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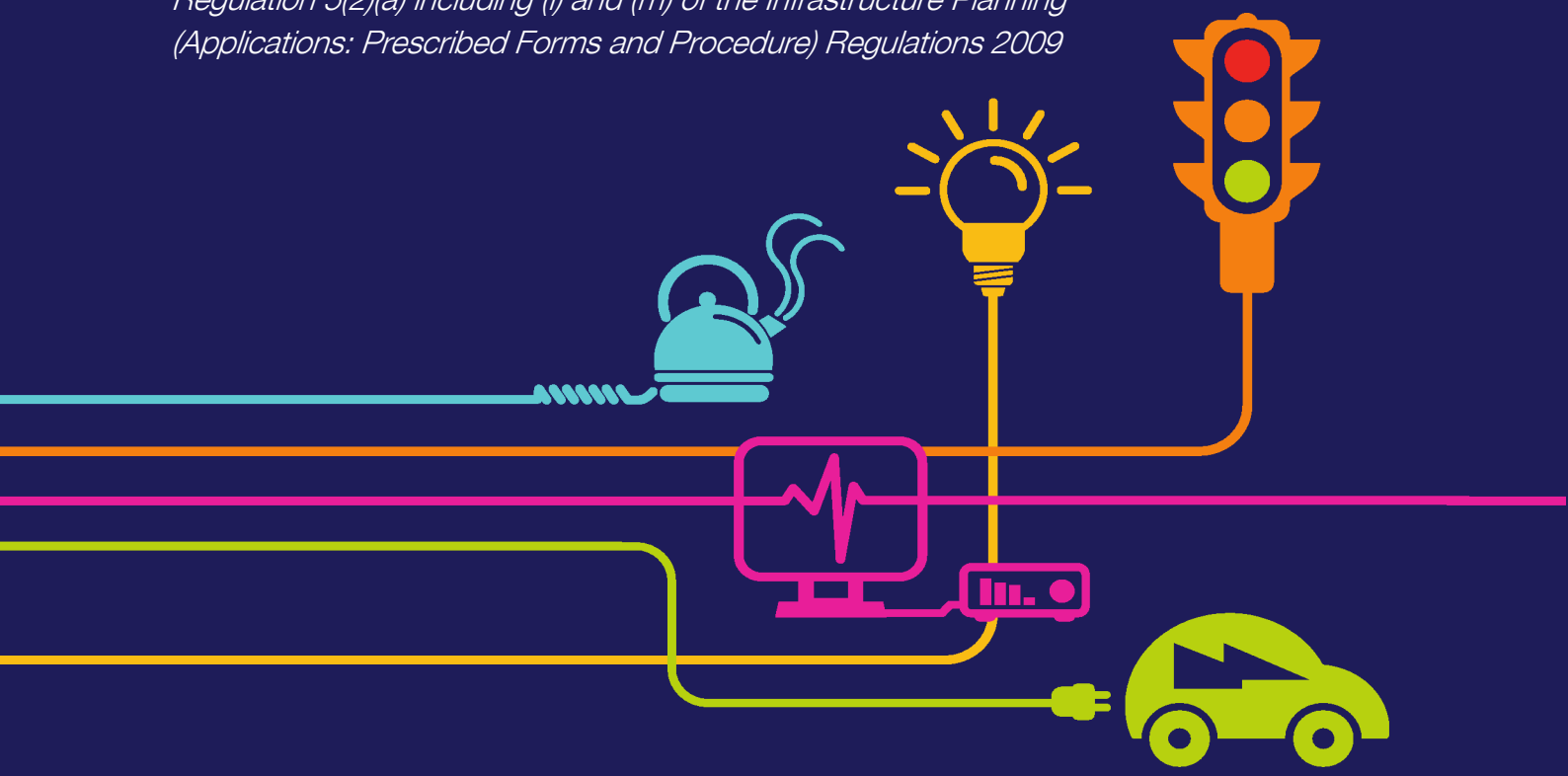
DOCUMENT 5.12

Environmental Statement Chapter 12

Water Quality, Resources and Flood Risk

National Grid (North Wales Connection Project)

Regulation 5(2)(a) including (l) and (m) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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National Grid
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

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Author		Guy Douglas	
Approved by		Liz Buchanan	
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1 Introduction

1.1 INTRODUCTION

1.1.1 This chapter contains information regarding the potential effects on water quality, resources and flood risk receptors resulting from the construction, operation, maintenance and decommissioning of the Proposed Development (as described in Chapter 3 Description of the Proposed Development (**Document 5.3**) and Chapter 4 Construction, Operation, Maintenance and Decommissioning of the Proposed Development (**Document 5.4**). The assessment takes into account the potential effects of environmental change through the lifetime of the Proposed Development, including changes in climate, land use and water quality. It also identifies mitigation measures that would be necessary to prevent, reduce or offset any likely significant adverse effects of the Proposed Development.

1.1.2 This chapter is supported by a number of Appendices as listed below:

- Appendix 12.1 - 4 (Documents 5.12.2.1 – 4): Flood Consequence Assessment (FCA) (12.1 Overarching FCA; 12.2 Substation Upgrades FCA; 12.3 Cable sealing end compound and tunnel head houses FCA; 12.4 Overhead lines (OHL) FCA).
- Appendix 12.5 (**Document 5.12.2.5**): Water Framework Directive Assessment;
- Appendix 12.6 (**Document 5.12.2.6**): Assessment of statutory national and international designated sites for hydrology
- Appendix 12.7 (**Document 5.12.2.7**): Local Planning Policy on Water Quality, Resources and Flood Risk.

1.1.3 Other documents that are interrelated to this Water Quality, Resources and Flood Risk assessment are:

- Chapter 5 EIA Consultation (**Document 5.5**), including responses to Comments made by Prescribed Consultees on the Scoping Report

- Chapter 9 Ecology and Nature Conservation, including maritime receptors (**Document 5.9**);
- Chapter 11 Geology, Hydrogeology and Ground Conditions (**Document 5.11**);
- Chapter 19 Intra-Project Cumulative Effects, which considers cumulative effects on receptors in the water environment from the Proposed Development (**Document 5.19**);
- Chapter 20 Inter–Project Cumulative Effects (**Document 5.20**); and
- Construction Environmental Management Plan (CEMP) (**Document 7.4**);

1.1.4 All technical terms and abbreviations used within this chapter are defined in the Glossary and Abbreviations (**Document 1.4**).

2 Legislation and Planning Policy

2.1 INTRODUCTION

2.1.1 This section sets out the legislative and planning policy framework that is relevant to the water quality resources and flood risk assessment. A full review of compliance with national and local planning policy is provided in the Planning Statement (Document 7.14) and a full review of relevant legislation is set out in the Legislation Compliance Appendix (Document 5.28.2.1).

2.2 LEGISLATION

The Water Framework Directive

2.2.1 The EU Water Framework Directive (WFD) (2000/60/EC), is enacted into domestic law by the Water Environment (WFD) (England and Wales) Regulations 2017. A fundamental requirement of the WFD is to attain 'good ecological status', or 'good ecological potential' within each defined water body, by December 2027 at the latest and to ensure that any deterioration in status is prevented. National Resources Wales (NRW) Guidance on the WFD published on the 26 May 2017, in relation to the classification of non reportable waterbodies, has also been followed within this chapter.

2.2.2 Operational Guidance Note (OGN) 72 Guidance for Assessing Activities and Projects for Compliance with the WFD (OGN72) Wales has been published by NRW (Ref 12.1). It is accompanied by the operational guidance note OGN 73 (Ref 12.2), WFD – Deterioration in Water Body Status which explains NRW's interpretation of WFD water body deterioration. In summary, the guidance states that the 'no deterioration criterion' applies to each supporting WFD element.

2.2.3 For surface waters there are two separate classifications for water bodies: ecological and chemical. For a surface water body to be in overall 'good' status both ecological and chemical status must be at least 'good'. Ecological status is recorded on a scale high, good, moderate, poor and bad and is classified by evaluation of the biological, physico-chemical and hydromorphological elements against various standards or benchmarks (e.g. Environmental Quality Standards (EQSs) for water quality). Chemical status

is recorded as good or fail, and is evaluated on the basis of meeting EQSs for specific priority substances or priority hazardous substances, such as pesticides and heavy metals. Current EQSs for WFD in England and Wales are specified in the WFD Directions 2015 (Ref 12.11).

2.2.4 The Planning Inspectorate (PINS) have provided an advice note on the WFD on preparing a DCO application in respect of the WFD Assessment (Ref 12.3). It advises that there is a need to identify the implications of the proposed development for the objectives of the WFD and the relevant River Basin Management Plans (RBMPs). RBMPs consider the status or potential of water bodies for all aspects of the water environment, including river catchments, inland standing waters (ponds, lakes and reservoirs), groundwater, transitional (estuarine) and coastal waters. The assessment provided in this chapter considers only those water bodies relating to inland rivers, standing water bodies and coastal water bodies. An overview of the status of groundwater bodies is provided in Chapter 11 Geology, Hydrogeology and Ground Conditions **(Document 5.11)**. The WFD Assessment, provided in Appendix 12.5 **(Document 5.12.2.5)** provides an overall assessment of compliance with the WFD, taking into account the effects on these different components of the water environment.

The EU Floods Directive

2.2.5 The EU Floods Directive (2007/60/EC) is enacted into domestic law by the Flood Risk Regulations 2009. It requires that in accordance with flood risk management plans, there should be a focus on the prevention of flooding, through avoidance of planned development in present and future flood prone areas, and protection by taking measures to reduce the likelihood of flooding.

Environmental Quality Standards Directive

2.2.6 The Environmental Quality Standards (Directive 2008/105/EC) is a 'daughter directive' of the WFD and sets out the criteria for good surface water chemical status under the Directive. It is implemented through the Environmental Permitting Regulations described below. This takes the form of Priority Substances and Priority Hazardous Substances together with their EQSs which must be met to achieve 'Good Chemical Status'. These EQSs are taken into account within the assessment to ensure that the Proposed Development does not compromise EQSs.

The Conservation of Habitats and Species Regulations 2017

2.2.7 The Conservation of Habitats and Species Regulations 2017 is enacted within England and Wales to transpose the EU Habitats Directive (92/43/EEC) and aspects of the Wild Birds Directive (2009/147/EC). The Regulations cover

the selection, designation, registration and management of European sites (also known as Natura 2000 sites), and list European protected species of animals and plants. Conservation Objectives must ensure that the European protected species identified as qualifying features of a Natura 2000 site remain or reach favourable condition (such as by maintaining the extent and distribution of habitats of qualifying features). This means that where a proposed development may affect a Conservation Objective of a Natura 2000 site, the design will need to include appropriate measures to ensure the Conservation Objectives are not adversely affected.

Environmental Permitting Regulations 2016

2.2.8 The 2016 Environmental Permitting (England and Wales) (Amendment No,2) replaces the previous 2010 regulations. It provides a consolidated framework for environmental permits and exemptions for waste operations and water discharge activities (previously consented under the Water Resources Act 1991, and the Control of Pollution Act 1974), and groundwater activities. It also sets out the powers, functions and duties of the regulators. The Proposed Development will need to be in compliance with the Environmental Permitting Regulations. As such permit applications will be submitted for approval by NRW as required. As part of this Flood Risk Activities Permits (FRAPs) are required for any works within 8 m of a non-tidal 'Main River', and within 16 m of a tidal 'Main River'. This replaces the former Flood Defence Consent regime which was under the Land Drainage Act 1991 and the Water Management Act. This is to ensure that works do not increase flood risk, damage flood defences, or harm the water environment.

Environmental Damage Regulations 2015

2.2.9 The 2015 Environmental Damage (Prevention and Remediation) (Wales) applies to the damage of protected species, Sites of Special Scientific Interest, and the Water Environment. It implements Directive 2004/35/EC on environmental liability to ensure that where there is imminent risk of environmental damage, the operator must take steps to prevent it, and to provide remediation in cases where it has occurred.

Flood and Water Management Act 2010

2.2.10 The Flood and Water Management Act sets out the Government's proposals to improve flood risk management, water quality and ensure water supplies are more secure. The act includes consideration and responsibilities for managing flood risk and consideration of drainage including the use of SuDS.

Land Drainage Act 1991

2.2.11 The Land Drainage Act (as amended) in combination with the Water Resources Act, stipulated that before work on or near a watercourse is carried out a Flood Defence Consent is required for a 'Main River', and Ordinary Watercourse Consent is required for an 'Ordinary Watercourse'. As noted the Flood Defence consenting regime was replaced by FRAPS under the Environmental Permitting Regulations 2016. Work affecting Ordinary Watercourses remain subject to Ordinary Watercourse consents.

2.2.12 Relevant legislation and compliance with that legislation is also discussed in Appendix 28.1 Legislation Compliance Audit (**Document 5.28.2.1**).

2.3 NATIONAL POLICY

National Policy Statements

2.3.1 National Policy Statements set out the primary policy test against which the application for a DCO for the Proposed Development will be considered. National policy related to nationally significant energy infrastructure projects is set out in the Overarching National Policy Statement for Energy (EN-1) (Ref 12.4). Also of relevance to the Proposed Development is the National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 12.5). These two documents provide the primary policy tests related to the Proposed Development. Policies relevant to the scope of potential effects on Water Quality, Resources and Flood Risk are outlined in **Table 12.1**.

Table 12.1: Relevant National Policy

National Policy	How the policy has been addressed in the assessment
National Policy Statement (NPS) for Energy EN-1 NPS EN-1 identifies requirements to assess the potential impacts of energy projects on flood risk (Section 5.7), and water quality and water resources (Section 5.15), including consideration of climate change effects over the proposed development lifetime (Section 4.8).	
Paragraph 5.15.2 Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics	The future baseline, accounting for climate change is presented in Paragraphs 7.7.1 to 7.7.6 in section 7. An assessment of the effects of the Proposed Development on the aquatic environment (which includes water quality, water resources and flood risk

Table 12.1: Relevant National Policy	
National Policy	How the policy has been addressed in the assessment
of the water environment as part of the ES or equivalent.	receptors) is provided in section 8 which deals with potential effects and section 9 which deals with mitigation and residual effects.
Paragraph 5.15.3 'The ES should in particular describe: • The existing quality of waters affected by the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges; • Existing water resources affected by the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and in reference to Catchment Abstraction Management Strategies; • Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics; and • Any impacts of the proposed project on water bodies or protected areas under the WFD and Source Protection Zones (SPZs) around potable groundwater abstractions'.	The baseline characteristics of the aquatic environment (which includes water quality, water resources and flood risk) has been provided in section 7. The water resources baseline includes licensed discharges and licensed and private abstractions in section 7.4. An assessment for the Proposed Development has been carried out for the aquatic environment (which includes water quality, water resources and flood risk receptors) in section 8 which deals with potential effects and section 9 which deals with mitigation and residual effects.
Paragraph 5.7.7 states that 'Applicants for projects which may be affected by, or may add to, flood risk should arrange	The statutory body in Wales is NRW and discussions have been held with both NRW and Lead Local Flood

Table 12.1: Relevant National Policy	
National Policy	How the policy has been addressed in the assessment
pre-application discussions with the EA, and, where relevant, other bodies such as Internal Drainage Boards, sewerage undertakers, navigation authorities, highways authorities and reservoir owners and operators. Such discussions should identify the likelihood and possible extent and nature of the flood risk, help scope the FRA, and identify the information that will be required by the Infrastructure Planning Committee IPC [now The Planning Inspectorate for England and Wales (PINS)] to reach a decision on the application when it is submitted.'	Authorities (LLFAs) at the Scoping, Stage 3 consultation, and the main EIA stage of assessment. A FCA has been undertaken and is provided in Appendices 12.1 – 4 **(Documents 5.12.2.1 – 4)**.
Paragraph 5.15.6 outlines that 'The IPC [now PINS] should satisfy itself that a proposal has regard to the River Basin Management Plans and meets the requirements of the Water Framework Directive (including Article 4.7) and its daughter directives, including those on priority substances and groundwater.'	WFD classifications and objectives are taken into account, as the WFD water bodies themselves are receptors in the assessment. The assessment of potential effects on WFD water bodies is based on the findings of the WFD Assessment which is provided in Appendix 12.5 **(Document 5.12.2.5)**.
NPS for Electricity Networks Infrastructure EN-5 NPS EN-5 restates the requirements of NPS EN-1 that due consideration and assessment is given to the effects of future climate change on flood risk to electricity transmission infrastructure (Section 2.4).	
Paragraph 2.4.1 requires that 'Applicants should set out to what extent the proposed development is expected to be vulnerable, and, as appropriate, how it would be resilient to: flooding, particularly for substations that are vital for the electricity transmission and distribution network; effects of wind and storms on overhead lines; higher average temperatures leading to	The FCA, provided in Appendices 12.1 – 4 **(Documents 5.12.2.1 – 4)**, addresses the issue of resilience to flooding. This takes into account the resilience of pylon design to other aspects of climate change, such as wind and storms and higher temperatures.

Table 12.1: Relevant National Policy	
National Policy	How the policy has been addressed in the assessment
increased transmission losses; and earth movement or subsidence caused by flooding or drought (for underground cables).'	

Planning Policy Wales

2.3.2 Whilst the National Policy Statements are the overarching policies against which the proposals will be primarily considered, regard has also been given to Welsh Government policy, compromising both national (Welsh) and local policy documents.

2.3.3 The consultation draft of Planning Policy Wales (PPW) Edition 10 was issued for review in March 2018. PPW Edition 10 does not contain any additional relevant policies further to those provided in PPW Edition 9. Currently PPW Edition 9 is still applicable and sets out objectives for minimising and managing environmental risks and pollution within Chapter 13, which includes preventing, or managing pollution and promoting environmental good practice. Policies relevant to the scope of potential effects on Water Quality, Resources and Flood Risk are outlined in Table 12.2.

Table 12.2: Relevant Policies from PPW	
Planning Policy Wales 9	How the Policy has been addressed in the assessment
Planning Policy Wales 9 Sections 13.2-13.4 and TAN15: Development and Flood Risk aim to direct new development away from areas at high risk of flooding. Section 13.2 of Planning Policy Wales 9 refers to TAN15 guidance. Where development has to be considered in high risk areas, only those developments that satisfy the 'Justification Test' should be located in such areas. TAN15 also discusses management of surface water (including the use of Sustainable Drainage) and climate change effects.	All of the requirements relating to flood risk are addressed in the FCA provided in Appendices 12.1 - 4 **(Documents 5.12.2.1 – 4)**. This has taken into account technical advice note TAN 15, which provides technical guidance (Ref 12.6) on development and flood risk that supplements the policy set out in PPW 9.

Planning Policy Wales 10 Paragraph 5.157 and Planning Policy 9 Section 4.5 requires 'planning for the consequences of climate change and states that consideration of climate change impacts should use the latest set of UK Climate Projections.	Impacts of climate change on the water environment, and in particular on flood risk, are considered within the Baseline conditions in section 7. The FCA takes account of the climate change allowances defined via the latest UK Climate Change projections and set out in supplementary guidance as discussed in more detail in the FCA in Appendix 12.1 **(Document 5.12.2.1)**.
Planning Policy Wales 9 also discusses water in the context of water supply and waste water management (Section 12.2-12.4) and improving the quality of air and water (Section 13.10-13.12)	An assessment of the effects of the Proposed Development on the aquatic environment, water resources and flood risk receptors are included on a Project-wide basis in sections 8 and 9 of this chapter.

2.4 LOCAL PLANNING POLICY

2.4.1 Please refer to the planning policy appendix specific to this topic (Appendix 12.7, **Document 5.12.2.7**).

3 Scope of Assessment

3.1 INTRODUCTION

3.1.1 This section describes the scope of the assessment of effects on water quality, resources and flood risk, with reference to the Secretary of State's (SoS) Scoping Opinion.

3.2 SECRETARY OF STATE'S SCOPING OPINION

3.2.1 Table 12.3 below presents the comments which were raised in the Secretary of State's Scoping Opinion and how these have been addressed in this assessment.

Table 12.3 Issues Raised in the Secretary of State's Scoping Opinion

Para-graph	Issue Raised by SoS	Response
3.36	Paragraph 9.7.14 proposes to scope out potential impacts from the construction of bridge deck crossings, however Appendix 9.2 proposes to scope in potential effects on water quality, water resources and flood risk. On the basis that no information has been provided regarding the construction methodology or precise locations of the bridge deck crossing, the Secretary of State does not agree this can be scoped out at this stage.	The Proposed Development now includes a tunnel crossing of the Menai Strait (see Menai Strait Crossing Report (**Document 9.6**)). Chapter 4, Construction, Operation, Maintenance and Decommissioning (**Document 5.4**) describes how the tunnel would be constructed.
3.105	The Secretary of State welcomes the definition of study areas within the Scoping Report and notes the two-tiered approach of a 'Local Hydrological Study Area' (LHSA) and a 'Wider Hydrological Study Area' (WHSA). However,	The supporting Figure 12.1 **(Document 5.12.1.1)** delineates the extent of the WHSA. Section 6 provides a description and rationale for the selection of the LHSA and WHSA. The study areas were presented to NRW/IACC and

Table 12.3 Issues Raised in the Secretary of State's Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
	the WHSA has not been as clearly identified as the LHSA and it would be useful for a figure to be provided showing the extent of the WHSA. The final study areas used in the EIA should be discussed with consultees, including NRW and the IACC and Gwynedd Council as the lead local flood authorities. The ES should justify the study areas chosen.	Gwynedd Council on 12 February 2016 and included within the Preliminary Environmental Information Reports (PEIR).
3.107	The Scoping Report presents average rainfall estimates for the period of 1961-1990; this data is therefore over 25 years old and the Secretary of State queries whether more up-to-date data is available. Should data of this age be used, the ES should justify its appropriateness and the Applicant is advised to agree its use with relevant consultees.	The Standard Average Annual Rainfall (SAAR) values are provided for the purpose of providing context in this chapter. They represent widely used and easily accessible data, which can be interrogated at a detailed level. However in Paragraph 7.2.5, climate data from the nearest weather station (Valley) has also been provided for the climate period 1981 – 2010 for context. For the purposes of assessing flood risk the FCA Appendices 12.1 – 4 **(Documents 5.12.2.1 – 4)** has used the most up to date UK guidance and data for rainfall.
3.110	The Secretary of State welcomes the provision of a Flood Consequence Assessment (FCA) that will accord with NPS EN-1. The FCA should form an appendix to the ES and should clearly demonstrate and evidence how the sequential and exception tests can be passed.	The FCA is provided in Appendices 12.1 –4 **(Documents 5.12.2.1 – 4)** of this chapter. It demonstrates how the sequential and exception tests can be passed.

