results in a **negligible** effect (**not significant**) to all potential receptors.

Decommissioning Phase

13.6.120 At the end of its operational life, it is anticipated 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 River Dee and all buried assets of the Proposed Development would be left in-situ and the associated pipework treated and filled. Any removal contractor would have a legal obligation to consider decommissioning and removal under the Construction (Design and Management) Regulations 2015, or the equivalent prevailing legislation at that time.

13.6.121 On this basis, decommissioning impacts are expected to be limited to water bodies in proximity to the Proposed Development Site (i.e., primarily the River Dee, Kelsterton Brook, Oakenholt Brook, and Lead Brook) and would be similar to the impacts reported for the construction phase, but with fewer earthworks, excavations and tunnel arisings to manage.

13.6.122 A DEMP would be produced pursuant to a DCO Requirement. This would identify the required measures to prevent pollution during this phase of the development. The DEMP would be agreed with the relevant planning authority.

13.6.123 There may be marginal improvement to the water quality of the Dee following decommissioning of the Proposed Development, with the discharge of cooling water and potentially treated process water ceasing.

13.6.124 Overall, no significant effects are anticipated during the decommissioning phase provided that the appropriate embedded mitigation measures are implemented.

13.7 Additional Mitigation and Enhancement Measures

13.7.1 The assessment undertaken for the construction, operation and decommissioning phases in Section 13.6 identified no significant effects as a result of the Proposed Development. As such, no additional mitigation or enhancement measures are required.

13.8 Summary of Residual Effects

13.8.1 Having considered the design, embedded mitigation, along with implementation of additional mitigation, described in the preceding sections, this water environment assessment has identified no significant residual effects for the construction, operation or decommissioning phases. Residual effects are summarised in **Table 13-11** for construction (and decommissioning) and **Table 13-13** for operation.

13.8.2 This outcome is reliant on the delivery of the various plans identified within the embedded mitigation for this chapter. These include the:

- Detailed Construction Environmental Management Plan (generally in accordance with the **Framework CEMP (EN010166/APP/6.5**)) – secured through a DCO Requirement;
- Water Management Plan (including Pollution Incident Emergency Response Plan) – secured through the **Framework CEMP (EN010166/APP/6.5)**;
- Flood Risk Management Plan – secured through the **Framework CEMP (EN010166/APP/6.5)**;
- **Framework Site Waste Management Plan (SWMP**) (which is included within the **Framework CEMP** (**EN010166/APP/6.5**)) - secured through a DCO Requirement; and
- Detailed Surface Water Drainage Strategy (generally in accordance with **Appendix 13-D Outline Surface Water Drainage Strategy (EN010166/APP/6.4)** – including Surface Water Maintenance and Management Plan.

13.8.3 For the treatment of operational process water and foul wastewater from the Proposed Development, it has yet to be confirmed whether treatment would be provided on site prior to discharge to the River Dee (in line with the

existing permit conditions), or whether these wastewater streams would be managed by a specialist contractor and taken offsite for treatment. If discharged to the Dee Estuary, no significant effects are considered likely to occur from these discharges on the basis that the discharge would continue to be regulated by NRW through the Environmental Permit required for the operation of the Proposed Development. This would be subject to a Permit Variation if taken forward, during which supporting studies would need to be undertaken to demonstrate that there would be no likely significant effects and that the proposed operation is WFD compliant. Where this outcome cannot be demonstrated to NRW's satisfaction the alternative option to dispose of waste water at an offsite licenced waste facility would be implemented.