Table 12.3 Issues Raised in the Secretary of State's Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
3.111	The Scoping Report states that the Scoping Study Area crosses several areas of Flood Zone C2. In accordance with NPS EN-1, the ES should therefore demonstrate that the proposed development will not result in a net loss of floodplain storage and will not impede water flows.	The FCA Appendices 12.1 – 4 **(Documents 5.12.2.1 – 4)** and the residual effects reported in section 9.5 of this chapter, both demonstrate that following the implementation of prescribed mitigation measures, the Proposed Development would not result in a net loss of floodplain storage and would not impede water flows.
3.112	The Secretary of State welcomes that drainage impact assessments would be provided where significant areas of new and permanent impermeable surfaces would be developed. The Scoping Report states that this would most notably be at the SECs and location of the works to the existing substations. The Applicant should give consideration to providing such an assessment for the tunnel head houses (should a tunnel be chosen). In accordance with NPS EN-1, the drainage system should comply with any National Standards published by Ministers under Paragraph 5(1) of Schedule 3 to the Flood and Water Management Act 2010; this should be demonstrated within the assessments.	As outlined in Table 12.20 Water Environment (WE) Mitigation Measures 51 - 53 include for the provision of a Drainage Management Plan post grant of a DCO, and this would build upon drainage information where appropriate. The provision of the Drainage Management Plan would be secured through DCO Requirement 7. Outline drainage information has also been provided for the Construction and Operational Compounds at Braint and Tŷ Fodol Tunnel Head House and Cable Sealing End Compounds in Appendix 12.3 (**Document 5.12.2.3)**. Outline drainage information is also referenced in Appendix 12.4 **(Document 5.12.2.4)** for the Construction Compounds at Penmynydd Road and Pentir. The key requirements for drainage strategies throughout the Order Limits are discussed in FCA Volume 4 (**Document 5.12.2.4**) and in the CEMP (**Document 7.4**).
3.113	Paragraph 9.6.34 of the Scoping	The CEMP **(Document 7.4)** includes

Table 12.3 Issues Raised in the Secretary of State's Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
	Report states that 'it is not proposed to quantify the drainage impact of temporary aggregate-surfaced access roads and construction compounds used for the construction of the Project'. However, the Secretary of State is concerned that the 6 year construction period is not 'temporary' and considers that this approach should be discussed and agreed with the relevant consultees.	measures to ensure that access track drainage impacts are managed. In particular measures WE51 - 53 outline typical drainage management measures that would ensure that runoff does not contribute towards track deterioration. The need for quantification of drainage impacts in relation to access tracks was discussed with relevant consultees and no changes to the proposed approach have been necessary. A flood modelling assessment is provided in Annex A to Appendix 12.3 **(Document 5.12.2.3).** This has demonstrated that the Braint tunnel head house/cable sealing end compound (THH/CSEC) platform would remain safe during the design 0.1% AEP + 7% climate change scenario. Outline drainage information has been provided for each of the construction and operational compounds at the Braint and Tŷ Fodol sites in Appendix 12.3 **(Document 5.12.2.3)** and for the Penmynydd Road and Pentir construction compounds provided in Appendix 12.4 **(Document 5.12.2.4).** This shows that flood risk generated on-site would be adequately mitigated as required by EN-1 and TAN 15. As outlined in Table 12.20 within this chapter measure WE51 has been identified for the development of a Drainage Management Plan, which

Table 12.3 Issues Raised in the Secretary of State's Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
		would build upon drainage information where appropriate. The provision of a Drainage Management Plan would be secured through DCO Requirement 7.
3.114	The Secretary of State notes the screening assessment for potential impacts on designated sites in Appendix 9.1 of the Scoping Report and advises that this information is also provided in the ES to demonstrate that sites screened out of the assessment have not simply been overlooked.	These screening assessment details are provided in Appendix 12.6: Assessment of statutory national and international designated sites for hydrology **(Document 5.12.2.6)**.
3.115	The Secretary of State welcomes the consideration of design mitigation early on the design phase of the proposed development, including the incorporation of sustainable drainage elements; details of which should be provided in the ES. In relation to bridges, where certain designs are proposed to minimise morphological disturbance and conveyance effects, the Applicant should ensure that any such designs are appropriately secured within the DCO application (e.g. as part of the authorised development within the draft DCO, through a DCO requirement, or through a management plan that would be subject to a DCO requirement).	The approval of designs and management plans would be secured through DCO Requirement 7. Relevant CEMP measures secured through DCO Requirement 6 are presented in Table 12.20. Flood Management (FM) Measure FM12 outlines that Flood Risk Activities Permits or Ordinary Watercourse Consents (OWC) to cover all watercourse crossings. The CEMP **(Document 7.4)** would be secured through DCO Requirement 6. FM24 and FM25 also set out management plans that would be required for works including bridges and culverting works. Outline drainage information has also been provided for each of the construction and operational compounds at Braint and Tŷ Fodol in

Table 12.3 Issues Raised in the Secretary of State's Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
		Appendix 12.3 **(Document 5.12.2.3).** Outline drainage information is referenced for the Penmynydd Road and Pentir Construction Compounds are provided in Appendix 12.4 **(Document 5.12.2.4)**. The key requirements for drainage throughout the Order Limits are discussed in Appendix 12.4 **(Document 5.12.2.4)**. The CEMP measures WE 51 – 53 require the preparation and submission of a detailed Drainage Management Plan to NRW, which would build on all of this drainage information. The provision of a Drainage Management Plan would be secured through DCO Requirement 7.
3.116	Similarly, any control management measures and bespoke mitigation should be appropriately controlled through the draft DCO. The Scoping Report states that discussed measures would be specified in a CEMP as the project develops; the Secretary of State notes the draft provided in Appendix 4.1 of the Scoping Report and would expect a refined draft to be provided with the application documents. Similarly, a draft of the Water Management Plan referred to in paragraph 9.7.25 of the Scoping Report should be provided.	The key requirements for drainage throughout the Order Limits are discussed in FCA Volume 4 (**Document 5.12.2.4**) and in the CEMP (**Document 7.4**). The CEMP which is secured by DCO Requirement 6, requires the preparation and submission of a detailed specific Drainage Management Plan to NRW, which would build on this drainage information (WE51). The Drainage Management Plan would be secured through DCO Requirement 7. A Water Management Plan for the crossing of the Menai Strait is no longer required as the crossing is now by tunnel and the tunnel compounds are a considerable distance from the Menai Strait

Table 12.3 Issues Raised in the Secretary of State's Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
		Coastal WFD Water Body (GB681010120000). Outline drainage information has been provided for each of the construction and operational compounds at Braint and Tŷ Fodol in Appendix 12.3 **(Document 5.12.2.3)**, and for the Penmynydd Road and Pentir Construction Compounds in Appendix 12.4 **(Document 5.12.2.4)**.
3.117	The Secretary of State notes the presence of reservoirs within the Scoping Study Area; the ES should appropriately assess the potential impacts on these water bodies. The Applicant is advised to consult Dŵr Cymru in relation to these receptors.	Discussions have been held with NRW and Dŵr Cymru Welsh Water (DCWW) in relation to these receptors. Chapter 5 EIA Consultation **(Document 5.5)** provides details of stakeholder consultation. Potential effects on both the Alaw and Cefni reservoirs are reported in section 9 of this chapter.

3.3 CONSULTATION

3.3.1 Meetings have been held with Isle of Anglesey County Council (IACC), Gwynedd Council and Natural Resources Wales (NRW) to discuss the scope methodology and assessment results of the Water Quality Resources and Flood Risk assessment, as described within this chapter. Chapter 5, EIA Consultation (Document 5.5) lists all the meetings which have taken place and the topics discussed.

3.3.2 Responses to comments from Stage 3 Consultation can be found in Chapter 5, Appendix 5.2 Schedule of responses to the Preliminary Environmental Information Report (Document 5.5.2.2) and the Consultation Report (Document 6.1). Responses to comments provided during the technical stakeholder review of the draft ES are provided in Chapter 5, Appendix 5.3 Schedule of responses to the technical stakeholder review of the draft Environmental Statement (Document 5.5.2.3).

3.4 UPDATES SINCE SCOPING

3.4.1 A number of minor amendments and clarifications have been made to the assessment methodology to address comments raised and discussed with consultees, as set out in sections 4.4 and 4.5.

3.5 SCOPE OF ASSESSMENT

3.5.1 The broad scope of assessment for this chapter includes water quality, water resources and flood risk for surface waters, in relation to the construction, operation, maintenance and decommissioning phases of the Proposed Development. It considers only surface waters and, for the most part, considers only the freshwater environment. The exception is the inclusion of marine water quality for the Menai Strait. Chapter 9 'Ecology and Nature Conservation' **(Document 5.9)** also covers the effects on the marine environment in relation to the Menai Strait.

3.5.2 Detailed methodologies for the FCA and WFD assessment are set out in the method statements in Appendices 12.1 (**Document 5.12.2.1**) and Appendix 12.5 **(Document 5.12.2.5)** respectively.

3.5.3 Further to the FCA method statement, and as a result of further consultation with NRW, it was discussed that flood modelling of the Lower Braint should be undertaken to inform the FCA. The results of this modelling are presented in the FCA in Appendix 12.3 **(Document 5.12.2.3)**.

3.5.4 As discussed in the FCA in Appendix 12.1 (**Document 5.12.2.1**) coastal flood risk is not included in the assessment, as discussed with NRW in January 2017.

Welsh Language

3.5.5 Consideration has been given to the potential for this topic to impact on the Welsh language in any way, drawing upon the findings of the Welsh Language Impact Assessment (**Document 5.26**). It has been concluded that there is no potential for the sources of effects or affected receptors dealt with in this chapter to have any effects upon the Welsh language.

4 Methodology

4.1 INTRODUCTION

4.1.1 This section outlines the technical methods used to determine the baseline, how it could be impacted by the Proposed Development and how significant the effects of these impacts are likely to be.

4.2 GUIDANCE SPECIFIC TO WATER QUALITY, RESOURCES AND FLOOD RISK

4.2.1 The following technical guidance is of relevance to the assessment of water quality, resources and flood risk baseline information in EIA terms:

- The European Water Framework Directive (WFD) is the most substantial piece of European water legislation to date, and is focused on delivering an integrated approach to the protection and sustainable use of the water environment on a river basin scale. One of the primary objectives of the Directive is for individual water bodies to achieve 'good status' which, for surface water bodies, requires both good ecological status and good chemical status to be achieved. For groundwater bodies, good status is achieved when both quantitative status and chemical status are at least good. NRW have provided operational guidance (OGN 72, 73) notes on the WFD classification process (Ref 12.1, Ref 12.2). NRW have also provided guidance on water resource pressures in relation to WFD waterbodies (Ref 12.12).

- The TAN 15 (Ref 12.5) accompanying the PPW sets out the Welsh Government's policy on development and flood risk. The key planning objectives of TAN15 are to avoid inappropriate development in areas of high flood risk and to avoid that the development increases flood risk elsewhere. Flood risk zones are depicted on the development advice map which is based on the EA's extreme flood outlines and the British Geological Survey (BGS) drift data. Flood risk can then be assessed using definitions of vulnerable development.

4.2.2 Guidance related to best practice measures during design and construction includes:

- Revised Netregs 2017 Guidance for Pollution Prevention (GPPs) (Ref 12.9) including GPP2: Above ground oil storage tanks, GPP5: Works

and maintenance in or near water, PPG7: Safe storage – The safe operation of refuelling facilities, PPG21: Pollution incident response planning;

- CIRIA Report C753: The SuDS Manual (Ref 12.7);
- CIRIA Report C532: Control of water pollution from construction sites (Ref 12.13);
- CIRIA Report C648: Control of water pollution from linear construction projects – technical guidance (Ref 12.14);
- CIRIA Report C649: Control of water pollution from linear construction projects – Style Guide (Ref 12.15); and
- CIRIA Report C692: Environmental good practice on-site (third edition) (Ref 12.16).

4.3 BASELINE DATA GATHERING AND FORECASTING METHODS

Identification of Receptors

4.3.1 The baseline characterisation has identified receptors that fall within the following three broad receptor categories:

- Aquatic environment;
- Water resources; and
- Flood risk.

4.3.2 Each of these receptors is discussed below.

Aquatic environment receptors

4.3.3 Aquatic environment receptors are defined within this assessment as either WFD surface water bodies or freshwater-dependent designated nature conservation sites. The Menai Strait coastal WFD water body is also included as an aquatic receptor so that the assessment of all surface water quality effects is considered within a single assessment.

4.3.4 A WFD assessment has been undertaken to support the ES and the results are presented in Appendix 12.5 **(Document 5.12.2.5)**. In respect of the WFD, this chapter looks at the potential effect on water quality and hydromorphology only. Effects on biological WFD classification elements are addressed in the WFD Assessment in Appendix 12.5 and in Chapter 9 Ecology and Nature Conservation **(Document 5.9)**, with the exception of diatoms which are not

considered to be potential receptors of likely significant ecological effects, and are not considered further within either chapter.

4.3.5 WFD monitoring and classification data is typically derived from the principal watercourses within the catchment. It should be noted however that within this chapter the assessment has considered all watercourses within WFD catchments to ensure that any potential effects have been captured and managed to an acceptable level for all catchment receptors.

4.3.6 The potential for impacts on the supporting water quality and hydromorphology for freshwater dependent sites is also considered. This includes all sites that are internationally and nationally designated for nature conservation purposes (i.e. Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar Sites, Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR)); and local nature conservation designations (i.e. Local Nature Reserves (LNR) and County Wildlife Sites (CWS)). In this context, the potential surface water dependence and consequent impacts on water quality and hydromorphology arising from the Proposed Development are considered in respect of the condition and conservation objectives of each designated site.

Water Resources Receptors

4.3.7 Water resources receptors are defined within this assessment as surface water abstractions and discharges including their associated upstream catchment.

4.3.8 Details of surface water abstractions and discharges in the study area have been obtained from an NRW Catchment Abstraction Management Strategy (CAMS) database. The abstraction data comprises of licensed abstractions that exceed 20 m^3/day.

4.3.9 In addition, IACC and Gwynedd Council were contacted for any information held on private water supplies of less than 20 m^3/day, to identify any isolated properties that may obtain their drinking water from surface water features. However, some of the data on small private water supplies only provides a location, not the source of the abstraction (i.e. whether it is surface water or groundwater). The unlicensed private water supplies of unknown source have therefore been assessed both in this chapter and in Chapter 11 Geology, Hydrogeology and Ground Conditions **(Document 5.11)** for completeness.

Flood Risk Receptors

4.3.10 Flood risk receptors are defined within this assessment as people, properties and infrastructure that could be at risk of flooding. Receptors have been identified in the FCA Appendices 12.1 – 4 **(Document 5.12.2.4)**, and are also included as receptors within the assessment of effects in this chapter.

Future Baseline

4.3.11 Baseline conditions for water quality, resources and flood risk are expected to change over the anticipated lifetime of the Proposed Development as a consequence of climate change, and as a result of measures taken to improve the water environment in the context of the WFD. These factors have been taken into account, where practicable, as part of the appraisal of potential effects presented in section 8.

4.3.12 The assessment of operational and decommissioning effects assumes a baseline WFD water body classification of good status. This is in recognition of the objectives of WFD, which places an obligation on Member States to achieve good status in all surface waters by 2027 at the latest.

4.3.13 The assessment of flood risk provided in this chapter is informed by the results of the FCA in Appendices 12.1 – 4 **(Documents 5.12.2.1 - 4)** which takes into account future EA (Ref 12.17) and Welsh Government (Ref 12.8) climate scenarios and the projected increases in rainfall, river flow and tidal conditions. It is a requirement that all development infrastructure (e.g. water drainage or conveyance systems) to be designed with additional capacity to account for these changing conditions. Therefore, the Proposed Development has accounted for these future changes.

4.4 ASSESSMENT CRITERIA

Value and Sensitivity of Receptors

4.4.1 The definition of sensitivity values for water quality, resources and flood risk receptors is summarised in Table 12.4.

Table 12.4: Summary of Sensitivity Criteria for Water Quality, Resources and Flood Risk receptors

Sensitivity Value for Receptor	Criteria	Receptor Type	Example
Very high	Feature with a very high yield, quality or	Aquatic environment	Conditions supporting sites with international

Table 12.4: Summary of Sensitivity Criteria for Water Quality, Resources and Flood Risk receptors			
Sensitivity Value for Receptor	Criteria	Receptor Type	Example
	rarity with little potential for substitution.		conservation designations (SACs, SPAs, Ramsar sites), where the designation is based specifically on aquatic features. High status WFD water bodies
	Water resources supporting human health and economic activity at a regional scale.	Water resources	Regionally important public surface water supplies or permitted discharges.
	Features with a very high vulnerability to flooding.	Flood risk	Critical National Infrastructure (CNI) assets as defined in the National Flood Resilience Review (Ref 12.18) (such as energy and water utilities, health, transport and telecommunications) on which substantial numbers of people (>10,000) and communities depend. TAN15 development categories defined as 'Emergency Services' which need to be operational and accessible at all times, and during flooding. Service types include hospitals ambulance stations, emergency depots and buildings used to provide emergency shelter in

Table 12.4: Summary of Sensitivity Criteria for Water Quality, Resources and Flood Risk receptors			
Sensitivity Value for Receptor	Criteria	Receptor Type	Example
			times of flood.
High	Feature with a high yield, quality or rarity with a limited potential for substitution.	Aquatic environment	Conditions supporting sites with national conservation designations (e.g. SSSI, NNR) where the designation is based specifically on aquatic features. Receptor WFD water body currently attaining at least good status/potential. Non-reportable WFD river water bodies (usually coastal catchments with an area of <10 km^2 that NRW are not required to monitor, classify or report on) are assumed to be at good status.
	Water resources supporting human health and economic activity at a local scale.	Water resources	Local public surface water supplies. Licensed non public surface water supply abstractions or permitted discharges which are large relative to available resource, or where raw water quality is a critical issue, e.g. industrial process water.
	Features with a high vulnerability to flooding.	Flood risk	TAN15 development categories defined as 'Highly Vulnerable' where the ability of occupants to decide on whether they

Table 12.4: Summary of Sensitivity Criteria for Water Quality, Resources and Flood Risk receptors			
Sensitivity Value for Receptor	Criteria	Receptor Type	Example
			wish to accept the risks to life and property associated with flooding are limited. Development types include all residential premises (including hotels and caravan parks) public buildings (e.g. schools, libraries, leisure centres), highly vulnerable industrial development (e.g. power stations, chemical plants, incinerators), and waste disposal sites.
Medium	Feature with a moderate yield, quality or rarity with some potential for substitution.	Aquatic environment	Sites with local conservation designations (e.g. LNRs, County Wildlife Sites) where the designation is based specifically on aquatic features. Receptor WFD water body currently attaining a status/potential of moderate or lower.
	Water resources supporting human health and economic activity at household/individual business scale.	Water resources	Licensed non public surface water supply abstractions which are small relative to available resource, or where raw water quality is not important, e.g. cooling water, spray irrigation. Unlicensed potable surface water abstractions

Table 12.4: Summary of Sensitivity Criteria for Water Quality, Resources and Flood Risk receptors			
Sensitivity Value for Receptor	Criteria	Receptor Type	Example
			or permitted discharges, e.g. private domestic water supplies.
	Features with a moderate to low vulnerability to flooding	Flood risk	TAN 15 development categories defined as 'Less vulnerable development' where the ability of occupants to decide on whether they wish to accept flood risks is greater than in the highly vulnerable category. Development types include general industry, commercial and retail development, car parks, mineral extraction sites, and land/buildings used for forestry and agriculture.
Low	Water resources do not support human health, and of only limited economic benefit.	Water resources	Unlicensed non-potable surface water abstractions, (e.g. livestock supplies).
	Features that are resilient to flooding	Flood risk	Land use types which are required in a fluvial, tidal or coastal location by virtue of their nature (e.g. flood control infrastructure, water transmission infrastructure).

Magnitude of Effects

4.4.2 The magnitude of change associated with any effects acting on water quality, resources and flood risk receptors is independent of the value and sensitivity of the receptor and is summarised in Table 12.5.

Table 12.5: Summary of Water Quality, Resources and Flood Risk magnitude of change

Magnitude	Criteria	Receptor Type	Example of negative change
High	Results in major change (scale or duration) to feature, of sufficient magnitude to affect its use/integrity	Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant conservation objectives (COs), non-temporary downgrading of WFD status (including downgrading of individual WFD elements), or resulting in the inability of the water body to attain good status in line with the measures identified in the RBMP.
		Water resources	Complete loss of licensed water resource or severely reduced resource availability and/or quality, compromising the ability of water users to exercise licensed rights. Complete loss of non – licensed water resource or severely reduced resource availability and/or quality.
		Flood risk	Change in baseline flood risk resulting in potential loss of life or major structural damage to

Table 12.5: Summary of Water Quality, Resources and Flood Risk magnitude of change			
Magnitude	Criteria	Receptor Type	Example of negative change
			property and infrastructure.
Medium	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances	Aquatic environment	Deterioration in river flow regime, morphology or water quality that may lead to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of WFD status (including potential temporary downgrading of individual WFD elements) but would not affect the ability to achieve future WFD objectives).
		Water resources	Moderate reduction in licensed water resource availability and/or quality, which may compromise the ability of water users to exercise licensed rights on a temporary basis or for limited periods with no longer – term impact on the purpose for which the water is used. Moderate reduction in non – licensed water resource availability and/or quality with no longer term impact on associated users and no cessation of drinking water supply to associated users.
		Flood risk	Change in baseline flood risk resulting in potential for moderate/internal damage to property and

Table 12.5: Summary of Water Quality, Resources and Flood Risk magnitude of change			
Magnitude	Criteria	Receptor Type	Example of negative change
			infrastructure.
Low	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances	Aquatic environment	Measurable impact on river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term short-term or permanent change to WFD status (of overall status or element status).
		Water resources	Minor reduction in resource availability and/or quality, but unlikely to affect the ability of water users to exercise licensed rights.
		Flood risk	Change in baseline flood risk resulting in potential for minor/external damage to property and infrastructure.
Very Low	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity	Aquatic environment	No measurable impact on river flow regime, morphology or water quality and no consequences in terms of COs or WFD designations.
		Water resources	No measurable change in licensed water resource availability or quality and no change in ability of water users to exercise licensed rights. No measurable change in licensed water resource availability or quality.

Table 12.5: Summary of Water Quality, Resources and Flood Risk magnitude of change			
Magnitude	Criteria	Receptor Type	Example of negative change
		Flood risk	Increased frequency of flood flows, but which does not pose an increased risk to people, property and infrastructure.

4.4.3 The definitions provided in Table 12.4 provide a framework for screening and assessing all potential impacts on the aquatic environment, water resources and flood risk, which are considered within section 8 of this chapter.

4.4.4 Note that for flood risk receptors, all effects assessed within this chapter and the FCA Appendix 12.1 **(Document 5.12.2.1)** are required to be no greater than negligible due to the statutory conditions set out in TAN15 technical guidance and NPS for EN -1. Therefore, the criteria provided in Table 12.4 are considered to be sufficient for assessing each type of receptor including flood risk.

4.4.5 Further to the definitions of magnitude provided in Table 12.4, it is recognised that a degree of professional judgment is often required in the assessment process. Consideration of potential magnitude of change has taken account of the following parameters:

- Whether the change is beneficial, neutral or adverse;
- The extent of the change (i.e. the area over which the change occurs in relation to the spatial extent of the receptor in question);
- The duration of the change (the time for which the change is expected to last prior to recovery or replacement of the resource or feature);
- The degree of reversibility of the change (i.e. whether it is permanent or temporary); and
- The timing and frequency of the change in relation to any temporally sensitive features of the receptor.

Significance

4.4.6 The significance of potential effects on water quality, resources and flood risk receptors is derived by considering the sensitivity of the receptor and the

magnitude of the change acting upon it. This is summarised in Table 12.4. Effects are graded in severity from Major through Moderate and Minor to Negligible, and can be beneficial, adverse or neutral. Significant effects are those of Major or Moderate severity, as shown in Table 12.6.

4.4.7 The Classification of Effects Table is used to identify indicative significance levels, however professional judgement is also applied as necessary to reflect locally specific issues. This is particularly the case for some interactions of sensitivity and magnitude, as reflected by the use of 'minor/negligible'.

Table 12.6 Classification of Effects (potentially significant shaded in grey)

Sensitivity / value of receptor	Magnitude of impact			
	High	Medium	Low	Very low
Very High	Major	Major	Moderate	Minor/Negligible
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor/Negligible	Negligible	Negligible	Negligible

4.4.8 The assessment presented in this EIA addresses changes in receptor sensitivity associated with both the current and future baseline conditions. The results of the assessment state when the sensitivity has been adjusted to reflect the future baseline. Furthermore, the assessment assumes that the Control and Management Measures (CMM) within the CEMP (**Document 7.4**) would be implemented.

4.5 ASSUMPTIONS AND LIMITATIONS

4.5.1 Some of the private water supply data provided by IACC and Gwynedd Council only provided a location for the private water supply[1], with no details about the source of the abstraction (i.e. the record did not specify whether the abstraction was from surface water or groundwater). Where it has not been possible to obtain further information on the source of the private water supply they have been assessed both in this chapter and in Chapter 11 Geology, Hydrogeology and Ground Conditions (**Document 5.11**) to ensure both scenarios are considered.

[1] For the purposes of this ES private water supplies are taken to include Public Wells.

4.5.2 The location information provided by IACC and Gwynedd Council for private water supplies was generally assumed to be for the property itself and not the actual location of the source. Therefore within this chapter, as a worst-case scenario, all private water supplies have been assumed to be surface water fed from the nearest surface watercourse to the Proposed Development.

5 Basis of Assessment

5.1 INTRODUCTION

5.1.1 The basis of assessment section sets out the assumptions that have been made in respect of the design flexibility maintained within the draft DCO, and the consideration that has been given to alternative scenarios and the sensitivity of the assessment to changes in the construction commencement year.

5.1.2 Details of the available flexibility are included in Chapter 3 Description of Proposed Development, (**Document 5.3**), Chapter 4 Construction, Operation, Maintenance and Decommissioning (**Document 5.4**) and are also considered in Chapter 6 EIA Methodology (**Document 5.6**).

5.2 FLEXIBILITY ASSUMPTIONS

5.2.1 For most topics the main assessment has been undertaken based upon the design shown on the Works Plans (**Document 4.4**), the Construction Plans (**Documents 5.4.1.1 and 5.4.1.2**) and the Design Plans (**Document 4.13**). To take account of the flexibility allowed for in the draft DCO, consideration has been given to the potential for effects to be of greater significance should any of the permanent or temporary infrastructure elements be moved within the LOD or Order Limits.

5.2.2 Where relocating temporary or permanent infrastructure within the LOD may have changed the significance of an effect, an environmental commitment has been made to restrict works in these areas. The Schedule of Environmental Commitments is provided in Volume 7 (**Document 7.4.2.1**) for more information.

5.2.3 The assumptions made regarding the use of flexibility are set out in Table 12.7 below.

Table 12.7 Flexibility assumptions

Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
Horizontal Limits of Deviation for pylons and conductors	The pylon is assessed in its current horizontal location as shown on the Works Plans (**Document 4.4**). The conductors have been assessed based on the location of the pylons and centreline shown in on the Works Plans (**Document 4.4**).	The assessment has considered the possible effects of locating pylons or conductors anywhere else within the LOD, and areas were excluded where the magnitude of effects or sensitivity of receptors could increase.
Vertical Limits of Deviation for pylons and conductors	Vertical limits are not relevant to this assessment	N/A
Pylon foundation type	There is no difference in the potential impacts of the different types of foundation type proposed, and the assessment is equally relevant to all types	N/A
Tunnel alignment within LOD	This is not applicable to the water quality, resources and flood risk assessment as it has no bearing on surface layout of the Proposed Development or on the potential effects on surface waters.	N/A
Tunnel depth	Assessed at the minimum depth below ground (10 m below the bed of the Menai Strait).	N/A
Tunnel construction compounds	Construction work could take place anywhere within the compounds area identified on	N/A

Table 12.7 Flexibility assumptions

Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
	the Works Plans (**Document 4.4**).	
Braint and Tŷ Fodol THH/CSEC/ and Pentir Substation	The assessment has been undertaken based on the maximum parameters shown on Design Plans (**Document 4.13**).	N/A
Access tracks and working areas	Access tracks and working areas would be located where they are currently shown on the Construction Plans (**Document 5.4.1.1**).	The assessment has considered the possible effects of locating access tracks and working areas anywhere else within the Order Limits, and areas were excluded where the magnitude of effects or sensitivity of receptors could increase.
Penmynydd Road Compound	Construction work could take place anywhere within the compounds area identified on the Works Plans (**Document 4.4**).	N/A
Pentir Construction Compound	Construction work could take place anywhere within the compounds area identified on the Works Plans (**Document 4.4**).	N/A
Third Party Services	It has been assumed that all third party services will be undergrounded within the LOD shown on the Third Party Services Construction Plans (**Document 5.4.1.2**) Access tracks and working areas would be located where they are currently shown on the	N/A

Table 12.7 Flexibility assumptions		
Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
	Third Party Services Construction Plans (**Document 5.4.1.2**).	

5.3 CONSIDERATION OF SCENARIOS

5.3.1 There are three sets of scenarios that have been considered within the assessment. These are:

- Option A and B in relation to the overhead line as explained in Chapter 3 Description of Proposed Development (**Document 5.3**). Proposed pylons 4AP064 and 4AP066 are in different locations for Option A and Option B; all other proposed pylons are consistent between options.
- Three tunnelling scenarios, as explained in Chapter 4 Construction, Operation, Maintenance and Decommissioning (Document 5.4). Scenario 1 involves TBM from Braint to Tŷ Fodol, Scenario 2 involves TBM from Tŷ Fodol to Braint, and Scenario 3 involves drill and blast (D & B) from both Tŷ Fodol and Braint.
- Construction traffic using the existing A5025 alignment or using the new alignment as proposed by Horizon Nuclear Power as explained in Chapter 4 Construction, Operation, Maintenance and Decommissioning (**Document 5.4**).

5.3.2 Table 12.8 details whether these different scenarios are relevant to the assessment and, if so, how they have been assessed in section 9.

Table 12.8 Consideration of Scenarios	
Scenario	Is the scenario relevant to the assessment? if so, how has it been considered within the assessment
Option A and B	Both options have been considered, but there is no distinction between them in terms of effects on water quality, water resources or flood risk, so they are not explicitly discussed within section 9.

Table 12.8 Consideration of Scenarios	
Scenario	Is the scenario relevant to the assessment? if so, how has it been considered within the assessment
Direction and method of tunnelling (Scenarios 1, 2 and 3)	The dewatering rates have been assumed to be higher for drill and blast (scenario 3) in comparison to TBM tunnelling methods (scenarios 1 and 2). For all scenarios, the rate of dewatering from the tunnel has been assumed to be higher at Braint. This is discussed within section 8.1 and 9.3.
Construction traffic using the existing A5025 alignment or using the new alignment as proposed by Horizon Nuclear Power	As construction traffic routes are not a consideration in this assessment, this is not applicable.

5.4 SENSITIVITY TESTS

5.4.1 Under the terms of the draft DCO (**Document 2.1**), construction could commence in any year up to five years following the grant of DCO. Consideration has been given to whether the potential mitigation or residual effects reported in this chapter would differ if construction were to commence in any year up to and including the fifth year.

5.4.2 The UK Climate Projections data (UKCP09) (Ref 12.22) indicates that in general mean precipitation levels are likely to increase in the winter and decrease in the winter. The central estimate of projections under a high emissions scenario indicates that during the 2020s the increase in winter mean precipitation will be approximately 5%, and the decrease in summer mean precipitation will be 4%. Therefore, there is potential for an increase in peak flows during winter months, and reduced low flows during summer months.

5.4.3 The FCA has assumed that during the construction period peak river flows could increase by 15%. During the operational/decommissioning periods it has been assumed that peak river flows could increase by 30% along the Proposed Development. An extreme assessment was also undertaken of a 75% increase at Braint THH/CSEC. The FCA has also assumed that during construction extreme daily rainfall intensity will increase by 5%, and that during the operational/decommissioning period it will increase by 20%.

It has not been necessary to undertake a more detailed assessment for an alternative programme to that set out in Chapter 4 (**Document 5.4**).

6 Study Area

6.1 INTRODUCTION

6.1.1 The study area identifies the spatial extent for which baseline characterisation, identification of potential receptors and the assessment of effects is necessary. The study area is displayed in Figure 12.1 (**Document 5.12.1.1**).

6.1.2 A two-tier approach has been used to identify the study area for baseline characterisation, identification of potential receptors and the assessment of water quality, resources and flood risk effects.

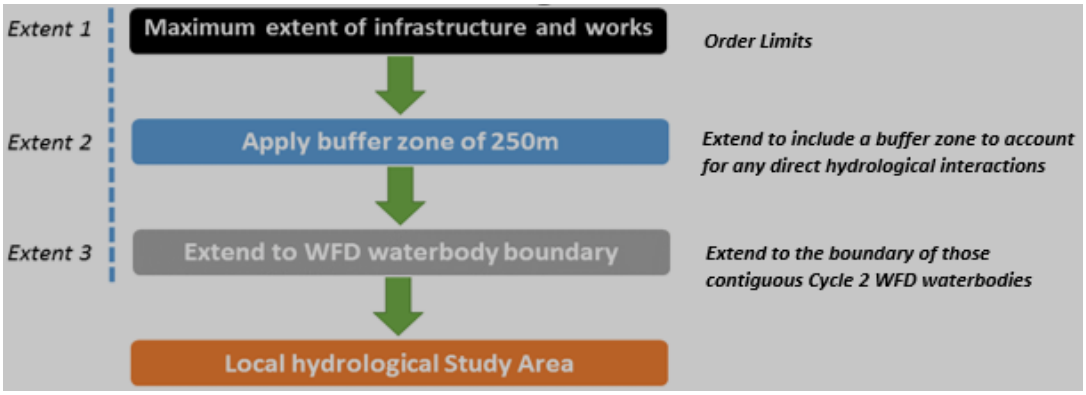
6.1.3 The Local Hydrological Study Area (LHSA; first tier) includes water bodies directly traversed by the Proposed Development. It is within the LHSA that effects are most likely to occur and it forms the primary search area for characterisation of baseline conditions.

6.1.4 The Wider Hydrological Study Area (WHSA; second tier) covers areas downstream of the LHSA (i.e. beyond the immediate WFD water bodies that are traversed by the Proposed Development) but that still have a flow pathway from the Proposed Development through which they could be indirectly affected.

6.1.5 The definition of Local and Wider Hydrological Study Areas is provided below.

LHSA

6.1.6 The process of defining the LHSA is shown in the flow chart below and set out in the following paragraphs.



Process of Defining the Local Hydrological Study Area (LHSA)

6.1.7 The LHSA is based on the Order Limits for the Proposed Development plus the application of a 250 m buffer to take account of the limited potential for direct hydrological and flood risk effects to be propagated over a large distance. The LHSA is then extended to the boundary of any contiguous WFD river water bodies in recognition of the WFD being the most overarching applicable regulatory framework for these studies (management and monitoring of the hydrological environment is most commonly assessed at a water body scale). This approach also enables data gathering to be consistent with water body scale receptors and reporting to satisfy the requirements of the WFD. The only exception to this is where the WFD water body in question has been classified, by NRW, as a non-reportable water body. Non-reportable water bodies are catchments that have not been classified by NRW as part of the latest WFD Cycle 2 process. There are no available NRW baseline monitoring data for these smaller non-reportable water bodies, which are therefore considered to be less sensitive. In such situations, owing to the lack of baseline data and large spatial extent of the non-reportable water bodies on Anglesey and Gwynedd, the LHSA does not extend beyond the Order Limits plus the applied 250m buffer (i.e. it does not encompass the entire non-reportable water body). The LHSA, as defined above, is presented in overview on Figure 12.1 **(Document 5.12.1.1)**.

WHSA

6.1.8 The WHSA consists of the Cefni Transitional WFD waterbody GB521010207500 as this is the only classified WFD waterbody which has baseline data and lies downstream of the LHSA. As stated previously the WHSA has been used to screen for sensitive baseline receptors, based on the definitions in Table 12.3. This has resulted in the screening in of the Malltraeth Marshes SSSI on Anglesey shown on Figure 12.1 (**Document 5.12.1.1).**

7 Baseline Conditions

7.1 INTRODUCTION

7.1.1 The water quality, resources and flood risk baseline has been developed based upon information collected during a desk-based assessment of existing data and a targeted site walkover survey.

7.1.2 Baseline data have been primarily derived from that held/published by NRW, Ordnance Survey (OS), the British Geological Survey (BGS) and the local authorities, comprising IACC and Gwynedd Council. Following the stage 3 consultation, the baseline characterisation has been further refined, in accordance with the latest available information and the evolution of the Proposed Development design. The latest data include historic flood outlines, hydraulic model results, licensed and unlicensed water abstractions, and licensed discharges.

7.1.3 A targeted site walkover has also been undertaken. This information improved the understanding of and confidence in the existing baseline water quality, resources and flood risk conditions developed from the desk-based assessment.

7.1.4 The following sections provide a description of the baseline environment relevant to the Proposed Development (including both the LHSA and WHSA).

Data sources

7.1.5 The primary sources of data and information upon which this ES is based are listed in Table 12.9.

Table 12.9: Water Quality, Resources and Flood Risk – primary sources of information

Data topic	Sources of information
Rainfall	Flood Estimation Handbook (FEH) CD-ROM
Topography	Ordnance Survey mapping, 1: 50,000 and 1: 25,000 scales
Environmental designations	MAGIC natural environment map viewer and

Table 12.9: Water Quality, Resources and Flood Risk – primary sources of information	
Data topic	Sources of information
	NRW website.
Hydrological environment	NRW Cycle 2 WFD river water bodies for water bodies in search area – as licensed to National Grid NRW 'Water Watch Wales Map Gallery' online interactive maps NRW Abstraction Licensing Strategies Cranfield Soil and Agrifood Institute Soilscapes Online Map
Flood risk	WAG TAN15 Flood Zone datasets as licensed to National Grid. NRW Flood Risk mapping – risk of flooding from tidal, fluvial and surface water sources Anglesey Preliminary Flood Risk Assessment (2011) Gwynedd Preliminary Flood Risk Assessment (2011) Anglesey Local Flood Risk Management Strategy (2013) Gwynedd Council Local Flood Risk Management Strategy (2013) Anglesey & Gwynedd Joint Local Development Plan Strategic Flood Consequence Assessment (2016)
Water resources	Abstraction data licensed by NRW NRW Discharge permits Private water supplies – IACC, Gwynedd Council
Water quality	NRW 'Water Watch Wales Map Gallery' online interactive maps NRW 'WFD Ecological and Chemical Status (current and future) for water bodies in search area – as licensed to National Grid

Table 12.9: Water Quality, Resources and Flood Risk – primary sources of information	
Data topic	Sources of information
	Western Wales (2015) River Basin Management Plan

7.2 HYDROLOGICAL CONTEXT

Topography

7.2.1 The topography within the LHSA undulates along the Proposed Development, largely associated with the fact that it traverses several different river catchments.

7.2.2 The Proposed Development traverses Anglesey from Wylfa (NGR 235288 393751) at an elevation of 14.6 m Above Ordnance Datum (AOD) to the Braint THH/CSEC (NGR 251652 371018) approximately 1.3 km from the Menai Strait at an elevation of 35 m AOD.

7.2.3 The highest point within Anglesey is Holyhead Mountain at 220 m AOD. The highest point of the Proposed Development in Anglesey is approximately 80 m AOD, 2.3 km to the south-west of Mynydd Bodafon (Order Limits Section C). The lowest point of the Proposed Development is east of Llangefni access track crossing of the Afon Ceint at an elevation of 7.5 m AOD (Order Limits Section E).

7.2.4 Within Gwynedd the Tŷ Fodol THH/CSEC is 82 m AOD (NGR 254658 368363), and the Proposed Development rises to 107 m AOD at Pentir Substation (NGR 255176 168172). Pentir substation is the highest point along the Proposed Development within Gwynedd (Order Limits Section F).

Climate

7.2.5 At Valley, which is located approximately 8 km to the west of the Order Limits, the annual average rainfall between 1981 and 2010 was 841 mm. The highest average monthly rainfall was 102 mm, occurring in October and November. The lowest average monthly rainfall was 48 mm, occurring in May (Ref 12.19). Annual average rainfall values vary along the Proposed Development, generally lower rainfall values occur at lower elevations and higher values at the higher elevations and on the Welsh mainland around Snowdonia. The northern and central regions of the Proposed Development receive less annual rainfall (800 mm/yr to 1000 mm/yr) than the south-eastern (1000 – 1200 mm/yr) and the immediate Pentir area (1200 mm/yr to

1400 mm/yr). Rainfall in the vicinity of the Proposed Development is lower than the Welsh annual average of 1433.5 mm/yr (Ref. 12.20).

7.2.6 Standard annual average rainfall estimates for the period 1961-1990 (SAAR61-90) were taken from the FEH CD-ROM V3 (Ref.12.21) for each Section [2]. Table 12.10 presents the SAAR values for each of the sections along the Proposed Development.

Table 12.10: Rainfall Estimate Summary across the Order Limits

Location	Local SAAR61-90 – OL (mm/yr)
A	984
B	1024
C	1061
D	1036
E	1078
F	1189

7.2.7 As a result of climate change, it is predicted that winters will become generally wetter and summers generally drier, as indicated by results from the UKCP09 projections (Ref 12.22). It is also likely that peak rainfall intensities could increase, with a consequent impact of the frequency and magnitude of higher river flows. There could be an increase in the frequency and magnitude of flood events in the LHSA and WHSA as a consequence.

7.2.8 The Welsh Government 'Guidance on Climate Change Allowances for Planning Purposes' (Ref 12.9) and the EA's 'Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities' report (Ref: 12.17) provide guidance on the potential future increases in river flood flows, extreme rainfall intensity and coastal flood levels to guide flood management scheme design, which is also based on outputs from UKCP09. The full range of future climate scenarios are taken into account in the future baseline in this assessment and in the FCA Appendices 12.1 – 4 **(Documents 5.12.2.1 – 4)**.

[2] This represents the most up to date easily accessible information which can be interrogated at a detailed level.

Geology and Soils

7.2.9 Much of the Proposed Development is underlain by impermeable, superficial deposits of Glacial Till that consist of dense clays but also silts, sands, gravels and boulders. There are small bands of more permeable Alluvium, associated with watercourse floodplains, distributed along much of the Order Limits. The soils along much of the Proposed Development are dominated by two key types; the most prevalent classification is a slowly permeable, seasonally wet acidic loamy and clayey soils (Ref 12.23). The second soil classification is freely draining loam, which is most prevalent in Sections D, E and F and is the only soil type encountered within the Order Limits within Gwynedd. There are also small, discrete patches of peat at Capel Coch and Talwrn.

7.2.10 Further soil information is provided in Chapter 11 Geology, Hydrogeology and Ground Conditions **(Document 5.11)** and Chapter 18, Agriculture **(Document 5.18)**.

Surface Water Hydrological Features

7.2.11 The LHSA and WHSA comprises numerous surface water catchments which include a range of watercourses, water bodies and other drainage features as shown in Figure 12.2 (**Document 5.12.1.2**) and 12.3 (**Document 5.12.1.3**). The following paragraph provides an overview of the surface water hydrological features within each section of the Proposed Development.

- Section A is situated within the unnamed watercourse catchment adjacent to Irish Sea and the Afon Wygyr catchment. Both catchments drain into Cemaes Bay and include multiple smaller watercourses and drainage ditches.
- Section B falls primarily within the Llyn Alaw Reservoir catchment (and is within 700 m of Llyn Alaw itself) and the Afon Goch River catchment, and a small area of the Afon Wygyr catchment. There are numerous small tributary watercourses and drainage ditches within these catchments.
- Section C lies primarily within the headwaters of the Cefni Reservoir catchments, with small areas in the Goch Dulas and Lligwy catchments.
- Section D falls within the headwaters of Afon Cefni River catchment, downstream of the reservoir, and its tributary, the Afon Ceint.
- Section E falls within the Ceint River catchment, a small part of the Cefni catchment, the upper Braint catchment, and the southern Braint

catchment. The Cefni subsequently drains into the Malltraeth Sands/Bay area. There are many small drains in the low lying flat areas of land between Llanfairpwll and Gaerwen, to the south of the A55 dual carriageway which are tributaries of the Afon Braint.

- Section F starts on Anglesey and includes the Braint catchment, and an unnamed watercourse catchment west of the Menai Strait. The order limits cross the Menai Strait between Anglesey and Gwynedd. On Gwynedd the section consists of an unnamed watercourse catchment east of the Menai Strait, and the Nant y Garth River catchment. The Proposed Development ends at Pentir, which is in the Afon Cegin catchment.

7.3 AQUATIC ENVIRONMENT

Designations

7.3.1 Table 12.11 provides a list of the fresh surface water dependent designated sites[3] (Ref 12.24) which lie within the LHSA and WHSA and where a flow pathway exists from the Proposed Development to the designated site. The sites are also shown in Figure 12.2 **(Document 5.12.1.2)** and Figure 12.3 **(Document 5.12.1.3)**.

7.3.2 There are also other surface water dependent designated sites that are not hydrologically connected to the Proposed Development, which are presented in the screening assessment for protected areas shown in Appendix 12.6 **(Document 5.12.2.6)**. These designated sites have not been assessed as there is no pathway for potential effects.

Table 12.11: Fresh surface water dependent designated sites with a potential flow pathway.

Designated Site	Relevant aquatic designated feature	Hydrological Connectivity to the Proposed Development
LHSA		
Tre'r Gof SSSI	Mineral rich wetland	Located approximately 45 m downslope of the Section A Order Limits. There are no watercourses which connect

[3] In this context 'freshwater surface dependent' refers to the input and transfer of flowing surface freshwater upon which the designated site is dependent in order to maintain its condition. Dependence of freshwater from a groundwater source, or rainfall-fed freshwater do not, therefore, fall within this category.

Table 12.11: Fresh surface water dependent designated sites with a potential flow pathway.		
Designated Site	Relevant aquatic designated feature	Hydrological Connectivity to the Proposed Development
		the Proposed Development to the SSSI.
Llyn Alaw SSSI and Drinking Water Protected Area (DWPA)	Lake	Located over 400 m downslope from the Section B Order Limits. Also downstream of watercourses crossing the Order Limits. Potential direct pathway from within the Order Limits.
Cors Erddreiniog (part of the Anglesey Fens SAC/SSSI/Ramsar/NNR)	Wetland habitat – calcareous/alkaline fens and meadows on clay-silt soils.	Located adjacent to and within the Section C Order Limits. Also downstream of watercourses within the Order Limits. Potential direct pathways from within the Order Limits.
Caeau Talwrn (SSSI) & Corsydd Mon/ Anglesey Fens SAC	Mix of dry grassland and wetland habitat – blunt flowered rush	Located within the Section D Order Limits, potential direct runoff from within the Order Limits.
Cors Tregarnedd Mawr Wildlife Site	Wetland habitat connected to the Malltraeth Marshes.	
Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC	Wetland habitat. Meadows and ditches. Potentially vulnerable to turbid or contaminated surface water flow.	Potential pathway from within the Order Limits (Section F).
WHSA		

Table 12.11: Fresh surface water dependent designated sites with a potential flow pathway.		
Designated Site	Relevant aquatic designated feature	Hydrological Connectivity to the Proposed Development
Malltraeth Marshes (SSSI)	Wetland habitat. Meadows and ditches.	Located more than 2 km downstream of the Order Limits. Potential pathway from within the Order Limits.