Table 13-11: Summary of Residual Effects: Construction Phase (and Decommissioning Phase where relevant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
Surface Water							
River Dee	Surface Water: Very High	Main Development Area: Sediment impacts on surface water quality (Construction and Decommissioning Phase) Potential impacts on water quality due to uncontrolled discharge of sediment laden water associated with construction (and decommissioning activities.	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Kelsterton Brook / Old Rockcliffe Brook	Surface Water: Medium		Low adverse	Minor adverse (not significant)	No additional mitigation required.	Low adverse	Minor adverse (not significant)
Lead Brook	Surface Water: High		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Oakenholt Brook	Surface Water: Medium		Low adverse	Minor adverse (not significant)	No additional mitigation required.	Low adverse	Minor adverse (not significant)
River Dee	Surface Water: Very High	Main Development Area: Water quality impacts to surface water from oils, fuels and	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
Kelsterton Brook / Old Rockcliffe Brook	Surface Water: Medium	other construction chemicals (Construction and Decommissioning Phase) Potential temporary impacts on water quality due to spillage of soils, fuels, or other construction (or decommissioning) chemicals, or through uncontrolled site run-off	Low adverse	Minor adverse (not significant)	No additional mitigation required.	Low adverse	Minor adverse (not significant)
Lead Brook	Surface Water: High		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Oakenholt Brook	Surface Water: Medium		Low adverse	Minor adverse (not significant)	No additional mitigation required.	Low adverse	Minor adverse (not significant)
River Dee	Surface Water: Very High	Water Connection Corridor Refurbishment– water quality impacts The refurbishment works in waterbodies may cause localised, short-term increases in suspended sediment and turbidity, with minor runoff from construction activities.	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
River Dee	Surface Water: Very High	Proposed CO_2 Connection Corridor impact on surface water quality Excavation, open trenching, and back filling works associated with construction could be impacted by uncontrolled runoff laden with fine sediment or accidental spillage.	Negligible	Negligible	No additional mitigation required.	Negligible	Negligible
Pentre Brook	Surface Water: High		Negligible	Negligible	No additional mitigation required.	Negligible	Negligible
Allt-Goch Brook and tributary	Surface Water: Medium		Low adverse	Minor adverse (not significant)	No additional mitigation required.	Low adverse	Minor adverse (not significant)
Ditches	Surface Water: Low		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Hydromorphology							
Allt-Goch Brook and tributary	Morphology: Medium	Proposed CO_2 Connection Corridor impact on hydromorphology Potential changes to hydromorphology associated with	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Ditches	Morphology: Low		Moderate adverse	Minor adverse (not significant)	No additional	Moderate adverse	Minor adverse (not significant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
		alterations to surface drainage patterns or crossings of upstream field ditches could lead to sediment mobilisation and input to these channels. Potential open-cut intrusive crossings of ephemeral field ditches.			mitigation required.		
River Dee	Morphology: High Importance	<u>Water Connection Corridor</u> Refurbishment and minor repairs to the existing infrastructure	No impact	No change (not significant)	No additional mitigation required.	No impact	No Change (not significant)
Flood Risk							
Flood risk (tidal)	Very High: Construction Workers	Flooding from tidal sources during construction	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Flood risk (fluvial)	Essential infrastructure: Very High	Flooding from fluvial sources during construction	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
Flood risk (surface water)	Agricultural land: Medium Residential areas: High Water compatible habitats: Low	Flooding from groundwater sources during construction	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Flood risk (groundwater)		Flooding from groundwater sources during construction	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Flood risk (artificial sources / sewers)		Flooding from artificial sources / sewers sources during construction	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Groundwater							
Superficial Secondary undifferentiated aquifer (tidal flat deposits, till, head)	Groundwater: Low	Potential for contamination to enter the groundwater during construction due to accidental leakage and spills of fuels, oils, chemicals and concrete.	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Superficial Secondary A aquifer	Groundwater: Medium		Negligible	Negligible (not significant)	No additional	Negligible	Negligible (not significant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
(glaciofluvial)					mitigation required.		
Bedrock Secondary A aquifer	Groundwater: Medium		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Bedrock Secondary Undifferentiated	Groundwater: Low		No change	No change (not significant)	No additional mitigation required.	No change	No change (not significant)
Dee Estuary/ Aber Afon Dyfrdwy GWDTE	Groundwater: High		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Superficial Secondary undifferentiated aquifer (tidal flat deposits, till, head)	Groundwater: Low	Construction and excavations which require dewatering could have a potential effect on: -Groundwater flow and quantity through reduction in	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
Superficial Secondary A aquifer (glaciofluvial)	Groundwater: Medium	groundwater levels and locally altering groundwater flow direction. -Groundwater quality through discharges associated with the abstracted groundwater.	Negligible	Minor (not significant)		Negligible	Minor adverse (not significant)
Bedrock Secondary A aquifer	Groundwater: Medium		Low Adverse	Minor adverse (not significant)		Low Adverse	Minor adverse (not significant)
Bedrock Secondary Undifferentiated	Groundwater: Low		No change	No change (not significant)		No change	No change (not significant)
Dee Estuary/ Aber Afon Dyfrdwy GWDTE	Groundwater: High		Negligible	Negligible (not significant)		Negligible	Negligible (not significant)
Superficial Secondary undifferentiated aquifer (tidal flats deposits, till, head)	Groundwater: Low	<u>Subsurface structures</u> could have an effect on: • groundwater flow and quantity through impeding groundwater movement resulting	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
Superficial Secondary A aquifer (glaciofluvial)	Groundwater: Medium	in groundwater mounding on the upgradient side of the structure and reduced groundwater levels on the down gradient side of the structure; • groundwater quality through introduction of new pathways along boundaries of subsurface infrastructure.	Low Adverse	Minor (not significant)		Low Adverse	Minor adverse (not significant)
Bedrock Secondary A aquifer	Groundwater: Medium		Low Adverse	Minor (not significant)		Low Adverse	Minor adverse (not significant)
Bedrock Secondary Undifferentiated	Groundwater: Low		No change	No change (not significant)		No change	No change (not significant)
Dee Estuary/ Aber Afon Dyfrdwy GWDTE	Groundwater: High		Negligible	Negligible (not significant)		Negligible	Negligible (not significant)
Superficial Secondary undifferentiated aquifer (tidal flat deposits, till, head)	Groundwater: Low	There is the potential for reduction in infiltration to groundwater and therefore a potential local decrease in groundwater levels due to the construction of	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity/ Importance	Description of Impact	Magnitude of Impact prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect After Additional Mitigation
Superficial Secondary A aquifer (glaciofluvial)	Groundwater: Medium	worksites, stockpiles and roads.	Negligible	Negligible (not significant)		Negligible	Negligible (not significant)
Bedrock Secondary A aquifer	Groundwater: Medium		Negligible	Negligible (not significant)		Negligible	Negligible (not significant)
Bedrock Secondary Undifferentiated	Groundwater: Low		No change	No change (not significant)		No change	No change (not significant)
Dee Estuary/ Aber Afon Dyfrdwy GWDTE	Groundwater: High		No change	Negligible (not significant)		No change	No change (not significant)