Water Framework Directive Classifications

7.3.3 Across the LHSA there are a total of nineteen water bodies comprising of; sixteen WFD river water bodies, two WFD lake water bodies and one coastal WFD water body. The WHSA is associated with one transitional WFD water body as shown in Figure 12.1 **(Document 5.12.1.1).**

7.3.4 Parts of the Order Limits pass through land not associated with a specific WFD water body due to these land parcels not being contained within a substantial river catchment, i.e. they drain directly to the sea via small coastal watercourses. These 'non-reportable' near-coast catchments do not themselves have any baseline WFD data but are considered as receptors as part of the EIA and the WFD Assessment in Appendix 12.5 **(Document 5.12.2.5**), though the extent considered is slightly different. Due to the extensive spatial scale of these water bodies, only the areas that coincide with the Order Limits (plus a 250 m buffer) have been considered in the assessment, rather than the whole water body. As such the assessment does not consider any areas of these non-reportable water bodies which do not have a pathway from the Proposed Development as there is no potential for any effects. Three non-reportable water bodies (not classified during the second WFD cycle in 2015) coincide with the Order Limits in Sections A and F and therefore have been considered as aquatic receptors within the assessment. The WFD water bodies are shown on Figure 12.1 **(Document 5.12.1.1)**.

7.3.5 Six of the water bodies are classed as 'Heavily Modified Water Bodies' (HMWB). In HMWB ecology is measured on a scale of ecological potential, as opposed to ecological status. GEP is defined as the best ecology that the water body can achieve without compromising its human use. This is based on the concept that there are specific ecological elements that are sensitive to the human use of the water body. In order to achieve GEP, a series of mitigation measures (which are set out in the Western Wales River Basin

Management Plan) must be implemented to address the ecologically-sensitive elements. The mitigation measures, when combined with good ecology for the non-sensitive ecological elements, and favourable water quality, are considered to provide the conditions to facilitate the best possible ecology that the water body can achieve without compromising its human use.

7.3.6 Ten water bodies are assessed as being of Moderate overall status due to supporting ecological elements being of less than Good status. The remaining ten water bodies are assessed as being of Good overall status (Ref 12.25). In accordance with NRW guidance it has been assumed that non reportable water bodies are of Good status. Table 12.12 presents a summary of the WFD baseline conditions, including a breakdown of their overall WFD status, and ecological and chemical status components. The detailed baseline WFD information is presented within the WFD Assessment in Appendix 12.5 **(Document 5.12.2.5)**.

Table 12.12 WFD Baseline Information					
Water body	Water body type	Overall Status/ potential	Current Ecological status/ potential	Current Chemical status	Supporting elements at less than good status/potential
Non reportable WFD Waterbody adjacent to the Irish Sea[4] GB110102059160	River, HMWB	Good	Good	Did not require assessment	-N/A
Afon Wygyr GB110102059170	River	Moderate	Moderate	Good	Phosphates
Alaw - upstream Llyn Alaw GB110102058982	River	Good	Good	Good	N/A – as already at good status
Goch Dulas GB110102059000	River	Moderate	Moderate	Good	Phosphates, Zinc
Cefni (Cefni Reservoir West) GB110102058790	River	Good	Good	Good	N/A – as already at good status
Lligwy GB110102059070	River	Good	Good	Good	N/A – as already at good status
Cefni (Cefni Reservoir East)	River	Good	Good	Good	N/A – as already at good

[4] The data presented is from the Cycle 1, 2009 baseline. This water body formerly fell within the Wygyr catchment. These non reportable water bodies were not assessed in Cycle 2, 2015.

Table 12.12 WFD Baseline Information					
Water body	Water body type	Overall Status/ potential	Current Ecological status/ potential	Current Chemical status	Supporting elements at less than good status/potential
GB110102058780					status
Cefni (Ceint to Cefni Reservoir) GB110102058770	River	Moderate	Moderate	Good	Macrophytes and Phytobenthos combined
Ceint GB110102058940	River, HMWB	Moderate	Moderate	Moderate	RBMP Mitigation measures required to achieve GEP
Cefni Transitional GB521010207500	Trans, HMWB	Moderate	Moderate	Good	RBMP Mitigation measures required to achieve GEP
Non reportable WFD Waterbody east of Malltraeth Sands (formerly GB110102059140)[5]	River, HMWB	Moderate	Moderate	Good	-N/A
Braint Lower GB110102058660	River, HMWB	Moderate	Moderate	Good	RBMP Mitigation measures required to achieve GEP

[5] The data presented is from the Cycle 1, 2009 baseline. These non reportable water bodies were not assessed in Cycle 2, 2015.

Table 12.12 WFD Baseline Information					
Water body	Water body type	Overall Status/ potential	Current Ecological status/ potential	Current Chemical status	Supporting elements at less than good status/potential
Braint Upper GB110102058690	River	Good	Good	Good	N/A – as already at good status
Non reportable WFD Waterbody west of Menai Strait (formerly part of GB110102058690)[6]	River	Good	Good	Good	N/A
Nant y Garth GB110065058490	River	Good	Good	Good	N/A – as already at good status
Non Reportable WFD Waterbody east of Menai Strait (formerly GB11006058490)[6]	River	Good	Good	Good	N/A
Cegin GB110065058540	River	Moderate	Moderate	Good	Macrophytes and Phytobenthos, Phosphates
Llyn Alaw GB31032538	Lake, HMWB	Moderate	Moderate	Good	Phosphates
Cefni Reservoir GB31032926	Lake, HMWB	Moderate	Moderate	Good	Phosphates

Table 12.12 WFD Baseline Information					
Water body	Water body type	Overall Status/ potential	Current Ecological status/ potential	Current Chemical status	Supporting elements at less than good status/potential
Menai Strait GB6810120000	Coastal	Good	Good	Good	-N/A – as already at good status

7.3.7 The two non-reportable WFD Waterbodies West (GB110102058690) and East of the Menai Strait (GB110065058490) are situated within the Order Limits. However as shown in Figure 12.3 **(Document 5.12.1.3)** there are no infrastructure elements within these catchments except underground tunnelling. Given that there is no hydrological linkage between these activities and the non-reportable Waterbodies, either to the east or west of the Menai Strait, they have not been considered as part of the assessment presented in section 9.4 of this Chapter.

7.3.8 The two nearest EU Designated protected bathing waters, one at Cemaes Bay and another at Traeth Lligwy (though these are outside of the LHSA and WHSA).

7.3.9 Cemaes Bay at the north of Anglesey is fed by the Afon Wygyr and was assessed as poor in 2017. Within the Afon Wygyr catchment short-term pollution is caused when heavy rainfall washes faecal matter into the sea, from livestock sewage and urban drainage via the river network. At Cemaes there were a total of sixteen warnings of a pollution risk forecast during the 2017 bathing water season. These warnings were issued because of the effects of heavy rain on the water quality (Ref 12.26).

7.3.10 Traeth Lligwy to the north-east of Anglesey into which Lligwy discharges was assessed as excellent in 2017. Sewage debris was not observed and only trace amounts of litter and animal faeces were observed by NRW at the bathing water.

7.4 WATER RESOURCES

Licensed Abstractions

7.4.1 Dwr Cymru Welsh Water (DCWW) has an NRW licensed abstraction from the Llyn Alaw Reservoir which supplies water to the whole of Anglesey via the Alaw Water Treatment Works (WTW) and the Bryn Alaw Pumping Station (PS). The abstraction is located at the outlet of the Reservoir and is situated approximately 4.77 km downstream from Section B of the Order Limits.

7.4.2 DCWW has a further NRW licensed abstraction from the Cefni Reservoir which supplies water to the central and southern extents of Anglesey via the Cefni WTW and the Cefni PS. The abstraction is connected to Section C of the Order Limits via the Afon Erddeiniog watercourse.

7.4.3 There is a NRW licensed abstraction in the lower Braint catchment, supplying water for a fruit farm 1 km to the north-east of Brynsiencyn serving Hooton. The abstraction is situated approximately 3.5 km from Section E of the Order Limits. There is however no hydrological connection between the Proposed

Development and the abstraction, as it is situated within a different tributary sub-catchment. As such this abstraction has not been subject to any further assessment.

7.4.4 Table 12.13 provides a summary of the licensed downstream abstractions within the LHSA, as illustrated in Figure 12.1 (**Document 5.12.1.1**) and 12.2 (**Document 5.12.1.2**). There are no existing licensed abstractions identified within the WHSA.

Table 12.13: Downstream Licensed Abstractions

License Holder & Number	Purpose	Name of License Holder	Source water body	Maximum annual abstraction (m^3)
23/102/6/0006	Public Water Supply	Dŵr Cymru Cyfngedig	Llyn Alaw Reservoir	8,637,400
23/102/2/0007	Public Water Supply	Dŵr Cymru Cyfngedig	Cefni Reservoir	5,475,000

Private Water Supplies

7.4.5 The information provided by IACC and Gwynedd Council indicated that there are three PWS situated down gradient and within the LHSA, and that no existing PWS are situated within the WHSA. The PWS are of unknown origin: they could be either surface water fed or groundwater fed. Therefore, in each case, in the absence of further information, it has been provisionally assumed as a worst case scenario, that all PWSs are surface water fed from the nearest surface watercourse. The PWS of unknown source have been assessed both in this chapter and Chapter 11 Geology, Hydrogeology and Ground Conditions (**Document 5.11**) for completeness. Table 12.14 provides the details of each of these PWS, which are shown in Figure 12.2 **(Document 5.12.1.2)** for reference.

Table 12.14: Downstream Private Water Supplies

Reference	Property Location	Purpose	NGR	Assumed Watercourse Abstraction Location	Position and OHL Section
S060ILLANE/1	Tyn Llan Old Rectory, Llanerchymed	Domestic Usage	243451 379726	Cefni – Cefni Reservoir West	2.8 km S and d/s from

Table 12.14: Downstream Private Water Supplies					
Reference	Property Location	Purpose	NGR	Assumed Watercourse Abstraction Location	Position and OHL Section
	d				Section C
S060ORHOSM/1	Pandy, Rhosmeirch, Llangefni	Domestic Usage	245174 376571	Cefni – Ceint to Cefni Reservoir	2.8 km SW and d/s from Section C
S060WHOLYH/1	Glan Menai, Holyhead Road, Llangefni	Domestic Usage	252595 371666	Afon Braint – upper or Afon Rhyd Eillan	875 m NE and d/s from Section F

Discharges

7.4.6 IACC provided a list of 96 registered discharges which are situated within the LHSA and WHSA. The majority of these discharges are not hydrologically connected to the Order Limits and would not be affected by the Proposed Development. Table 12.15 provides details of the remaining two discharges that are downstream of the Order Limits and could potentially be affected by the Proposed Development. Figure 12.2 **(Document 5.12.1.2)** shows the locations of these two licensed discharges.

Table 12.15: Downstream Private Non Licensed Discharges				
Permit Number	Effluent Type	Name of License Holder	Water Discharged to	Position and OHL Section
CG0058101	Secondary Treated	Llanfachell STW	Afon Meddanen	40 m N from Section A
CG0058201	Storm Sewage	Llanfechell Pumping Station	Afon Meddanen	70 m from Section A

7.5 FLOOD RISK

Fluvial/ Surface Flood Risk

7.5.1 The FCA in Appendices 12.1 – 12.4 (**Document 5.12.2.1 – 4**) considers potential receptors in the vicinity of the Proposed Development in relation to sources of fluvial and/or surface water flood risk. It identifies areas where the

Order Limits intersect NRW and the Development Advice Map (DAM) fluvial flood zones and mapped surface water flood zones.

7.5.2 The NRW and DAM mapped fluvial flood zones are usually based on catchments which are greater than 3 km^2 in area. The receptors are categorised under a range of TAN15 flood risk vulnerability categories including 'critical national infrastructure assets', 'highly vulnerable development' (e.g. residential premises), and 'less vulnerable development' (e.g. general industry, commercial development and local transport/ utilities infrastructure).

Groundwater Flood Risk

7.5.3 The FCA Appendix 12.4 **(Document 5.12.2.4)** also identifies that approximately 20 locations throughout the Proposed Development Sections A – F coincide with Zone C 'Potential for groundwater flooding at the surface'. Further details of the groundwater flood risk coverage are provided within Appendix 12.4.

Reservoir Flood Risk

7.5.4 The FCA Appendix 12.4 (**Document 5.12.2.4**) identifies that there is no risk of reservoir flood risk in relation to the Proposed Development, given that the Proposed Development is upstream of both the Llyn Alaw and Cefni Reservoirs. A number of very small ponds have been identified near the Order Limits within the FCA but the risk of flooding from these sources is negligible.

Sewer Flood Risk

7.5.5 As part of the FCA, DCWW, IACC and Gwynedd Council were asked to provide details of sewer flood records within a 100 m buffer from the Order Limits. The FCA Appendix 12.4 (**Document 5.12.2.4**) reports that DCWW confirmed only three minor instances of sewer flooding relating to a single pumping station malfunction and two instances of foul sewers becoming blocked and surcharging through manholes. IACC provided records of 37 reported flood incidents between 1999 to June 2016. Incidents included fluvial flooding, stream blockage, surcharged sewers, inundated cellars, blocked drains and gullies and highways flooding. Only five occurred in the area within the Order Limits although details were only given for two of them (watercourse blockage and heavy rainfall). Gwynedd Council confirmed they hold no records for the area of the Proposed Development.

7.6 IDENTIFIED RECEPTORS

7.6.1 A range of aquatic environment, water resources and flood risk receptors have been identified that may be affected by the Proposed Development. Table 12.16 summarises each of the receptors being considered in this Chapter. Receptor sensitivity has been determined in accordance with the sensitivity criteria provided in Table 12.3.

Table 12.16: Identified Receptors

Receptor Type	Identified Receptor	Sensitivity	Rationale
Aquatic environment	Designated Sites: Cors Erddreiniog (Anglesey Fens SAC/SSSI/Ramsar/NNR) Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC Tre'r Gof SSSI & Corsydd Mon/ Anglesey Fens SAC	Very High	Conditions supporting sites with international designations. The sites lie adjacent to proposed infrastructure and so potential effects could result from overland flow
	Designated Sites: Llyn Alaw (SSSI) Caeau Talwrn (SSSI) Malltraeth Marshes (SSSI)	High	Conditions supporting sites with national conservation designations. The sites lie adjacent to proposed infrastructure and so potential effects could result from overland flow.
	Designated Site: Cors Tregarnedd Mawr Wildlife Site	Medium	Sites with local conservation designations. The sites lie adjacent to proposed infrastructure and so potential effects could result from overland flow

Table 12.16: Identified Receptors			
Receptor Type	Identified Receptor	Sensitivity	Rationale
	Good Status WFD River/ Coastal Bodies: Non reportable WFD Waterbody adjacent to the Irish Sea GB110102059160 Alaw – upstream Llyn Alaw GB110102058982 Cefni West GB110102058790 Lligwy GB110102059070 Cefni (Cefni Reservoir East) GB110102058780 Non reportable WFD Waterbody east of Malltraeth Sands (formerly GB110102059140) Braint Upper GB110102058690 Nant y Garth GB110065058490 Menai Strait GB6810120000	High	These water bodies are at Good WFD Status. The Proposed Development infrastructure is located within the catchment associated with the WFD river body. Therefore, potential effects could result directly from overland flow into the watercourse network within the river body.
	Moderate Status WFD River Bodies: Afon Wygyr GB110102059170 Goch Dulas GB110102059000 Ceint to Cefni Reservoir	Medium (Construction) High (Operation)	Moderate WFD status currently gives a Medium sensitivity. Predicted improvements in WFD status with the objective to improve status to Good by 2027 (i.e. during the lifetime of the Proposed Development) results in the change in sensitivity to

Table 12.16: Identified Receptors			
Receptor Type	Identified Receptor	Sensitivity	Rationale
	GB110102058770 Ceint GB110102058940 Braint Lower GB110102058660 Cegin GB11006505854 Llyn Alaw GB31032538 Cefni Reservoir GB31032926 Cefni Transitional Waterbody GB521010207500		High during the operational phase. The Proposed Development infrastructure is located within the catchment associated with the WFD river water bodies. Therefore, potential effects could result directly from overland flow or via the intervening watercourse network.
Water Resources	DCWW Licensed Public Water Supplies: Llyn Alaw Reservoir (23/102/6/0006) Cefni Reservoir (23/102/2/0007)	Very High	Regionally important public water supplies. Potential effects could be conveyed overland and downstream towards both reservoirs.
	Unlicensed potable abstractions: Tyn Llan Old Rectory (S060ILLANE/1) Pandy, Rhosmeirch (S060RHOSM/1) Glan Menai (S060WHOLYH/1)	Medium	Unlicensed potable surface water abstraction e.g. PWS. Potential effects could be conveyed overland and downstream of adjacent watercourses

Table 12.16: Identified Receptors			
Receptor Type	Identified Receptor	Sensitivity	Rationale
	Permitted Discharges	Medium	Licensed discharges which are small relative to available resource. Potential effects could be caused due to possible changes in the morphology of receiving watercourses
Flood Risk (Third Party) Receptors	Land use types defined as Critical National Infrastructure in the National Flood Resilience Review (Ref 12.19) (i.e. critical national infrastructure, e.g. essential transport and utility infrastructure)	Very High	Potential effects could arise as a result of displacement or conveyance effects in the immediate vicinity of infrastructure or be conveyed downstream as a consequence of changes in runoff rates.
	Land use types defined as 'Highly Vulnerable' development in the TAN 15 Classification (e.g. all residential premises hospitals, ambulance stations, buildings used to provide emergency shelter)	High	
	Land use types defined as 'Less vulnerable' development in the TAN15 classification (e.g. general industry, commercial and retail development, local transport and utilities	Medium	

Table 12.16: Identified Receptors			
Receptor Type	Identified Receptor	Sensitivity	Rationale
	infrastructure)		

7.7 FUTURE BASELINE PREDICTIONS

7.7.1 The FCA (**Appendices 5.12.2.1- 4**) has taken into account future baseline scenarios for peak river flow allowances during future time horizons or 'epochs'. In the context of Proposed Development, the 2020s epoch has been used for the construction phase and the 2080s epoch has been used for the operation, maintenance and decommissioning phases, in accordance with Welsh Government guidance (Ref 12.9).

7.7.2 The UKCP09 data (Ref 12.22) indicates that in North Wales there will be greater seasonality with winters becoming wetter and summers becoming drier. Under the high emissions scenario, the central estimate of the predicted increase in winter precipitation is +5% in the 2020s and +26% by the 2080s. The central estimate of the predicted decrease in winter precipitation is for -4% in the 2020s and -26% in the 2080s. Therefore there is potential for an increase in peak flows during winter months, and reduced low flows during summer months.

7.7.3 The FCA has assumed that during the construction period peak river flows could increase by 15%. During the operational/decommissioning periods it has been assumed that peak river flows could increase by 30% along the Proposed Development. An extreme assessment was also undertaken of a 75% increase for Braint THH/CSEC.

7.7.4 The FCA has also assumed that during construction extreme daily rainfall intensity will increase by 5%, and during the operational/decommissioning period rainfall by 20%.

7.7.5 WFD water bodies have an overall target of Good Status by 2027 (or earlier) unless a lower Status is justified by means of technical infeasibility or disproportionate cost. For the purposes of this assessment all WFD waterbodies have been assumed to be at Good Status by 2027. The potential for the WFD to drive improvement of the aquatic environment is considered in more detail in the WFD Assessment Appendix 12.5 (**Document 5.12.2.5**).

7.7.6 Changing land use, in the form of changing agricultural land management practices, urban development, or development of major industrial sites could cause changes to the surface water environment over time. These changes could result in changes in patterns and rates of rainfall infiltration, changes in flow pathways and sources of sediment inputs, direct morphological

alterations to WFD water bodies, or the introduction or removal of sources of pollution. The Wylfa Newydd power station proposals are at the pre-application stage, but the development has the potential to influence land use and topography. Specifically, in relation to topography, there is landscaping grass mounding being proposed to the east and south of the Proposed Development. Large areas of the mounding are expected to be permanent, with minor areas to the south expected to be temporary and restricted to the construction phase. An indicative timescale for construction of these mounds is around 2020 – 21.

7.7.7 Although there is expected to be some diversification of agriculture, the majority of existing agriculture land uses are expected to remain largely unchanged during the lifecycle of the Proposed Development.

8 Potential Effects

8.1 INTRODUCTION

8.1.1 This section describes the type of effects that could potentially occur as a result of the Proposed Development, prior to the implementation of mitigation. It includes all phases of the Proposed Development including construction, operation, maintenance and decommissioning; for details about the various maintenance requirements please refer to Chapter 4 **(Document 5.4)**. Table 12.17 provides an overview of the potential effects arising from all types of Proposed Development infrastructure. These are then described in detail along with the relevant mitigation measures in section 9, which concludes on the significance of residual effects.

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
Change in water quality through mobilisation of sediment	The effects associated with an increased sediment supply to watercourses as a result of ground disturbance within construction working areas. These changes could be associated with temporary access track watercourse crossings, the excavation of trenches for undergrounding of existing infrastructure (e.g. third party assets) or sediment	Aquatic Environment	✓		✓	✓
		Water Resources	✓		✓	✓

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
	entrained runoff from soil bunds. No permanent watercourse crossings are proposed. Maintenance refurbishment work could include the installation of access tracks and temporary watercourse crossings, on a smaller scale and for a shorter duration than during construction. There may be some potential for sediment mobilisation during the maintenance phase. During the decommissioning phase these effects may take place where decommissioning working areas are excavated.					
Change in water quality through accidental contamination	The effects associated with the spillage or leakage of fuels, lubricants or other chemicals required for construction, and during maintenance, and decommissioning activities.	Aquatic Environment	✓		✓	✓
		Water Resources	✓		✓	✓

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
Changes in watercourse morphology	The effects associated with works in or near watercourses (e.g. from the installation of temporary watercourse crossings during construction). These works could potentially alter baseline rates of water and sediment transfer in morphologically sensitive locations. Maintenance refurbishment work could include the installation of access tracks and temporary watercourse crossings, on a smaller scale and for a shorter duration than during construction. There may be some potential for changes in watercourse morphology during the maintenance phase. During the decommissioning phase, sediment transfer could be generated from working areas that may result in morphological alterations within watercourses. In a precautionary worst case scenario this has the potential to facilitate some	Aquatic Environment	✓		✓	✓
		Water Resources	✓		✓	✓

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
	localised bank instability within the vicinity of discharge outlet headwalls.					
Changes in river baseflow arising from dewatering	Excavations associated with pylon foundations, tunnel shafts and tunnel are likely to require groundwater dewatering during construction due to interception of the perched water table. Dewatering from the tunnel and shafts would be discharged into the Braint Upper and Nant y Garth catchments, resulting in increased flows to those watercourses. During construction option (3) for drill and blast would result in greater dewatering requirements compared to options (1 and 2) for TBM approaches. This would be due to higher leakage given that drill and blast tunnelling would not be lined until the process was completed, whereas TBM would entail gradual lining as the tunnelling takes place. Dewatering would also be	Aquatic Environment	✓	✓		✓
		Water Resources	✓	✓		✓

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
	carried out at the operational stage to clear the tunnel of excess water. The construction of culverted access track watercourse crossings would generally be achieved by localised damming of the flow upstream of the proposed crossing location, with overpumping of water to leave a dry area in which to install the culvert. Where there is undergrounding of existing third party infrastructure, a cable trench would be dug and damming/overpumping of a watercourse would leave a dry working area for a maximum duration of two days. This would naturally lead to a temporary localised reduction in baseflow. There may be some potential for changes in baseflow due to overpumping for any temporary watercourse crossings installation during maintenance.					

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
	During the decommissioning stage temporary watercourse crossings would be required to facilitate the movement of vehicles.					
Surface Water Flood Risk (increased runoff)	Inadequate management of surface water through uncontrolled discharges could potentially result in flash flooding in receiving watercourses if the area drained and rainfall volume is significant enough. Uncontrolled discharges during construction and operational activities could also result in backwater effects propagating upstream if the channel immediately downstream of the discharge point is constrained. Similar effects could potentially result from unmanaged runoff resulting in direct overland flow.	Flood Risk Receptors	✓	✓		✓

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk						
Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
Changes in patterns and rates of infiltration	It is likely that there would be changes in patterns and rates of infiltration arising from ground disturbance and the development of temporary access tracks, working areas and undergrounding of third party infrastructure. It is assumed that temporary access tracks and working areas would result in only local displacement of infiltration during construction, and maintenance works. The creation of working areas could also result in localised effects during decommissioning.	Aquatic Environment	✓		✓	✓
		Water Resources	✓		✓	✓
Surface Water Flow Obstruction	Obstruction to surface water flow could potentially result in areas of surface water flooding. These potential effects are associated with ground disturbance and the creation of temporary access tracks and working areas, and underground cable trenches and working areas. It is	Flood Risk Receptors	✓		✓	✓
		Aquatic Environment	✓		✓	✓

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
	assumed that temporary access tracks and working areas would result in only localised changes to runoff during construction and maintenance works. The potential runoff effects are assessed in the FCA and summarised in this chapter.					
Fluvial flow impedance	Fluvial flow impedance is associated with the construction of temporary watercourse crossings during the construction and maintenance phase. If a culvert or bridge has insufficient capacity or becomes blocked, then it is possible that backwater effects may propagate upstream, and cause an increase in the extent of fluvial flooding. During the decommissioning stage temporary watercourse crossings would be required to facilitate the movement of vehicles.	Flood Risk Receptors	✓		✓	✓
		Aquatic Environment	✓		✓	✓

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
Flood Storage Displacement	Volumetric displacement of flood water is associated with the construction of temporary spoil mounds, raised access tracks, construction compounds and hardstanding in floodplain areas during the construction and maintenance phase. During the operational phase effects could be caused by the presence of permanent infrastructure. The assessment of effects is based on the findings of the FCA.	Flood Risk Receptors	✓	✓	✓	✓
		Aquatic Environment	✓	✓	✓	✓
Risk of pollution to coastal waters from tunnel blowout	If a TBM option is selected for tunnel construction, then the type of tunnel boring machine (TBM) selected would be dictated by the ground conditions identified along the tunnel alignment. Many TBMs utilise drilling fluids to aid operation of the drilling head. Drilling fluids for slurry separation TBMs can include compounds such as bentonite, and Earth Pressure Balance (EPB)	Aquatic Environment	✓			

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
	Machines can include polymers and foams. These are injected ahead of the drilling face to stabilise ground conditions and aid the action of the cutting head. Depending on the ground conditions, drilling fluids may be injected under pressure, which can result in a pressure blowout. Blowouts result where the drilling fluids crack or weaken fissures in the rock and result in a release of pressure at the surface. TBM blowout events may pose a risk to water quality as a result of the release of potentially contaminating drilling fluids into the aquatic environment. TBM blowouts are relatively rare events caused by pressure differentials and ground conditions. If the TBM hits a fissure or fracture there is potential for low density drilling fluid to escape to the surface					

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk

Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
	through connecting channels. Should an event occur, the volume of drilling fluid released is likely to be very small in comparison to the volume of the receiving water. TBM blowouts are only associated with the TBM tunnelling options (1 and 2), and not for the drill and blast option (3).					
Changes in water quality due to the release of brackish water into a freshwater environment	There would be shaft and tunnel dewatering requirements which would be discharged into the Braint Upper and Nant y Garth catchments. A secant pile would be installed as a cut-off wall in order to minimise excessive groundwater ingress into the shaft during construction. This may result in saline or brackish groundwater being brought to the surface, and if discharged to surface watercourses this could result in increased salinity within the receiving watercourses, which are freshwater environments.	Aquatic Environment	✓	✓		

Table 12.17 Potential Effects of the Proposed Development on Water Quality, Resources and Flood Risk						
Potential Effect	Description	Receptor group	Phase C: Construction O: Operation M: Maintenance D: Decommission			
			C	O	M	D
	There are larger volumes of dewatering associated with the drill and blast tunnelling method.					

9 Mitigation and Residual Effects

9.1 INTRODUCTION

9.1.1 Appropriate mitigation measures are committed to prevent, or control potential adverse effects of the Proposed Development. Mitigation would be in place through carefully considered design and the application of standard good practice working methods. However, where it is necessary, bespoke mitigation measures are committed to, prevent or control potential adverse impacts of the Proposed Development.

9.2 MITIGATION

Mitigation by Design

9.2.1 The careful siting of infrastructure has been a key consideration as part of the design process which has helped minimise or prevent potential impacts. During the evolution of the Proposed Development, water quality, resources and flood risk effects have been considered during the design and siting of infrastructure in order to avoid significant effects as described for each of the proposed infrastructure elements below.

Substation

9.2.2 Substation work at Wylfa and Pentir needs to be located at the existing substation location. The extension to the existing Substation at Pentir, and works within the existing site boundary at Wylfa would be constrained by these existing activities.

Tunnel Head House and Cable Sealing End Compounds (THH/CSEC)

9.2.3 The proposals have sought to locate the THH/CSEC sites at Braint and Tŷ Fodol in areas with the lowest possible flood risk, outside of the Flood Zones B and C. Details of this approach are provided in the Menai Strait Crossing Report (**Document 9.6**).

Construction Compounds

9.2.4 The proposals have also sought to locate each of the Construction Compounds at Braint and Tŷ Fodol, and at Pentir and Penmynydd Road, in areas with the lowest possible flood risk, outside of Flood Zones B and C.

During the design evolution the Compound at Penmynydd Road has been relocated to the west in order to avoid Flood Zone C.

OHL/Access Tracks

9.2.5 The DCO design has sought to minimise the areas of permanent OHL infrastructure within areas of flood risk.

Watercourse Crossings

9.2.6 As part of the design proposals at locations where culverts are not suitable for a crossing temporary bridges have been identified. Bridge crossings have been put forward for all WFD principal watercourses and Main Rivers. The bridges being proposed would involve no in channel work. The Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)** which is appended to Chapter 3 Proposed Development (**Document 5.3**) identifies where bridge crossings would be utilised, and this has been used to inform the assessment of effects in sections 9.3 – 9.5.

Control and Management Measures

9.2.7 The implementation of good practice during the construction phase would provide benefits as a result of general good 'housekeeping'. These are referred to as Control and Management Measures (CMMs).

9.2.8 Specific CMMs are also identified for mitigating potential impacts on water quality, resources and flood risk. Each CMM has been detailed within the CEMP **(Document 7.4)** which is secured by DCO Requirement 6. The CMMs summarised in Table 12.18 below are described in further detail within Section 8 Protection of the Water Environment (WE measures), and Section 9 Flood Management (FM measures) within the CEMP.

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk

CMM Code	Summary Description (CEMP Section)	Reason
WE11	General Principles (8.1) Prevent siltation and contamination of existing drainage systems and natural water environments. Ensure flows from construction areas do not exceed pre-development runoff rates (subject	Management of any effects on-site runoff to ensure protection of water quality and to avoid exceedance of greenfield runoff rates

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk

CMM Code	Summary Description (CEMP Section)	Reason
	to a minimum rate of 5 l/s in order to minimise the risk of blockage to outfall structures). Ensure routes of existing flows are not impacted.	
WE21 WE22 WE23	Pollution Control (8.3) • Pollution Prevention measures would be adopted in general accordance with existing PPGs where still relevant and the new GPPs • Specific Pollution Incident Control Plan (PICP) would be prepared and implemented, including pollution control and emergency response measures • A list of good industry practices for the PICP has been outlined in the CEMP	Management of effects associated with changes to water quality through sedimentation or contamination
WE31	Stand-off Distances from Watercourses or Waterbodies (8.4) • Works within 8 m of watercourse bank tops or waterbodies would be avoided wherever possible. As a minimum no works will be undertaken within 3 m of any watercourse or waterbody (other than for watercourse crossings and drainage mitigation works). Greater stand-off distances may be required for the protection of protected species; where relevant these are specified in the Biodiversity Mitigation Plan (**Document 7.7**) • No works to be undertaken within 3 m of watercourse (except watercourse crossings and drainage mitigation works) The acceptable standoff distance from the top	Management of any effects on fluvial flow impedance and protection of water quality

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk

CMM Code	Summary Description (CEMP Section)	Reason
	of watercourse banks will be assessed by a suitably experienced ecologist	
WE41 WE42 WE43	Groundwater and Dewatering Discharges (8.5) • *OHL and Substations*: Discharge from excavations would be discharged to adjacent grassed/vegetated agricultural away from watercourses as far as possible. Additional measures would be put in place (e.g. sediment fencing, check dams, SuDS, storage ponds, silt trapping systems etc) • *Tunnel*: Dewatering from shafts would be treated as appropriate prior to discharge, and discharged in a controlled manner under Environmental Permit. • *Environmental Permits*: would be obtained in consultation with NRW as required, and is dependent on the duration of the discharge activity. There is a requirement for permits in areas less than 500 m from a protected site, even for short durations.	Management of effects on river baseflow as a result of dewatering
WE51	Drainage Management (8.6): • Drainage Management Plan (DMP) would be prepared prior to commencement of works	Management of any effects associated with water quality through sedimentation and watercourse morphology. Ensuring site runoff does not exceed greenfield runoff rates. Management of
WE52 WE53	• *Drainage Design*: DMP would specify design and control measures, developed following detailed drainage investigations and hydrological assessments	

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk

CMM Code	Summary Description (CEMP Section)	Reason
WE54	• *Inspections*: Programme for routine checking and clearing of drainage systems to be developed and implemented prior to installation	effects associated with changes in infiltration patterns and rates.
WE55	• *Silt Management*: Good industry practices have been outlined to help minimise sediment laden runoff. For instance, soils will not be stockpiled within 8 m of surface water features, and would preferably be located in Flood Zone A in areas that do not coincide with mapped areas of surface water flood risk.	
WE56	• *Land Drainage*: Procedures outlined to ensure the protection of features (including PWS) have been outlined.	
WE57 WE58	• *Cors Erddreiniog Drainage Management*: Specific considerations have been outlined for seven areas within Section C where the Order Limits extend into the SAC, and a site specific DMP for temporary outfalls would be agreed with NRW prior to the commencement of works in these areas	
WE59 WE510 WE511	• *Tunnel Construction*: Specific DMP would be prepared by the Contractor for activities. This would include options for managing partially saline dewatered arisings and the controlled risk of blowout from Tunnel Boring Machine (TBM) operations. The provision of a separate designated pond with a control valve would be used to store the potentially saline tunnel water in a controlled manner separate from surface runoff . Sodium chloride levels would be	

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk

CMM Code	Summary Description (CEMP Section)	Reason
	tested prior to discharge to assess if it is acceptable for discharge into adjacent watercourses. If the tested sodium chloride levels are not acceptable, tanker facilities would be provided for the water to be transported off site.	
FM11	Flood Management (9.2): • Flood Management Plan (FMP): • A detailed Flood Management Plan (FMP) would be prepared and submitted to NRW and LLFAs for approval post grant of the DCO. The following measures would be implemented. • FMPs would apply equally to all sources of flooding, including main river and ordinary watercourses, surface water (external) and groundwater, together with internal sources of flood risk as appropriate. • The FMP would cover both construction and operational/maintenance phases as different receptor groups would be affected for each phase. • The FMP would, as a minimum include details as to how frequently weather and stream flow observations would be made, how forecasts, alerts and actions would be disseminated, signage, roles and responsibilities, emergency response procedures, including detailed evacuation plan and procedures for making safe plant and equipment. • Procedures would be presented to facilitate the periodic robust assessment of any potential floodplain and surface water flow	Ensuring the safety of site operatives who may be working in the floodplain, or may need to cross it for access/egress to working areas Management of effects associated with fluvial flow impedance, surface water obstructions and flood storage displacement

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk

CMM Code	Summary Description (CEMP Section)	Reason
	obstructions, ensuring that activities do not coincide with those areas of mapped fluvial and surface water flood risk.	
FM12	• Permits and Consent: • No works would be undertaken within 3 m of any watercourse (other than for watercourse crossings). • All works within 8m of non-tidal Main River and 16 m of tidal Main River would be subject to a Flood Risk Activity Permit (FRAP) from NRW. • Any works within 8m of an Ordinary Watercourse would be subject to an OWC from the relevant LLFA (either IACC or Gwynedd Council).	
FM13	• Structures in the Floodplain: • As far as possible, no raised structures (such as access tracks, working areas and associated topsoil stockpiles) would be located within the floodplain. • Approaches to bridges and culverts in Flood Zone C2 would minimise ramping up to the bridge deck so as not to impede flood flow conveyance. • Access tracks that are shown to intersect areas of surface water flooding (exc. those coincident with watercourse crossings)	

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk

CMM Code	Summary Description (CEMP Section)	Reason
	should not provide a topographic barrier to the flow path. • Temporary trackway (i.e. interlocking panels) would be used in areas of Flood Zone C2 wherever practicable. • Stockpiles would be present for the shortest practicable timeframe, with stockpiled material being reinstated as the construction works progress. • Soil stockpiles would be located in Flood Zone A to minimise reductions in floodplain storage/conveyance. • Stockpiles would be located in areas that don't coincide with mapped areas of surface water flood risk. • Sufficient gaps will be left in stockpiles so as to not impede flood flow pathways. Stockpile gaps will be located at topographic low points to preserve existing flow paths. Where stockpiles are places on either side of access tracks, the gaps should coincide.	
FM14	Design of Watercourse Crossings (9.2): • All temporary watercourse crossings would be designed to safely convey the 1% AEP event plus a 15% allowance for climate change. • Culverts would be designed with a pipe/openings of appropriate sizes for the watercourse in addition to the minimum size requirement based on the design flow criteria. • Culverts would be installed with the invert	Management of effects associated with water quality through sedimentation and watercourse morphology, ensuring no flow impedance

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk

CMM Code	Summary Description (CEMP Section)	Reason
	set below the natural bed level in order for a semi natural bed to establish within the culvert. • Culverts will be kept to the minimum size required, and access for wildlife would be maintained to prevent fragmentation of habitats. • Culverts would be installed in a dry channel isolated from upstream and downstream channel flow. These activities would need to take place during periods of normal to low flow conditions to avoid conveyance-related flood risk effects. • Flow would be diverted around the culvert working area by overpumping. Pumped water high in suspended solids would be pumped out into a sediment trap, before being discharged back into the watercourse downstream of the working area. • Operations and maintenance (O&M) plans would be prepared covering, as a minimum, details as to how blockages would be prevented/minimised/detected/removed, periodic inspection schedules, roles and responsibilities, details of associated FRAP or OWC. • Sufficient information will be provided to NRW and LLFAs to enable appropriate screening and permitting decisions to be made for FRAP and OWC purposes; and • Following construction, temporary watercourse crossings will be removed and bed and bank material will be reinstated in the same general profile as the pre-	

Table 12.18 Summary of CMMs for Mitigating Potential Impacts on Water Quality, Resources and Flood Risk		
CMM Code	Summary Description (CEMP Section)	Reason
	installation state. Bed and bank profiles will be recreated with appropriate measures to ensure stability that do not involve hard engineering (unless such stability measures were in place before the watercourse crossing works are carried out).	

Mitigation Measures

9.2.9 There would be a mitigation measure relating to tunnel drainage management during the operational phase. Consistently with the construction-phase measure WE510 (see Table 12.18), during the operation of the tunnel there would be the provision of a separate designated pond with a control valve used to store potentially saline water in a controlled manner separate from surface runoff. Sodium chloride levels would be tested prior to discharge to assess if it is acceptable for discharge into adjacent watercourses. If the tested sodium chloride levels are not acceptable, tanker facilities would be provided for the water to be transported off-site. The discharge permit would cover the construction and operational stages of the Proposed Development.

Assessment of Effects

9.2.10 The following sections (9.3 – 9.5 identify the range of potential impacts from Table 12.17 in section 8.1 which are relevant to each of the respective aquatic environment, water resources and flood risk receptors. Appropriate control and management measures from the CEMP Table 12.18 in section 9.2 are identified and where necessary additional site specific measures are prescribed to help manage residual effects during the construction, operation, maintenance and decommissioning phases.

9.2.11 The assessment references distances to elements of the Proposed Development as shown on Figures 12.1 – 3 **(Document 5.12.1.1 – 3)**. There are no aspects of design flexibility that would lead to effects of greater significance than those presented in sections 9.3 – 9.5 below.

9.3 THE AQUATIC ENVIRONMENT

Freshwater dependent designated sites

Tre'r Gof SSSI

9.3.1 This receptor is situated downgradient of various elements of the Proposed Development. Although there are no connecting watercourses between the Proposed Development and the SSSI, there is the potential for surface water runoff-related effects from within the catchment.

9.3.2 Three existing pylons (4AP002, 4AP003, 4AP004) and associated working areas required for their modification are situated 240 m, 480 m and 500 m from the designated site boundary and within the surface water catchment of the SSSI. Furthermore, two new pylons (4ZA005 and 4ZA006) have a hydrological flow pathway to the SSSI, approximately 170 m and 320 m from the site, respectively. There is also approximately 1.1 km of proposed access track and 0.6 km of proposed undergrounding of existing third party infrastructure within the surface water catchment of the SSSI (**Document 5.12.1.3, Sheet 1**).

9.3.3 From Table 12.17 the potential effects on Tre'r Gof SSSI associated with the construction of proposed access tracks, undergrounding of third party infrastructure and the modification of existing pylons are:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in watercourse morphology;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.3.4 Mitigation measures required to manage potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substations & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain.

No site specific measures are necessary to further manage the potential effects.

9.3.5 The residual construction phase effects on the Tre'r Gof SSSI would be managed to an acceptable level by the incorporation of the mitigation measures outlined above. Due to there being no measurable residual impact on the water flow regime, morphology or water quality, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst-case effect on the SSSI during construction would be **Negligible (not significant)**.

9.3.6 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Tre'r Gof SSSI . The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.7 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change is considered **Very Low** for all associated effects and, therefore, although the SSSI has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.8 The effects during decommissioning of the Project on the Tre'r Gof SSSI would be broadly the same as those associated with construction. They would be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change on the Tre'r Gof SSSI associated with all such effects is **Very Low.** Coupled with the **High** receptor sensitivity, the significance of the decommissioning effects would be **Negligible (not significant)**.

Llyn Alaw SSSI and DrWPA

9.3.9 This site is situated approx. 400 m – 800 m directly downstream and hydrologically connected to six proposed watercourse crossings comprising of one bridge crossing (Ref: NG-STRX B/94) and five culvert crossings (Refs: NG-DRX B/89, NG-DRX B/106, NG-DRX B/107, NG-DRX B/108, NG-DRX B/109), identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. There is also a section of proposed stone access track and sixteen proposed pylons and their associated working areas situated adjacent to tributary watercourses **(Document 5.12.1.3, Sheets 3,4).** There are working areas situated less than 8 m from a Main River, between 10 -12 m from an Ordinary Watercourse and more than 20 m from an Ordinary Watercourse **(Document 5.12.1.3, Sheets 3,4)**. There would be a requirement to carry out dewatering at pylon locations and where the

controlled discharge activity is less than 500 m upstream of the SSSI it would require an Environmental Permit from NRW.

9.3.10 From Table 12.17 the potential effects on Llyn Alaw SSSI/ DrWPA associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks, and undergrounding of third party infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.3.11 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.12 From Table 12.18 the standard mitigation measures required to manage potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.13 The residual construction phase effects on the Llyn Alaw SSSI/DrWPA designated site would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Due to there being no measurable residual impact on the water flow regime, morphology or water quality, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.3.14 During operation, there would be **no effects (not significant)** given that there would be minimal physical infrastructure with hydrological connection to the

Llyn Alaw SSSI/DrWPA. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help minimise any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.15 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the SSSI has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.16 The effects of decommissioning on the Llyn Alaw SSSI/ DrWPA would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **High** sensitivity of the site the significance of the decommissioning effects would be **Negligible (not significant)**.

Cors Erddreiniog (Anglesey Fens SAC/SSSI)

9.3.17 There are numerous ephemeral field drains which flow from west to east towards the Cors Erddreiniog SAC. These field drains flow into a larger perimeter drain on the upgradient side of an existing track, which flows alongside the perimeter of the SAC. The perimeter drain subsequently discharges into the Afon Erddreiniog which flows to the south away from the SAC **(Document 5.12.1.3, Sheet 6)**.

9.3.18 Two proposed access track culvert watercourse crossings identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)** (Refs: NG-DRX C/154, NG-DRX C/155) are situated approximately 20–70 m within the field drains upgradient of the Cors Erddreiniog SAC. These field drains feed into the perimeter carrier drain which marks the boundary of the site. Therefore, during moderate – high flows there is potential for mobilised sediment to extend into the perimeter drain; however this then flows into the Afon Erddreiniog, which flows away from the SAC.

9.3.19 The Order Limits encompass a corner of the SAC approximately 20 m upstream of a bridge watercourse crossing (Ref: NG-RVX C/156) identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. A site-specific mitigation measure has been committed to within the Schedule of Environmental Commitments provided in Volume 7 **(Document 7.4.2.1)** to avoid the siting of any temporary or permanent infrastructure (other than

temporary drainage works which may connect to the perimeter drain) within the SAC boundary **(Document 5.12.1.3, Sheet 7)**.

9.3.20 The working area associated with proposed pylon 4AP051 is situated less than 8 m from a Main River. There are also two proposed pylons (4AP048, and 4AP050) and associated working areas situated less than 8 m from an Ordinary Watercourse upstream of the SAC **(Document 5.12.1.3, Sheet 7).** Where possible, runoff would be discharged to the field drains located outside of the SAC, minimising the discharge to the perimeter drain. At topographic low points where it is not possible to convey flows to a field drain outside of the SAC, it may be necessary to convey flows into the perimeter drain. If it did prove necessary to carry out dewatering at these pylons' and should a controlled discharge activity of any duration be required as set out above, it would also require an Environmental Permit from NRW, as the working areas are less than 500 m upstream of the SAC/SSSI.