Table 13-12: Summary of Residual Effects: Operational Phase

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
Surface Water							
River Dee	Surface Water: Very High	Cooling Water and process discharges impacts on temperature Changes in water quality from operational discharges from the Proposed Development associated with the cooling water temperature and quality.	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
River Dee	Surface Water: Very High	Process Water impacts on surface water quality Potential for contaminated process water	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
		from various operations to be accidentally discharges or to overflow to the surface water discharge and be discharged to surface water receptors.					
River Dee	Surface Water: Very High	Surface Water discharge impact on runoff impacts to water quality (including from chemical spills and fire water runoff)	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Old Rockcliffe Drain	Surface Water: Medium	Potential for contaminants to be mobilised by surface water runoff and to discharge into Old Rockcliffe Drain and River Dee via	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
		the drainage pipeline and outfall.					
River Dee	Surface Water: Very High	Foul Water Foul water contains pollutants, such as organic matter, nutrients, and harmful chemicals being discharged into surface water bodies. No discharge to waterbodies following embedded mitigation measures.	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Flood Risk							
Flood risk (tidal)	Very High: Construction Workers	Flooding from tidal sources during operation	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
Flood risk (fluvial)	Essential infrastructure: Very High Agricultural land: Medium Residential areas: High Water compatible habitats: Low	Flooding from fluvial sources during operation	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Flood risk (surface water)		Flooding from groundwater sources during operation	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Flood risk (groundwater)		Flooding from groundwater sources during operation	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Flood risk (artificial sources / sewers)		Flooding from artificial sources / sewers sources during operation	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Hydromorphology							
Allt-Goch Brook and tributaries	Hydromorphology: Medium	Proposed and Repurposed CO_2 Connection Corridors	No impact	Not applicable	No additional mitigation required.	No impact	Not applicable
Lead Brook	Hydromorphology: Medium	Presence of new crossings altering hydromorphology through changes	No impact	Not applicable	No additional mitigation required.	No impact	Not applicable