9.3.21 There are a further ten proposed pylons (4AP046, 4AP047, 4AP048 4AP049, 4AP050 4AP052, 4AP053, 4AP054, 4AP055, and 4AP056) and associated working areas positioned approximately 35 m – 240 m upstream of the SAC. There is approximately 3 km of proposed access track that is also hydrologically connected to the SAC. There is also approximately 1.4 km of undergrounding of existing third party infrastructure adjacent to the proposed track and site boundary. Although there are no watercourses to directly link the source of effects to the SAC, sediment bound pollutants and contaminants could potentially be mobilised and transported from these areas via a surface water runoff pathway into the designated site.

9.3.22 From Table 12.17 the potential effects on Cors Erddreiniog SAC associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks, and undergrounding of existing third party infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.3.23 Measures required to manage potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43

Groundwater and Dewatering Discharges (OHL & Environmental Permits), WE51 – WE58 Drainage Management (including specific Cors Erddreinniog Drainage Management Plan measures in WE57 & WE58), FM12 Permits and Consent, FM13 Structures in the Floodplain.

Specific measures required include:

- The Schedule of Environmental Commitments in Volume 7 **(Document 7.4.2.1)** avoids locating any infrastructure (other than temporary drainage connecting to the perimeter drain) in the Cors Erddreinog SAC.
- Where it is necessary to convey flows into the perimeter drain, temporary outfalls may be required. These would comprise of a temporary drainage pipe and glass reinforced concrete headwall inserted into the bank, which would be removed on completion of construction.
- Cross drains would be provided under the access track and stockpiles at regular intervals and low features.
- Site specific siltation mitigation methods would be implemented to prevent increased flows or silt laden runoff entering the perimeter drain that forms the western boundary of the Cors Erddreiniog SAC. The appropriate measures would be installed to facilitate settlement and removal of sediment particles and contaminants prior to discharge. Priority would be given to the diversion of preferential pathways away from the perimeter drain and dispersion of runoff across vegetated land.
- The appropriate measures would be set out in a site specific Drainage Management Plan, which would be discussed with NRW prior to the commencement of construction in this section, as secured by DCO Requirement 7.

9.3.24 The residual construction phase effects on the Cors Erddreiniog SAC designated site would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Due to there being no measurable residual impact on the river flow regime, morphology or water quality from the predicted effects, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Very High** sensitivity, it is considered that the worst case effects during construction would be **Negligible (not significant)**.

9.3.25 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Cors Erddreiniog SAC. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help

minimise any longer term changes in water quality or morphology as a result of the presence of the Proposed Development.

9.3.26 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the SAC has a **Very High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.27 The effects of decommissioning on the Cors Erddreiniog SAC would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is considered to be **Very Low**, and given the **Very High** sensitivity of the site the significance of the decommissioning effects would be **Negligible (not significant)**.

Caeau Talwrn SSSI & Corsydd Mon/ Anglesey Fens SAC

9.3.28 This freshwater designated site has four constituent components; one to the east and three to the west of the Proposed Development.

9.3.29 The eastern component is situated approximately 70 m downstream of an access track culvert watercourse crossing (Ref: NG-DRX D/194) identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. Figure 12.3 **(Document 5.12.1.3, Sheet 9)** indicates that this watercourse does not, however, enter into the SSSI boundary so there is no direct flow pathway to the receptor under normal flow conditions. However during moderate-high flows there is potential for mobilised sediment and contaminants from these crossings to extend into the site. There is one proposed pylon (4AP069) which is situated approximately 75 m from the eastern component of the SSSI. Figure 12.3 **(Document 5.12.1.3, Sheet 9)** also indicates that the drainage from this pylon area would be discharged downstream of the SSSI.

9.3.30 There are three constituent components of the SSSI/SAC to the west of the Proposed Development **(Document 5.12.1.3, Sheet 8)**. The northern and southern components are hydrologically connected to the Proposed Development; the intermediate component is not hydrologically connected.

9.3.31 The northern component is situated approximately 180 m downstream of a proposed culvert watercourse crossing (Ref: NG-DRX C/180) identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. Figure 12.3 **(Document 5.12.1.3, Sheet 8)** indicates that the watercourse passes

downstream into the SSSI. There is also a proposed pylon (4AP062) and associated working area approximately 30 m to the north of the watercourse but within the surface water catchment of the SSSI.

9.3.32 The southern component is not linked to any watercourses flowing from the area of the Proposed Development but there are various infrastructure elements situated up-gradient of the SSSI boundary and within the same surface water catchment area. There is approximately 0.25 km of proposed access track and two proposed pylons (4AP064 and 4AP066) 200 m and 250 m from the site boundary.

9.3.33 Any discharges at these pylon sites (4AP062, 4AP064 and 4AP066) would require an Environmental Permit from NRW as they are less than 500 m upgradient of the SSSI.

9.3.34 From Table 12.17 the potential effects on Caeau Talwrn SSSI/Corsydd Mon SAC associated with the construction and maintenance of the proposed new pylon, and the construction of the proposed access track include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.3.35 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.36 From Table 12.18 the standard mitigation measures required to manage potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substations & Environmental Permits), WE51 – WE56, WE59, WE510 – WE511 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.

Site specific mitigation measures required to manage potential effects are set out below:

- Site specific siltation mitigation measures would be incorporated into the access track drainage design to attenuate flow from the impervious area, encouraging filtration to facilitate the settlement and removal of any sediments and contaminants between the access track and the Caeau Talwrn SSSI/Corsydd Mon SAC. The details on the type of flow attenuation measures would be developed by the appointed contractor, in agreement with NRW.
- Design of drainage around watercourse crossings would be discussed and agreed with NRW post granting of a DCO, as secured through DCO Requirement 6.

9.3.37 The residual construction phase effects on the Caeau Talwrn SSSI/Corsydd Mon SAC designated site would be managed to an acceptable level by the incorporation of the mitigation measures outlined above. Due to there being no measurable residual impact on the river flow regime, morphology or water quality from the predicted effects, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Very High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.3.38 During operation, there would be **no effects (not significant)** given that there would be minimal permanent infrastructure with hydrological connection to the Caeau Talwrn SSSI/Corsydd Mon SAC. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.39 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the SSSI/SAC has a **Very High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.40 The effects of decommissioning on the Caeau Talwrn SSSI/ Corsydd Mon SAC would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change would be **Very Low**, and given the **Very High** sensitivity of the site the worst-case decommissioning effects would be **Negligible (not significant)**.

Cors Tregarnedd Mawr Wildlife Site and Malltraeth Marshes SSSI

9.3.41 Four proposed access track bridge crossings (Refs: NG-DRX D/192, NG-DRX D/193, NG-RVX D/196, NG-RVX D/206) and eight access track culvert watercourse crossings (Refs: NG-DRX C/190, NG-DRX D/209, NG-DRX D/194, NG-DRX D/197, NG-DRX D/201, NG-DRX E/215, NG-DRX E/216, NG-DRX E/220) identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**, are situated approximately 500 m to 650 m upstream of the Wildlife site. There are nine proposed pylons (4AP 067, 068, 069, 070, 071, 072, 073, 074, 076) and associated working areas situated approx. 12 m – 45 m from the nearest tributary. There is approximately 1.2 km of proposed access track that is also hydrologically connected to the Wildlife site and the SSSI **(Document 5.12.1.2 Sheet 5, and Document 5.12.1.3 Sheets 9/10)**.

9.3.42 From Table 12.17 the potential effects on the Cors Tregarnedd Mawr Wildlife Site and Malltraeth Marshes SSSI associated with the construction and maintenance of proposed new pylons, and the construction of proposed access tracks include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.3.43 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.44 From Table 12.18 the standard mitigation measures required to manage potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings. No site specific measures are necessary to further manage the potential

effects.

9.3.45 The residual construction phase effects on the Cors Tregarnedd Mawr Wildlife Site and Malltraeth Marshes SSSI designated site would be managed to an acceptable level by the incorporation of the standard mitigation measures outlined above. Due to there being no measurable residual impact on the river flow regime, morphology or water quality from the predicted effects, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Medium/High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.3.46 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Cors Tregarnedd Mawr Wildlife Site and Malltraeth Marshes SSSI. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.47 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower significance than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the wildlife site and SSSI has a **Medium and High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.48 The effects of decommissioning on the Cors Tregarnedd Mawr Wildlife Site and Malltraeth Marshes SSSI would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change would be **Very Low**, and given the **Medium/High** sensitivity of the site the worst-case decommissioning effects would be **Negligible (not significant)**.

Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC

9.3.49 This designated site is considered to have a Very High sensitivity and is situated more than 1 km downstream of the nearest infrastructure contained within the Afon Braint (upper) and Nant y Garth catchments. Within the Afon Braint (upper) catchment there is one proposed bridge crossing (Ref: NG-RVX F/243) and one culvert crossing (Ref: NG-RVX F/243) identified within the indicative Watercourse crossing Schedule **(Document 5.3.2.2)**, are situated approximately 1 – 1.5 km upstream of the SAC. There are four proposed pylons (4AP082, 083, 084, 085) and their associated working areas

situated approximately 6 – 70 m from the nearest tributary, and 1.5 – 1.9 km upstream of the SAC. Approximately 0.42 km of proposed undergrounding of existing third party infrastructure is associated with three trenched watercourse crossings. There is also approximately 1.25 km of proposed access track situated within the Afon Braint (upper) catchment **(Document 5.12.1.3, Sheet 11**).

9.3.50 Within the Nant y Garth catchment there is one proposed bridge crossing (Ref: NG-STRX F/256) and seven proposed culvert crossings (Refs: NG-DRX F/282, NG-DRX F/262, NG-DRX F/281, NG-DRX F/277, NG-DRX F/263, NG-DRX F/264, NG-DRX F/291) identified within the Indicative Watercourse crossing Schedule **(Document 5.3.2.2)**, are situated approximately 1.8 km – 2.2 km upstream of the SAC. There are four proposed pylon locations (4AP088, 089, 090, 091) situated approximately 30 m – 70 m from the nearest tributary, 1.4 km – 1.7 km upstream of the SAC. There is also a temporary construction compound situated approximately 20 m from an adjacent tributary approximately 1.8 km upstream of the SAC. There is also approximately 0.22 km of proposed undergrounding of existing third party infrastructure including four trenched watercourse crossings, approximately 1.4 km – 1.6 km upstream of the SAC. There is also approximately 0.6 km of proposed access tracks situated within the Nant y Garth catchment **(Document 5.12.1.3, Sheet 14)**.

9.3.51 Within both catchments there would also be elements of work that are required for the tunnelling operation during the construction phase. This would include construction of the tunnel shafts, dewatering, removal and off-site disposal of soil and shaft and tunnel arisings at the Tŷ Fodol and Braint THH/SCECs. The proposed THH/CSECs are situated 0.9 km and 1.3 km from the SAC within the Afon Braint (upper) and Nant y Garth catchments respectively. During the operational phase there would also be a requirement to carry out dewatering to remove leakages and excess water accumulation within the tunnel and the controlled discharge activity would require an Environmental Permit from NRW.

9.3.52 From Table 12.17 the potential effects on Y Fenai a Bae Conwy/Menai Strait and Conwy Bay SAC associated with the undergrounding of third party infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and

- Surface water flow obstruction.

9.3.53 The construction of watercourse crossings is associated with

- Changes in watercourse morphology; and
- Fluvial flow impedance

9.3.54 Tunnelling activities are also associated with the risk of pollution to coastal waters from tunnel blowout (option 1 and 2). The risk of pollution from tunnel blowout is not associated with the drill and blast (option 3).

9.3.55 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 – WE43 & WE 510 – WE511 Groundwater and Dewatering Discharges (OHL, Tunnel, & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, Design of Watercourse Crossings FM14.
>
> Operational Tunnel Drainage Management measure.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.56 The residual construction phase effects which have been identified on the Y Fenai a Bae Conwy/Menai Strait and Conwy Bay SAC designated site would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Due to there being no measurable residual impact on the river flow regime, morphology or water quality from the predicted effects, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Very High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.3.57 During operation, there would be **no effects (not significant)** given that there would be minimal physical infrastructure with hydrological connection to the Y Fenai a Bae Conwy/Menai Strait and Conwy Bay SAC. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.58 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower significance than those presented for construction. The magnitude of change associated with

all effects is considered **Very Low** and, therefore, although the SAC has a **Very High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.59 The decommissioning effects on the Menai Strait SAC would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **Very High** sensitivity of the site the significance of the decommissioning effects would be **Negligible (not significant)**.

WFD Water bodies

9.3.60 Each of the WFD Water body assessments below have been based on a screening exercise whereby infrastructure activities have been identified within 25 m of the respective tributary watercourses. The assessments and their associated mitigation are applicable to all infrastructure activities within respective water body boundaries. A cumulative impact assessment for the WFD water bodies is presented in the WFD Assessment in Appendix 12.5 (**Document 5.12.2.5**).

Non reportable WFD Water body adjacent to the Irish Sea GB110102059160

9.3.61 There is one proposed access track bridge crossing (Ref: NG-RVX A/32) and one proposed culvert crossing (Ref: NG-RVX A/37) within the catchment, identified in the Indicative Watercourse crossing Schedule **(Document 5.3.2.2)**. There are also two proposed pylons (4ZA008, 4ZA009) and associated working areas situated less than 8 m from a Main River **(Document 5.12.1.3, Sheet 1)**.

9.3.62 Two existing pylons (4AP005, 006) and their associated working areas are situated less than 8 m from an Ordinary Watercourse and a Main River respectively **(Document 5.12.1.3, Sheet 1)**.

9.3.63 From Table 12.17 the potential effects on the non reportable WFD water body associated with the construction and maintenance of proposed new pylons, the construction of proposed access track, and modification of existing pylons include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;

- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.64 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.65 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.66 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the river flow regime, morphology or water quality WFD objectives of this non-reportable water body due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst case effect during construction would be **Minor (Not significant).**

9.3.67 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to this non-reportable WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.68 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with

all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.69 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** sensitivity of the site the significance of the operational effects would be **Minor (not significant)**.

Afon Wygyr GB110102059170

9.3.70 There are fourteen proposed access track watercourse crossings, comprising three bridge watercourse crossings (Refs: NG - RVX A/48, NG-RVX A/51, NG-RVX A/70), and eleven culvert watercourse crossings (Refs: NG-DRX A/44, NG-DRX A/45, NG-RVX A/55, NG-DRX A/64, NG-DRX B/79, NG-DRX A/80, NG-DRX A/67, NG-DRX A/69, NG-DRX A/72, NG-DRX A/73, NG-DRX B/78**)** within the catchment, identified in the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. There are three proposed pylons (4ZA017, 4ZA020, 4ZA022) and their associated working areas situated adjacent to tributary watercourses. The working area associated with 4ZA020 is approximately 10 m from the nearest watercourse. The working areas associated with 4ZA017 and 4ZA022 are situated less than 8 m from Ordinary Watercourses **(Document 5.12.1.3, Sheets 2/3)**.

9.3.71 Five existing pylons (4AP010, 4AP012, 4AP013, 4AP016, 4AP017) and their associated working areas are situated 10 m, 9 m, 10 m, 10m and 12 m respectively from the nearest tributary. There is also approximately 140 m of proposed underground third party infrastructure including one trenched watercourse crossing.

9.3.72 From Table 12.17 the potential effects on the Afon Wygyr WFD water body associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks, undergrounding of existing third party services and modification of existing pylons include

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.73 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.74 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.75 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Afon Wygyr due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **Medium** sensitivity during the construction phase, it is considered that the worst case effect during construction would be **Negligible (not significant).**

9.3.76 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Afon Wygyr WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.77 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.78 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude associated with all effects is **Low**, and given the **High** future baseline sensitivity of the water body the significance of the decommissioning effects would be **Minor (not significant).**

Alaw - upstream Llyn Alaw GB110102058982

9.3.79 This WFD river water body catchment contains the same proposed infrastructure elements as described above for the Llyn Alaw SSSI and DrWPA receptor.

9.3.80 From Table 12.17 the potential effects on the WFD water body upstream of Llyn Alaw Reservoir associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks, undergrounding of infrastructure and modification of existing pylons include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.3.81 The construction of watercourse crossings is also associated with

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.82 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.

No site specific measures are necessary to further manage the potential effects.

9.3.83 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the river water body upstream of Llyn Alaw Reservoir due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **High** sensitivity of the water body, it is considered that the worst case effect during construction would be **Minor (not significant)**.

9.3.84 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the WFD water body upstream of Llyn Alaw. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.85 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.86 The effects of decommissioning on the WFD water body upstream of Llyn Alaw reservoir would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** sensitivity of the site the significance of the decommissioning effects would be **Minor (not significant)**.

Llyn Alaw Reservoir GB31032538

9.3.87 The Llyn Alaw Reservoir catchment contains the same proposed infrastructure elements as described above for the Llyn Alaw SSSI and DrWPA receptor.

9.3.88 From Table 12.17 the potential effects on the Llyn Alaw Reservoir water body associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks, undergrounding of third party services and modification of existing pylons include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.3.89 The construction of watercourse crossings is also associated with:

- Changes in Watercourse morphology; and
- Fluvial flow impedance.

9.3.90 From Table 12.18 standard mitigation measures required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.91 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the lake water body Llyn Alaw Reservoir due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **Medium** sensitivity of the water body during the construction phase, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.3.92 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Llyn Alaw Reservoir WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas

would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.93 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.94 The effects of decommissioning on the WFD water body upstream of Llyn Alaw reservoir would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** future baseline sensitivity of the site the significance of the decommissioning effects would be **Minor (not significant)**.

Goch Dulas GB110102059000

9.3.95 There are six proposed access track watercourse crossings comprising of one bridge crossing (Ref: NG-STRX B/94) and five culvert crossings (Refs: NG-DRX B/89, NG-DRX B/106, NG-DRX B/107, NG-DRX B/108, NG-DRX B/109) within the WFD river water body catchment, identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. There are also six proposed pylons (4AP033, 4AP036, 4AP041, 4ZA042, 4ZA043, 4ZA044) and associated working areas situated adjacent to a tributary. The working area associated with 4AP036 is less than 8 m from an Ordinary Watercourse. The working areas associated with 4ZA042, 4ZA043, and 4ZA044 are situated 10 m, 20 m and 12 m from the nearest respective tributary **(Document 5.12.1.3, Sheets 4/5)**.

9.3.96 Three existing pylons (4ZA036, 4AP038, 4ZA040) and their associated working areas are situated adjacent to a tributary. The working area associated with 4ZA036 is situated 12 m from the adjacent tributary. The working areas associated with 4AP038 and 4AP040 are less than 8 m from an Ordinary Watercourse. There is also approximately 520 m of proposed third party underground infrastructure including two trenched watercourse crossings **(Document 5.12.1.3, Sheets 4/5)**.

9.3.97 From Table 12.17 the potential effects associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks, undergrounding of existing infrastructure and modification of existing pylons include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.98 The construction of watercourse crossings is also associated with:

- Changes in Watercourse morphology; and
- Fluvial flow impedance.

9.3.99 From Table 12.18 standard mitigation measures required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.100 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Goch Dulas water body due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **Medium** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant).**

9.3.101 During operation, there would be **no effects (not significant)** given that there would be minimal physical hydrological connection to the Goch Dulas WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.102 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.103 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** future baseline sensitivity of the water body the significance of the decommissioning effects would be **Minor (not significant).**

Cefni (Cefni Reservoir West) GB110102058790

9.3.104 There is one proposed pylon (4AP045) and its associated working area situated approximately 8 m from the nearest Ordinary Watercourse. There is also approximately 40 m of undergrounding of third party infrastructure in the vicinity of the watercourse headwaters **(Document 5.12.1.3, Sheets 5/6)**.

9.3.105 From Table 12.17 the potential effects on Cefni Reservoir West associated with the construction and maintenance of a proposed new pylon, and the construction of undergrounding third party existing infrastructure, include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.106 From Table 12.18 standard mitigation measures required to manage these potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.

No site specific measures are necessary to further manage the potential

effects.

9.3.107 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Cefni Reservoir West water body due to the incorporation of mitigation measures outlined above. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst case effect during construction would be **Minor (Not significant).**

9.3.108 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Cefni West WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.109 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.110 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** sensitivity of the water body the significance of the decommissioning effects would be **Minor (not significant).**

Cefni (Cefni Reservoir East) GB110102058780

9.3.111 There are three proposed access track crossings including one bridge crossing (Ref: NG-RVX C/156) and two culvert crossings (Refs: NG-DRX C/154, NG-DRX C/155) within the Cefni Reservoir East WFD river water body catchment identified in the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. There are also two proposed pylons (4AP050, 4AP051) and associated working areas situated adjacent to a tributary watercourse. The working area associated with 4AP050 is situated less than 8 m from an Ordinary Watercourse. The working area associated with 4AP051 is situated less than 8 m from a Main River. There is also approximately 70 m of proposed undergrounding of third party infrastructure including two trenched watercourse crossings **(Document5.12.1.3, Sheets 6/7)**.

9.3.112 From Table 12.17 the potential effects on Cefni Reservoir East associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks and undergrounding of third party infrastructure include:

- Changes in water quality through mobilisation of sediment
- Changes in water quality through accidental contamination
- Changes in patterns and rates of infiltration
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.3.113 The construction of watercourse crossings is also associated with:

- Changes in Watercourse morphology; and
- Fluvial flow impedance.

9.3.114 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.115 The WFD Assessment in Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Cefni Reservoir East due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst case effect during construction would be **Minor (not significant).**

9.3.116 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological

connection to the Cefni Reservoir East WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.117 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.118 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** sensitivity of the water body the significance of the decommissioning effects would be **Minor (not significant).**

Lligwy GB110102059070

9.3.119 The water body catchment includes a proposed pylon location (4AP048) and its associated working area situated less than 8 m from an Ordinary Watercourse **(Document 5.12.1.3, Sheet 6)**. As previously noted (in paragraph 9.3.21 there would be a requirement for an Environmental Permit from NRW to carry out dewatering within 500 m of a designated site.

9.3.120 From Table 12.17 the potential effects associated with the construction of the proposed new pylon include:

- Changes in water quality through mobilisation of sediment
- Changes in water quality through accidental contamination
- Changes in river baseflow arising from dewatering
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.121 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation &

Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain. No site specific measures are necessary to further manage the potential effects.

9.3.122 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Ligwy water body due to the incorporation of mitigation measures outlined above. Given that there would be no measurable impact on river flow regime, morphology or water quality and no consequences in terms of WFD designations, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant).**

9.3.123 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Lligwy WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.124 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.125 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **High** sensitivity of the water body the significance of the decommissioning effects would be **Negligible (not significant).**

<u>Ceint to Cefni Reservoir GB110102058770</u>

9.3.126 There are five access track watercourse crossings comprising of one bridge crossing (Ref: NG-RVX C/166) and four culvert crossings (Refs: NG-DRX C/165, NG-DRX C/168, NG-DRX C/180, NG-DRX C/183) within the WFD catchment identified in the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. There are two proposed pylons (4AP058, 4AP060) and associated working areas situated adjacent to tributaries. The working area

associated with 4AP058 is less than 8 m from an Ordinary Watercourse. The working area associated with 4AP060 is approximately 15 m from the nearest watercourse. There is approximately 100 m of proposed undergrounding of existing third party services **(Document 5.12.1.3, Sheet 8)**.

9.3.127 From Table 12.17 the potential effects associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks and undergrounding of existing third party infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.128 The construction of watercourse crossings is also associated with:

- Changes in Watercourse morphology; and
- Fluvial flow impedance.

9.3.129 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.130 The WFD Assessment in Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Ceint to Cefni Reservoir due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the

Medium sensitivity during the construction phase, it is considered that the worst case effect during construction would be **Negligible (not significant).**

9.3.131 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Ceint to Cefni WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.132 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** future baseline sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.133 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** future baseline sensitivity of the water body the significance of the decommissioning effects would be **Minor (not significant).**

Ceint GB110102058940

9.3.134 There are twelve proposed watercourse crossings comprising of four bridge crossings (Refs: NG-DRX D/192, NG-DRX D/193, NG-RVX D/196, NG-RVX D/206) and eight culvert crossings (Refs: NG-DRX C/190, NG-DRX D/209, NG-DRX D/194, NG-DRX D/197, NG-DRX D/201, NG-DRX E/215, NG-DRX E/216, NG-DRX E/220) within the catchment, identified in the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. There are two proposed pylons (4AP068, 4AP070) and their associated working areas situated adjacent to a tributary. The working area associated with 4AP068 is situated less than 8 m from an Ordinary Watercourse. The working area associated with 4AP070 is situated 9 m from the nearest watercourse. There is also approximately 50 m of proposed undergrounding of third party infrastructure associated with one trenched watercourse crossing **(Document 5.12.1.3, Sheets 9/10)**.

9.3.135 From Table 12.17 the potential effects associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks and undergrounding of existing third party infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.136 The construction of watercourse crossings is also associated with:

- Changes in Watercourse morphology; and
- Fluvial flow impedance.

9.3.137 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.138 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Ceint Reservoir due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **Medium** sensitivity, it is considered that the worst case effect during the construction phase would be **Negligible (not significant).**

9.3.139 During operation, there would be **no effects (not significant)** given that there would be no physical infrastructure with hydrological connection to the Ceint Reservoir WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.140 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** future baseline sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.141 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** future baseline sensitivity of the water body the significance of the decommissioning effects would be **Minor (not significant).**

Cefni Transitional GB52101010207500

9.3.142 The Cefni transitional water body is situated downstream of the Ceint river water body and therefore the proposed infrastructure elements described above could result in cross water body potential effects.

9.3.143 From Table 12.17 the potential effects associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks and undergrounding of existing third party infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.144 The construction of watercourse crossings is also associated with:

- Changes in Watercourse morphology; and
- Fluvial flow impedance.

9.3.145 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation &

Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings. No site specific measures are necessary to further manage the potential effects.

9.3.146 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Cefni transitional WFD water body due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **Medium** sensitivity during the construction phase, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.3.147 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Cefni transitional WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.148 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** future baseline sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.149 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** future baseline sensitivity of the water body the significance of the decommissioning effects would be **Minor (not significant)**.

<u>Non reportable waterbody east of Malltraeth Sands</u>

9.3.150 Figure 12.3 **(Document 5.12.1.3)** indicates that there is no infrastructure within the applied screening distance of 25 m. One pylon (4AP077) and its

associated working area situated outside of the screening limits approximately 120 m from the tributary headwaters.

9.3.151 From Table 12.17 the potential effects associated with the construction and maintenance of the proposed new pylon include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.152 From Table 12.18 the standard mitigation measures required to manage these potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain. No site specific measures are necessary to further manage the potential effects.

9.3.153 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the non reportable WFD water body due to the incorporation of mitigation measures outlined above. Given that there would be measurable impact on the river flow regime, morphology or water quality and no consequences in terms of WFD designations, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.3.154 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the non reportable WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.155 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.156 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **High** sensitivity of the water body the significance of the decommissioning effects would be **Negligible (not significant)**.

Braint Lower GB110102058660

9.3.157 There are five proposed access track watercourse crossings comprising of two bridge crossings (Refs: NG-DRX E/229, NG-RVX E/241) and three culvert crossings (Refs: NG-DRX E/225, NG-DRX E/227, NG-DRX E/228) within the WFD water body catchment, identified in the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. Two proposed pylons (4AP080 and 4AP081) and their associated areas are situated adjacent to a tributary. The working area associated with 4AP080 is situated 25 m from the nearest tributary. The working area associated with 4AP081 is situated less than 8 m from an Ordinary Watercourse. There is also one proposed trenched watercourse crossing associated with 220 m of underground infrastructure **(Document 5.12.1.3, Sheet 11)**.

9.3.158 From Table 12.17 the potential effects associated with the construction and maintenance of proposed new pylons, and the construction of proposed access tracks include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.159 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and

- Fluvial flow impedance.

9.3.160 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.161 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Lower Braint due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **Medium** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant).**

9.3.162 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Lower Braint WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.163 During maintenance, the refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** future baseline sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.164 The decommissioning effects on the water body would also be managed to an acceptable level, through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** future baseline sensitivity of the water body the

significance of the decommissioning effects would be **Minor (not significant).**

Braint Upper GB110102058690

9.3.165 There are there are two proposed culvert crossings comprising of one proposed bridge crossing (Ref: NG-RVX F/243) and one culvert crossing (Ref: NG- DRX E/236) within the WFD water body catchment, identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. There are also proposed working areas situated less than 8 m from an Ordinary Watercourse **(Document 5.12.1.3, Sheet 11)**.

9.3.166 In connection with the THH within the catchment there would be dewatering requirements during construction and operation phases, associated with the disposal of potentially saline groundwater from the tunnel. As previously noted, the controlled discharge activity would require an Environmental Permit from NRW.

9.3.167 From Table 12.17 the potential effects associated with the construction of proposed access tracks, and undergrounding of third party existing infrastructure, include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.168 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.169 The dewatering of the THH shafts during construction and operation phases is also associated with:

- Changes in river baseflow arising from the release of dewatering to surface watercourses. Dewatering would be associated with each of the tunnelling scenarios. During construction the greatest dewatering requirements would be associated with the drill and blast tunnelling option.

- Changes in water quality due to the release of brackish water from dewatering into a freshwater environment. There could be a higher volume of brackish water associated with construction of the drill and blast tunnelling option.

9.3.170 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 – WE43 Groundwater and Dewatering Discharges (OHL, Tunnel, & Environmental Permits), WE51 – WE56, WE59, WE510 – WE511 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> Operational Tunnel Drainage Management measure (see paragraph 9.2.9).
>
> No site specific measures are necessary to further manage the potential effects.

9.3.171 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Upper Braint due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst-case effect during construction would be **Minor (not significant).**

9.3.172 During operation, there would be **no effects (not significant)** associated with ground disturbance given that there would be minimal permanent physical infrastructure with hydrological connection to the Upper Braint WFD water body. The commitment to the provision of suitable THH DMP would help minimise any longer-term changes in water quality as a result of the presence of the operating Proposed Development. The magnitude of change associated with the release of brackish water from dewatering of the operational THH shaft is **Very Low**, and given the **High** sensitivity of the water body the significance of the operational effects would be **Negligible (not significant)**.

9.3.173 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than

those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.174 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** sensitivity of the water body the significance of the decommissioning effects would be **Minor (not significant).**

Nant y Garth GB110065058490

9.3.175 There is one proposed bridge crossing (Refs: NG-RVX F/243) and seven proposed culvert crossings (Refs: NG-DRX F/282, NG-DRX F/262, NG-DRX F/281, NG-DRX F/277, NG-DRX F/263, NG-DRX F/264, NG-DRX F/291) within the WFD catchment, identified in the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. There is also a temporary construction compound situated approximately 20 m from an adjacent tributary. Four proposed pylons locations (4AP088, 089, 090, 091) are situated approximately 30 m – 70 m from the nearest tributary. There is also approximately 0.22 km of proposed undergrounding of existing third party infrastructure including four trenched watercourse crossings **(Document 5.12.1.3, Sheet 13)**.

9.3.176 In connection with the THH, during construction there would be shaft dewatering requirements associated with the disposal of potentially saline groundwater from the tunnel. As previously noted, the controlled discharge activity would require an Environmental Permit from NRW.

9.3.177 From Table 12.17 the potential effects associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks and undergrounding of existing third party infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface Water Obstruction.

9.3.178 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.179 The dewatering of the THH shafts during the construction phase is also associated with:

- Changes in river baseflow arising from dewatering. Dewatering would be associated with each of the tunnelling scenarios. During construction the greatest dewatering requirements would be associated with the drill and blast tunnelling option.
- Changes in water quality due to the release of brackish water into a freshwater environment. There could be a higher volume of brackish water associated with the drill and blast tunnelling option.

9.3.180 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 – WE43 Groundwater and Dewatering Discharges (OHL, Tunnel, & Environmental Permits), WE51 – WE56, WE59, WE510 – WE511 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, Design of Watercourse Crossings FM14.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.181 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Nant y Garth due to the incorporation of mitigation measures outlined above. There would however be transient effects on the natural watercourse morphology due to the presence of temporary culvert crossings causing alterations in the transport of sediment. However, given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst case effect during construction would be **Minor (not significant).**

9.3.182 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Nant y Garth WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.183 During maintenance, refurbishment work could have some similar effects to enabling construction works (e.g. for site access and maintenance of pylons), however it would be of a smaller scale and shorter duration and is therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.184 The decommissioning effects on the water body would also be managed to an acceptable level, through good practice in the same way as the construction phase. The magnitude of change associated with all effects is **Low**, and given the **High** sensitivity of the water body the significance of the operational effects would be **Minor (not significant).**

Cegin GB110065058540

9.3.185 There is part of the proposed Pentir temporary construction compound situated within the catchment, positioned approximately 15 m from the nearest tributary watercourse.

9.3.186 From Table 12.17 the potential effects associated with the siting of the construction compound include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.187 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.188 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Cegin

WFD catchment due to the incorporation of environmental measures prescribed above. Given that there would be no measurable impact on the river flow regime, morphology or water quality and no consequences in terms of WFD designations, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Medium** sensitivity during the construction phase, it is considered that the worst case effect during construction would be **Negligible (not significant).**

9.3.189 During operation, there would be **no effects (not significant)** given that there would be no permanent physical infrastructure with hydrological connection to the Cegin WFD water body. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.190 During maintenance, refurbishment work could have similar effects to initial construction works, however it would be of a smaller scale and shorter duration and is therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** future baseline sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.191 The decommissioning effects on the water body would also be managed to an acceptable level, through good practice in the same way as the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **High** future baseline sensitivity of the water body the significance of the decommissioning effects would be **Negligible (not significant).**

Menai Strait (GB681010120000)

9.3.192 The Menai Strait Coastal WFD catchment contains the proposed tunnelling activities as described above for the Menai Strait and Conwy Bay SAC. The tunnelling activities would be directly below the Menai Strait Coastal WFD catchment boundary. Additionally there would be cross water body effects from the Nant y Garth, and Braint (Upper and Lower) WFD river water body catchments described above.

9.3.193 From Table 12.17 the potential effects on the Menai Strait coastal WFD catchment associated with the construction of access tracks and undergrounding of third party infrastructure in upstream water bodies include:

- Changes in water quality through mobilisation of sediment;

- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow obstruction.

9.3.194 The construction of watercourse crossings in upstream water bodies is associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.3.195 Tunnelling activities for the TBM options (not relevant to the drill and blast tunnelling option) are also associated with:

- Risk of pollution to coastal waters from tunnel blowout.

9.3.196 From Table 12.18 the standard mitigation required to manage these potential effects in the Menai Strait catchment and other inter-related catchments are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 – WE43 Groundwater and Dewatering Discharges (OHL, Tunnel, & Environmental Permits), WE51 – WE56 Drainage Management, WE59, WE510 – WE511 Tunnel Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.3.197 The WFD Assessment Appendix 12.5 **(Document 5.12.2.5)** concludes that there would be no measurable impact on the WFD objectives for the Menai Strait coastal WFD catchment due to the incorporation of mitigation measures outlined above. Given that there would be no short-term or permanent change to WFD status, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant).**

9.3.198 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to Menai Strait WFD water body. The commitment to effective

reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality or morphology as a result of the presence of the operating Proposed Development.

9.3.199 During maintenance, refurbishment work could have some similar effects to the for the enabling construction works (for site access and maintenance of pylons), however it would be of a smaller scale and shorter duration and is therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the water body has a **High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.3.200 The decommissioning effects on the water body would also be managed to an acceptable level, through good practice in the same way as the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **High** sensitivity of the water body the significance of the decommissioning effects would be **Negligible (not significant).**

9.4 WATER RESOURCES

Licensed Abstractions

Llyn Alaw Reservoir

9.4.1 This licensed abstraction is downstream of proposed infrastructure elements as described above in section 9.4 for the Llyn Alaw SSSI and DrWPA receptor.

9.4.2 From Table 12.17 the potential effects on the Llyn Alaw Reservoir associated with the construction and maintenance of proposed new pylons, construction of proposed access tracks, undergrounding of third party services and decommissioning and removal of existing pylons include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.4.3 The construction of watercourse crossings is also associated with:

- Fluvial flow impedance.

9.4.4 From Table 12.18 the standard mitigation measures required to manage these potential effects to an acceptable level are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.4.5 The residual construction phase effects on the Llyn Alaw Reservoir licensed abstraction would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Given that there would be no measurable change in licensed water resource availability or quality, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Very High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.4.6 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Llyn Alaw Reservoir licensed abstraction. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality as a result of the presence of the operating Proposed Development.

9.4.7 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the public water supply has a **Very High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.4.8 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **Very High** sensitivity of the public water supply the significance of the decommissioning effects would be **Negligible (not significant).**

Cefni Reservoir

9.4.9 This licensed abstraction is situated downstream of proposed infrastructure elements as described above in section 9.4 for the Cefni Reservoir east and Cefni Reservoir east WFD water bodies.

9.4.10 From Table 12.17 the potential effects on the Cefni Reservoir licensed abstraction associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks and undergrounding of existing third party infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.4.11 The construction of watercourse crossings is also associated with:

- Fluvial flow impedance.

9.4.12 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.4.13 The residual construction phase effects on the Cefni Reservoir licensed abstraction would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Given that there would be no measurable change in licensed water resource availability or quality, and given the extensive potential for dilution, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Very High** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.4.14 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Cefni Reservoir licensed abstraction. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality as a result of the presence of the operating Proposed Development.

9.4.15 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the public water supply has a **Very High** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.4.16 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **Very High** sensitivity of the public water supply the significance of the decommissioning effects would be **Negligible (not significant).**

Private Water Supplies

Tyn Llan, Old Rectory S060ILLANE/1

9.4.17 The Tyn Llyn PWS is situated 2.2 – 2.6 km downstream of proposed infrastructure elements outlined above in section 9.1 for the Goch Dulas catchment and Cefni Reservoir East catchment **(Document 5.12.1.2, Sheet 3)**.

9.4.18 From Table 12.17 the potential effects on the PWS associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks and undergrounding of existing third party services include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.4.19 The construction of watercourse crossings is also associated with:

- Fluvial flow impedance.

9.4.20 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.4.21 The residual construction phase effects on the Tyn Llan PWS would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Given that there would be no measurable change in PWS water resource availability or quality, and given the extensive potential for dilution (due to the distance between the Order Limits and the abstraction), the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Medium** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.4.22 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Tyn Lan PWS. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality as a result of the presence of the operating Proposed Development.

9.4.23 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the PWS has a **Medium** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.4.24 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is

Very Low, and given the **Medium** sensitivity of the PWS the significance of the decommissioning effects would be **Negligible (not significant).**

Pandy, Rhosmeirch S060ORHOSM/1

9.4.25 The Pandy PWS is situated 2.8 km downstream of proposed infrastructure elements outlined above in section 9.1 for the Cefni Reservoir east catchment **(Document 5.12.1.2, Sheet 4)**.

9.4.26 From Table 12.17 the potential effects on the Pandy PWS associated with the construction and maintenance of proposed new pylons, the construction of proposed access tracks and undergrounding of infrastructure include:

- Changes in water quality through mobilisation of sediment;
- Changes in water quality through accidental contamination;
- Changes in patterns and rates of infiltration;
- Changes in river baseflow arising from dewatering; and
- Surface water flow obstruction.

9.4.27 The construction of watercourse crossings is also associated with:

- Changes in watercourse morphology; and
- Fluvial flow impedance.

9.4.28 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings. No site specific measures are necessary to further manage the potential effects.

9.4.29 The residual construction phase effects on the Pandy PWS would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Given that there would be no measurable change in PWS water resource availability or quality, and given the extensive potential for dilution (due to the distance between the Order Limits and the abstraction),

the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Medium** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.4.30 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Pandy PWS. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality as a result of the presence of the operating Proposed Development.

9.4.31 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the PWS has a **Medium** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.4.32 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **Medium** sensitivity of the PWS the significance of the decommissioning effects would be **Negligible (not significant).**

Glan Menai, Holyhead Road S060WHOLYH/1

9.4.33 The Glan Menai property is situated within the upper Braint catchment adjacent to and approximately 50 m from the Afon Rhyd Eillan tributary watercourse. It is likely that the Glen Menai property PWS abstraction source location is taken from the Afon Rhyd Eillan which is upstream and hydrologically disconnected from the Proposed Development. However, as a worst case scenario it has been assumed that the source location is taken from the Afon Braint 120 m to the south of the Glan Menai property **(Document 5.12.1.2, Sheet 5)**. The worst case scenario PWS location is situated downstream of the infrastructure elements outlined in section 9.1 for the Braint upper WFD catchment. The nearest bridge crossing is situated approximately 140 m (Ref: NG-RVX F/243) directly upstream of this worst case scenario PWS source location.

9.4.34 From Table 12.17 the potential effects on the PWS associated with the construction of proposed access tracks, and undergrounding of existing third party services include:

- Changes in water quality through mobilisation of sediment;

- Changes in water quality through accidental contamination;
- Changes in river baseflow arising from dewatering;
- Changes in patterns and rates of infiltration; and
- Surface water flow pathway obstruction.

9.4.35 The construction of watercourse crossings is also associated with:

- Fluvial flow impedance.

9.4.36 From Table 12.18 the standard mitigation required to manage potential effects are set out below:

> WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
>
> No site specific measures are necessary to further manage the potential effects.

9.4.37 The residual construction phase effects on the Glan Menai PWS would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Given that there would be no measurable change in PWS water resource availability or quality, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Medium** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant).**

9.4.38 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Glen Menai PWS. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in water quality as a result of the presence of the operating Proposed Development.

9.4.39 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the PWS has a

Medium sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.4.40 The decommissioning effects on the water body would also be managed to an acceptable level through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **Medium** sensitivity of the PWS the significance of the decommissioning effects would be **Negligible (not significant).**

Discharges

Llanfachell STW CG0058201

9.4.41 The Llanfachell STW discharge is situated approximately 120 m downstream of two proposed access track bridge crossings (NG-RVX A/48, NG-RVX A/51) and one culvert crossing (Ref: NG-RVX A/55) of the Afon Wygyr tributary identified within the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)** and shown on a figure **(Document 5.12.1.2, Sheet 2)**.

9.4.42 From Table 12.17 the potential effects on the discharge associated with the construction of the watercourse crossing are:

- Changes in watercourse morphology

9.4.43 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings. No site specific measures are necessary to further manage the potential effects.

9.4.44 The residual construction phase effects on the Llanfachell STW discharge would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Due to there being no measurable change on the river morphology, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Medium** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.4.45 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Llanfachell STW discharge. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in morphology as a result of the presence of the operating Proposed Development.

9.4.46 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the discharge has a **Medium** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.4.47 The decommissioning effects would also be managed to an acceptable level, through good practice in the same way as the construction phase. The magnitude is considered to be **Very Low**, and given the **Medium** sensitivity of the discharge the significance of the decommissioning effects would be **Negligible (not significant)**.

Llanfechell Pumping Station CG0058101

9.4.48 The Llanfechell Pumping Station discharge is situated approximately 140 m and 150 m downstream of two proposed bridge crossings (Refs: NG-RVX A/48, NG-RVX A/51) and one proposed culvert crossing (Ref: NG-RVX A/55) identified in the Indicative Watercourse Crossing Schedule **(Document 5.3.2.2)**. The discharge is also positioned approximately 90 m downstream of a proposed trenched watercourse associated with a proposed section of underground existing infrastructure (**Document 5.12.1.3, Sheet 2**).

9.4.49 From Table 12.17 the potential effects on the discharge associated with the construction of the watercourse crossing are:

- Changes in watercourse morphology

9.4.50 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.

No site specific measures are necessary to further manage the potential effects.

9.4.51 The residual construction phase effects on the Llanfachell Pumping Station discharge would be managed to an acceptable level by the incorporation of mitigation measures outlined above. Due to there being no measurable impact on the river morphology, the expected magnitude of change is predicted to be **Very Low** during construction. Coupled with the **Medium** sensitivity, it is considered that the worst case effect during construction would be **Negligible (not significant)**.

9.4.52 During operation, there would be **no effects (not significant)** given that there would be minimal permanent physical infrastructure with hydrological connection to the Llanfechell Pumping Station discharge. The commitment to effective reinstatement of topsoil and vegetation within pylon working areas would help avoid any longer term changes in morphology as a result of the presence of the operating Proposed Development.

9.4.53 During maintenance, refurbishment work could have similar effects to the initial construction works, however would be of a smaller scale and shorter duration and are therefore likely to result in effects of a lower magnitude than those presented for construction. The magnitude of change associated with all effects is considered **Very Low** and, therefore, although the discharge has a **Medium** sensitivity the significance of the maintenance effects would be **Negligible (not significant)**.

9.4.54 The decommissioning effects would also be managed to an acceptable level, through good practice measures as employed during the construction phase. The magnitude of change associated with all effects is **Very Low**, and given the **Medium** sensitivity of the discharge the significance of the decommissioning effects would be **Negligible (not significant)**.

9.5 FLOOD RISK RECEPTORS

Third Party Receptors

9.5.1 As outlined in the FCA, Appendix 12.4 **(Document 5.12.2.4)**, potential effects on third party receptors include:

- Surface water flooding (increased runoff);
- Surface water obstruction;
- Fluvial flow impedance; and
- Flood storage displacement.

9.5.2 From Table 12.18 the standard mitigation required to manage these potential effects are set out below:

- WE11 General Principles, WE21 – WE23 Pollution Control Measures, WE31 Stand-off Distances from Watercourses, WE41 & WE43 Groundwater and Dewatering Discharges (OHL/Substation & Environmental Permits), WE51 – WE56 Drainage Management, FM11 Flood Management Plan, FM12 Permits and Consent, FM13 Structures in the Floodplain, FM14 Design of Watercourse Crossings.
- No site specific measures are necessary to further manage the potential effects.

9.5.3 The FCA Appendix 12.4 **(Document 5.12.2.4)** has presented a detailed assessment of flood risk for the OHL and all associated construction activities. Other targeted assessments were also carried out for the Pentir substation extension and the Braint and Ty Fodol THH/CSEC, due to their associated workers being potentially vulnerable to sources of flooding during the construction and operational phases. Appendix 12.2 (**Document 5.12.2.2**) indicated that groundwater flooding and internal surface water flooding was shown to be a potential hazard, and Appendix 12.3 (**Document 12.12.2.3**) indicated that external flood risk could pose a potential hazard to the Braint and Tŷ Fodol THH/SCECs. Each assessment has shown that in all instances where flood risk receptors could be impacted by an associated flood hazard, the incorporation of the mitigation measures would be sufficient to mitigate any potential flood risk increase due to the Proposed Development during the construction, operational or decommissioning phases.