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
		to bed and banks, however not anticipated to be new pipelines and reinstatement for all sites.					
Kelsterton Brook / Old Rockcliffe Brook	Hydromorphology: Medium	Main Development Area changes to hydromorphology Potential changes to hydromorphology due to diversions or new structures within the channels (e.g. surface water drainage outfall').	Low adverse	Minor adverse (not significant)	No additional mitigation required.	Low adverse	Minor adverse (not significant)
Oakenholt Brook	Hydromorphology: Medium		Low adverse	Minor adverse (not significant)	No additional mitigation required.	Low adverse	Minor adverse (not significant)
Groundwater							
Superficial Secondary undifferentiated aquifer (tidal flat	Groundwater: Low	Subsurface structures could have an effect on: -Groundwater flow and quantity	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
deposit, till, head)		through impeding groundwater movement resulting in groundwater mounding on the upgradient side of the structure and reduced groundwater levels on the down gradient side of the structure. -Groundwater quality through introduction of new pathways along boundaries of subsurface infrastructure.					
Superficial Secondary A aquifer (glaciofluvial)	Groundwater: Medium		Low Adverse	Minor adverse (not significant)	No additional mitigation required.	Low Adverse	Minor adverse (not significant)
Bedrock Secondary A aquifer	Groundwater: Medium		Low Adverse	Minor adverse (not significant)	No additional mitigation required.	Low Adverse	Minor adverse (not significant)
Bedrock Secondary Undifferentiated	Groundwater: Low		No change	Not applicable	No additional mitigation required.	No change	Not applicable
Dee Estuary/ Aber Afon Dyfrdwy GWDTE	Groundwater: High		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Superficial Secondary undifferentiated	Groundwater: Low	Potential for new pathways could be created along foundations of	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
aquifer (tidal flat deposits, till, head)		structures or along utilities which could result in contaminants migrating and entering groundwater.					
Superficial Secondary A aquifer (glaciofluvial)	Groundwater: Medium		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Bedrock Secondary A aquifer	Groundwater: Medium		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Bedrock Secondary Undifferentiated	Groundwater: Low		No change	Not applicable	No additional mitigation required.	No change	Not applicable
Dee Estuary/ Aber Afon Dyfrdwy GWDTE	Groundwater: High		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
Superficial Secondary undifferentiated aquifer (tidal flat deposits, till, head)	Groundwater: Low	Contamination of groundwater as a result of chemical spills in the chemical storage area and its subsequent run-off.	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Superficial Secondary A aquifer (glaciofluvial)	Groundwater: Medium		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Bedrock Secondary A aquifer	Groundwater: Medium		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Bedrock Secondary Undifferentiated	Groundwater: Low		No change	Not applicable	No additional mitigation required.	No change	Not applicable
Dee Estuary/ Aber Afon	Groundwater: High		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
Dyfrdwy GWDTE							
Superficial Secondary undifferentiated aquifer (tidal flat deposits, till, head)	Groundwater: Low	Land raising would increase the distance between the groundwater aquifers and the ground surface which can increase recharge time to aquifers.	Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Superficial Secondary A aquifer (glaciofluvial)	Groundwater: Medium		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Bedrock Secondary A aquifer	Groundwater: Medium		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)
Bedrock Secondary Undifferentiated	Groundwater: Low		No change	Not applicable	No additional mitigation required.	No change	Not applicable

Receptor	Sensitivity / importance	Description of Impact	Magnitude of Impact Prior to Additional Mitigation	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
Dee Estuary/ Aber Afon Dyfrdwy GWDTE	Groundwater: High		Negligible	Negligible (not significant)	No additional mitigation required.	Negligible	Negligible (not significant)

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