9.5.4 Measures to mitigate flood risk have been specified in the CEMP (**Document 7.4**), as secured by Requirement 6 of the draft DCO. The preparation of further detailed mitigation for drainage and flood risk would be prepared within the DMP and FMP, which would be secured by Requirement 7 of the draft DCO. As such the FCA has concluded that there would be **no effects (not significant)** from the Proposed Development during the construction, operational and decommissioning phases, once the committed mitigation is implemented.

10 Cumulative Effects

10.1 INTRODUCTION

10.1.1 This section of the assessment considers the cumulative effects of the various elements of the Proposed Development and the accumulated effects of the proposals with other developments proposed in the vicinity.

10.2 INTRA PROJECT CUMULATIVE EFFECTS

10.2.1 Intra-project effects are reported in Chapter 19, Intra-Project Effects (**Document 5.19**).

10.3 INTER PROJECT CUMULATIVE EFFECTS

10.3.1 Inter-project cumulative effects occur when two or more planned developments have an effect on the same receptor leading to an overall effect of greater significance. Note that these 'other developments' are developments that have not yet been constructed and are not operational; where developments are constructed and operational they are considered to form part of the existing baseline.

10.3.2 Chapter 20 Inter-Project Cumulative Effects (Document 5.20) presents a methodology for determining whether inter-project cumulative effects could occur as a result of these 'other developments' being built and/or operated at the same time as the Proposed Development. This methodology is based upon the Planning Inspectorate Advice Note 17, which deals with cumulative effects assessment. A long list of other developments needs to be developed and agreed initially. Once this is agreed, the methodology consists of four main stages as follows:

10.3.3 Stage 1: a long list of other developments is identified and outline information gathered. Consideration is given to whether the other development is within the zone of influence (ZOI) for each topic; if it is, then the assessment progresses to stage 2.

10.3.4 Stage 2: consideration is given to the potential temporal overlap i.e. whether the construction or operational effects of the other development could coincide with those of the Proposed Development. Consideration is also given to the scale and nature of the other development, the nature of the

receiving environment and whether there are shared receptors, and whether there is a 'pathway' for a cumulative effect to occur. At the end of stage 2 a shortlist of other developments is considered in stages 3 and 4.

10.3.5 Stage 3: detailed information is gathered about each of the shortlisted other developments, typically in the form of ESs or Scoping Reports.

10.3.6 Stage 4: cumulative effects are assessed and mitigation identified, and apportioned, where necessary. The securing mechanism for any necessary mitigation is identified.

10.3.7 The potential for cumulative effects to occur is considered for any effects that are minor, moderate or major. However, where the residual effects on a shared receptor are concluded to be negligible for either the Proposed Development or the other development, it is not considered possible for there to be a resulting inter-project cumulative effect. Where all effects related to a particular topic are negligible, for either the proposed Development or other development, the other development is screened out at stage 2.

10.3.8 Details about the 'other developments' on the long list considered at stage 1 are provided in Chapter 20 Inter-Project Cumulative Effects (Document 5.20) and its appendices.

Stage 1 and Stage 2

10.3.9 Table 12.19 provides a summary of stages 1 and 2 of the inter-project cumulative effects assessment on water quality, water resources and flood risk receptors. Where the effects of other developments are either outside the ZOI or outside the temporal scope of the Proposed Development, they have not been included in this table.

Table 12.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
Wylfa Newydd Nuclear Power Station	Yes	Yes	Potential overlap between both the construction and operational phases.	Shared receptors: Wygyr Water Framework Directive (WFD) water body (GB110102059170) and Tre'r Gof SSSI. Proposed activities associated with the Wylfa Newydd Power Station includes landscape mounding that would modify the surface water catchment of Tre'r Gof SSSI, with associated potential to affect water quality to the SSSI. Potential sources of sediment entrained runoff could have an effect on Tre'r Gof SSSI and the Afon Wygyr catchment. These have been identified by the developer as having the potential to result in significant effects associated with the Wylfa Newydd Power Station alone. The Proposed Development would also involve works within the surface water catchments of the Tre'r Gof SSSI and the Afon Wygyr. However,) the Proposed Development would only result in a **negligible** effect on both receptors. As such, the Proposed Development would not add to the magnitude of change relative to the effects associated with the Wylfa Newydd Power Station alone. There would therefore be no cumulative effects.	No
Wylfa Nuclear Power Station Decommissioning	Yes	Yes	Overlap between all phases of the Wylfa Nuclear Power Station Decommissioning and the construction and operation of the Proposed Development.	Shared receptors: Wygyr WFD water body (GB110102059170) and Tre'r Gof SSSI. The Wylfa Nuclear Power Station Decommissioning activities would be within the same catchment as the construction and operation activities of the Proposed Development. As **negligible** effects from the Proposed Development have been predicted at shared receptors potential significant cumulative effects are considered to be unlikely.	No
Penrhos Leisure Village	No	No			
Anglesey Eco Park	No	No			
Parc Cybi	No	No			
Rhyd-y-Groes Re-power	Yes	Yes	Construction works have commenced and are expected to have been completed prior to the construction of the Proposed Development. There would be an overlap in the operational phases.	Shared receptor: Wygyr WFD water body (GB110102059170). The 'other development' is located within the same catchment as the Proposed Development. The construction phase is anticipated to have completed prior to construction of the Proposed Development and as such there are no potential cumulative effects from construction activities. During the operational phase, as **negligible** effects from the Proposed Development have been predicted to the shared receptor, significant cumulative effects are considered unlikely.	No

Table 12.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
Holyhead Waterfront Redevelopment	No	No			
Glyn Rhonwy Pumped Storage	No	No			
Underground Grid Connection between Glyn Rhonwy Pumped Storage Development and Pentir Substation	Yes	Yes	The connection is expected to take less than a year however as the start date is not currently known, it is assumed there could be overlap in the construction and operational phases.	Shared receptors: Cegin WFD water body (GB11065058540) and Nant y Garth (GB110065058490). The construction and operation activities associated with the connection would be partially within the same catchments as the Proposed Development. The construction of the Proposed Development is anticipated to result in a **negligible** effect on the Cegin waterbody, and as such, significant cumulative effect on the Cegin are considered unlikely. Construction of the Proposed Development is anticipated to result in a **minor** effect on the Nant y Garth water body. Given the scale and nature of the 'other development', which involves trenching alongside existing highways, there is not anticipated to be any potential for a significant cumulative effect on the Nant y Garth.	No
West Anglesey Demonstration Project	No	No			
Holyhead Deep	No	No			
A487 Caernarfon to Bontnewydd Bypass	No	No			
Menai Science Park	Yes	Yes	The first phase of the development would be completed prior to the construction phase of the Proposed Development however the remainder of the development would take approximately 10 years to complete (more detailed timescale currently unknown) therefore is	Shared receptor: Braint Lower WFD water body (GB110102058660). The 'other development' would be within the same catchment as the construction and operation activities of the Proposed Development. As **negligible** effects from the Proposed Development have been predicted at shared receptors potential significant cumulative effects are considered unlikely.	No

Table 12.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			likely to overlap with both the construction and operation phases of the proposed development.		
Third Menai Crossing	Yes	Yes	Potential for the construction phases to overlap (construction timescale currently unknown anticipated to be 2020/2021 to 2022/2023). The operations phases would also overlap.	Potential shared receptors: Braint Upper and Nant y Garth WFD river water bodies (GB110102058690 and GB110065058490) Some of the options for the crossing route (as described in **Document 5.20.2.2**) could include alterations to junctions that are within the Braint Upper and Nant y Garth river water body catchments. Minor construction related effects could occur to the Nant y Garth and Braint Upper WFD river water bodies as a result of the Proposed Development. Given the potential coincidence of construction activities for the two projects within those water bodies, there is potential for cumulative effects.	Yes - Nant y Garth and Braint Upper WFD river water bodies
A55 - Junction 15 & Junction 16 Improvement	No	No			
A55 Abergwyngregyn to Tai'r Meibion Improvement	No	No			
Nant y Garth Landfill Site	Yes	Yes	Overlap of operation of landfill (time-limited to the end of July 2021) and construction of the Proposed Development.	Shared receptor: Nant y Garth (GB110065058490). Nant y Garth Landfill Site development is to re-configure the finished profile of the existing inert landfill site, within the limitations of the existing consent. As minor amendments to landform would be unlikely to have an effect on the Nant y Garth, or to change the effects compared to the originally consented landform, significant cumulative effects are unlikely.	No
Caernarfon Brickworks Quarry	No	No			
Amlwch Liquid Natural Gas (LNG)	No	No			
Green Wire	Yes	Yes	Timescales currently unknown. If connection in place as per the	Shared receptor: Cegin WFD water body (GB11065058540). The Green Wire construction and operational activities would be within the same catchment as the Proposed Development. As **negligible** effects from the Proposed Development have	No

Table 12.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			agreement (completed by end of 2020) there would be an overlap with the OHL and tunnel construction however not with works at Pentir. Likely to be an overlap in operation phases.	been predicted at shared receptors potential significant cumulative effects are considered unlikely and are not considered further in this assessment.	
Llanbadrig Solar Farm	Yes	Yes	It is likely that this development would be constructed before the construction phase of the Proposed Development. There would be an overlap with the operational phases.	Shared receptor: Wygyr WFD water body (GB110102059170). The Llanbadrig Solar Farm construction and operational activities would be within the same catchment as the Proposed Development. As **negligible** effects from the Proposed Development have been predicted to the Afon Wygyr, potential significant cumulative effects are considered unlikely and therefore are not considered further.	No
Codling Wind Park	No	No			
Grŵp Llandrillo Menai Llangefni Campus	Yes	Yes	Although some elements would be completed prior to the construction phase of the Proposed Development there is the potential for overlap between the full build out of the site (timescale currently unknown) and the construction of the Proposed Development. There is also overlap between the operational phases	Shared receptors: Ceint WFD water body (GB110102058940) and Ceint to Cefni reservoir water body (GB110102058770). The other development is located within the same catchment as the Proposed Development. As **negligible** effects from the Proposed Development have been anticipated to the Ceint and Ceint to Cefni reservoir water bodies, potential significant effects are considered unlikely.	No

Table 12.19 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			of the developments.		
Dinorwig Cables	Yes	Yes	Potential overlap between construction phases (cable installation is programmed for between 2019 and 2025) along with overlap in the operational phases.	Shared receptors: Cegin WFD water body (GB110065058540) and Nant y Garth (GB110065058490). Details of this development are not available, but it is possible that it could involve construction and operational activities within the same catchments as the Proposed Development. Construction of the Proposed Development would result in a **negligible** effect on the Cegin waterbody therefore cumulative effects on this receptor are considered unlikely. A **minor** effect on the Nant y Garth waterbody due to the Proposed Development has been predicted; however, given the likely scale and nature of the works to replace cables, potential significant cumulative effects are considered to be unlikely and therefore are not considered further in the assessment.	No
Holyhead Port Expansion	No	No			

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Stage 3 and Stage 4

10.3.10 At the end of Stage 2 the original long list of other developments was reduced to a short list of other development where there would be potential for a significant cumulative effect to occur. The short list of other developments is as follows:

- Third Menai Crossing.

10.3.11 Stage 3 requires the gathering of detailed information; however, a substantial amount of information about the other developments had already been gathered to support stages 1 and 2.

10.3.12 The results of the Stage 4 assessment of cumulative effects and mitigation are presented in Table 12.20 below.

10.3.13 Professional judgement has been applied in determining whether the combination of effects from two developments could result in a significant effect overall. In the case of minor effects, it is considered highly unlikely that effects could prove to be additive; however, professional judgement has been applied to check that two or more minor effects do not have potential to accumulate, thereby resulting in a potentially significant effect.

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Table 12.20 Water Quality, Resources and Flood Risk					
Development Name	Effects on shared receptors from the Proposed Development	Effects on shared receptors from the 'other development'	Assessment of Cumulative effect with Proposed Development	Proposed Mitigation applicable to the Proposed Development including any apportionment	Residual Cumulative Effect
Third Menai Crossing	Braint Upper and Nant y Garth WFD river water bodies (GB110102058690 and GB110065058490): **Minor** Adverse (not significant) during construction and decommissioning associated with culvert crossings affecting channel morphology.	No information available.	There is insufficient information as yet about the effects of the other development, and as such the potential cumulative effects with the Proposed Development would need to be a consideration during the relevant assessment and consenting for that development. Braint Upper WFD river water body: The existing Junction 8A of the A55 lies on the catchment boundary with the non-reportable water body to the north of the Menai Strait. The junction options for the Third Menai crossing are at a similar location or to the east of the existing junction. They extend in to the non-reportable waterbody, outside the Braint Upper waterbody boundary, and do not appear, from the information available, to cross any watercourses. Nant y Garth WFD river water body: Existing junction 9 lies on the catchment boundary with the non-reportable waterbody to the south of the Menai Strait. The available information indicates that the junction would be modified but does not illustrate how or where, so it is assumed that the junction would remain in the same place but may be reconfigured. Given its location it is unlikely that localised alterations to the junction would necessitate crossing any watercourses. If any crossings were required, they would be in the headwaters of the northern tributary of the Nant y Garth (the Heulyn). Braint Upper WFD river water body: Given the likely minimal interaction between the Third Crossing and the catchment of the Braint Upper water body, significant cumulative effects are considered unlikely. Nant y Garth WFD river water body: Any interactions between the Third Crossing and the catchment of the Nant y Garth water body would be likely to be **minor,** and, whilst located in the same WFD water body catchment as the Proposed Development, would be on a different watercourse compared to the Proposed Development. As a result, significant cumulative effects are considered unlikely.	None.	Not significant.

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Conclusion

10.3.14 Taking into consideration all of the other developments for which a potential cumulative effect has been identified, the overall cumulative effects are considered to be not significant.

11 Summary

11.1.1 This chapter provides an assessment of the effects of the Proposed Development on the surface water environment, which comprises of the aquatic environment, water resources and flood risk.

11.1.2 In section 7 this chapter has identified that a range of receptors situated within the LHSA and WHSA are hydrologically connected to elements of Proposed Development infrastructure. Aquatic environment receptors include freshwater dependent designated sites, and WFD water bodies, as presented in the WFD Assessment Appendix 12.5 (**Document 5.12.2.5**). Water resource receptors comprise of licensed abstractions and discharges, and PWS. Flood risk receptors have been identified for fluvial and surface water sources in accordance with the FCA (Appendices 12.1 – 4, **Documents 5.12.2.1-4**).

11.1.3 The proposed infrastructure interacts with these baseline receptors in ways which could give rise to a variety of potential effects during the construction, operation, maintenance and decommissioning phases. Section 8 describes these potential effects which include; changes in water quality through the mobilisation of sediment and accidental contamination, changes in watercourse morphology, changes in river baseflow from dewatering, changes in patterns and rates of infiltration, changes in runoff/new flow pathways, Volumetric displacement of floodwaters and changes in watercourse conveyance.

11.1.4 The CMMs presented in section 9 have been developed as part of the CEMP (**Document 7.4**) in order to help manage these effects. The assessment of residual effects presented in section 9 has been carried out on the assumption that these embedded measures, and where applicable site-specific mitigation measures, would be implemented as described. The assessment has reported that for each identified receptor the prescribed measures would help manage effects to an acceptable level to ensure that there are no significant effects as a result of any phase of the Proposed Development.

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
The Aquatic Environment – Freshwater Designated Sites					
Tre'r Gof SSSI	Very High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41 - WE43, WE51 – WE56, FM12 – FM13	No measurable Impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases No Effects (not significant) during Operation Phase
		Changes in watercourse morphology	WE11, WE31, WE41 -WE43, WE51 – WE56, FM12 – FM13		
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Changes in river baseflow from dewatering	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
Llyn Alaw SSSI, DrWPA	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – 14	No measurable impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases No Effects (not significant) during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – 14		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Cors Erddreiniog (Anglesey Fens SAC/SSSI)	Very High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM13, Schedule of Environmental Commitments, Site specific DMP measures including Cors Erddreiniog DMP (DCO Requirement 7)	No measurable impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases No Effects (not significant) during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56, specific DMP measures		

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56, specific DMP measures		
		Surface water flow obstruction	FM13		
Caeau Talwrn SSSI & Corsydd Mon/Anglesey Fens SAC	Very High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – 14, Site specific measures for track drainage design (DCO Requirement 6)	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases No Effects (not significant) during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – 14		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Cors Tregarnedd Mawr Wildlife Site and Malltraeth Marshes SSSI	Medium/ High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases No Effects (not significant) during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC	Very High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, WE59, FM12 – FM14	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases
		Changes in water quality through accidental contamination	WE21 – WE23, WE510		

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
		Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, WE59, FM12 – FM14	Decommissioning Phases **No Effects** during Operation Phase	No Effects (not significant) during Operation Phase
		Changes in river baseflow arising from dewatering	WE41 - WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41 - WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
		Risk of pollution to coastal waters from tunnel blowout	WE511		
The Aquatic Environment – WFD Water Bodies					
Non reportable WFD Water body adjacent to the Irish Sea GB110102059160	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Low** during Construction Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction Maintenance and Decommissioning Phases No Effects (not significant) during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Non reportable WFD Water body adjacent to the Irish Sea GB110102059160	High	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status short-term Overall – **Low** during Construction Phase and Decommissioning Phase **Very Low** during and Maintenance Phases **No Effects** during Operation Phase	**Minor (not significant)** during Construction Phase and Decommissioning Phases **Negligible (not significant)** during Maintenance Phases No Effects (not significant) during Operation Phase
Afon Wygyr GB110102059170	Medium	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low**	**Negligible (not significant)** during Construction,

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
	(construction) High (operation, maintenance and decommissioning)	Changes in water quality through accidental contamination	WE21 – WE23	during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	Maintenance and Decommissioning Phases **No Effects** during Operation Phase
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Afon Wygyr GB110102059170	Medium (construction) High (operation, maintenance and decommissioning)	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction Phase and Decommissioning Phase **Very Low** during and Maintenance Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance Phases **Minor (not significant)** during Decommissioning Phase **No Effects** during Operation Phase
Alaw - upstream Llyn Alaw GB110102058982	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Alaw - upstream Llyn Alaw GB110102058982	High	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction and	**Minor (not significant)** during Construction and Decommissioning Phases **Negligible (not significant)** during Maintenance Phase

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
				Decommissioning Phases **Very Low** during Maintenance Phase **No Effects** during Operation Phase	**No Effects** during Operation Phase
Llyn Alaw Reservoir GB31032538	Medium (construction) High (operation, maintenance and decommissioning)	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Llyn Alaw Reservoir GB31032538	Medium (construction) High (operation, maintenance and decommissioning)	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction & Decommissioning Phases **Very Low** during Maintenance Phase **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Operation, and Maintenance Phases **Minor (not significant)** during Decommissioning Phase **No Effects** during Operation Phase
Goch Dulas GB110102059000	Medium (construction) High (operation, maintenance and decommissioning)	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56	**No Effects** during Operation Phase	
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Goch Dulas GB110102059000	Medium (construction) High (operation, maintenance and decommissioning)	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction & Decommissioning Phase **Very Low** during Maintenance Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, and Maintenance Phase **Minor (not significant)** during Decommissioning Phase **No Effects** during Operation Phase
Cefni (Cefni Reservoir West) GB110102058790	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low** Construction, Maintenance and Decommissioning Phases	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
Cefni (Cefni Reservoir West) GB110102058790	High	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction & Decommissioning Phase **Very Low** during Maintenance Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction and Maintenance Phases **Minor (not significant)** during Decommissioning Phase **No Effects** during Operation Phase

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
Cefni (Cefni Reservoir East) GB110102058780	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Cefni (Cefni Reservoir East) GB110102058780	High	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction & Decommissioning Phase **Very Low** during Maintenance Phases **No Effects** during Operation Phase	**Minor (not significant)** during Construction & Decommissioning Phase and **Negligible (not significant)** during Maintenance Phase **No Effects** during Operation Phase
Lligwy GB110102059070	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM13	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No Effects** during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
Ceint to Cefni Reservoir GB110102058770	Medium (construction) High (operation, maintenance and	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low** during Construction, Maintenance and	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases
		Changes in water quality through accidental contamination	WE21 – WE23		

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
	decommissioning)	Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56	Decommissioning Phases **No Effects** during Operation Phase	**No Effects** during Operation Phase
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Ceint to Cefni Reservoir GB110102058770	Medium (construction) High (operation maintenance and decommissioning)	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction & Decommissioning Phases **Very Low** during Maintenance Phase **No Effects** during Operation Phase	**Negligible (not significant)** during Construction and Maintenance Phases **Minor (not significant)** during Decommissioning Phase **No Effects** during Operation Phase
Ceint GB110102058940	Medium (construction) High (operation)	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low**	**Negligible (not significant)** during Construction, Operation, Maintenance and Decommissioning Phases
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
Ceint GB110102058940	Medium (construction) High (operation)	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Overall – **Low** during Construction and Decommissioning Phase **Very Low** during Operation and Maintenance Phases	**Negligible (not significant)** during Construction, Operation and Maintenance Phases **Minor (not significant)** during Decommissioning Phase
Cefni Transitional GB52101010207500	Medium (construction) High (operation)	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low**	**Negligible (not significant)** during Construction, Operation, Maintenance and Decommissioning Phases
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Cefni Transitional GB52101010207500	Medium (construction) High (operation)	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction & Decommissioning Phases **Very Low** during and Maintenance Phase **No effects** during Operational Phase	**Negligible (not significant)** during Construction and Maintenance Phases **Minor (not significant)** during Decommissioning Phase **No effects** during Operational Phase
Non reportable waterbody east of	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM13	No Measurable Impact	**Negligible (not significant)** during Construction,

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
Malltraeth Sands		Changes in water quality through accidental contamination	WE21 – WE23	Overall – **Very Low** **No effects** during Operational Phase	Maintenance and Decommissioning Phases **No effects** during Operational Phase
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM12 – FM13		
Braint Lower GB110102058660	Medium (construction) High (operation)	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact Overall – **Very Low**	**Negligible (not significant)** during Construction, Operation, Maintenance and Decommissioning Phases
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Braint Lower GB110102058660	Medium (construction) High (operation)	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	Transient but no short-term/ permanent change to WFD Status Overall – **Low** during Construction & Decommissioning Phases **Very Low** during Maintenance Phase **No effects** during Operational Phase	**Negligible (not significant)** during Construction and Maintenance Phases **Minor (not significant)** during Decommissioning Phase **No effects** during Operational Phase
Braint Upper GB110102058690	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, WE59, FM12 – FM14	No Measurable Impact Overall – **Very Low**	**Negligible (not significant)** during Construction, Operation, Maintenance and Decommissioning Phases
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from	WE41, WE43, WE51 – WE56		

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
		dewatering			
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
		Changes in water quality due to the release of brackish water into the freshwater environment	WE59, WE510, , and an Operational Tunnel Drainage Management measure		
Braint Upper GB110102058690	High	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, WE59, FM12 – FM14	No Measurable Impact Overall – **Low** during Construction & Decommissioning Phase **Very Low** during Operation and Maintenance Phases	**Negligible (not significant)** during Operational and Maintenance Phases **Minor (not significant)** during Construction & Decommissioning Phases
Nant y Garth GB110065058490	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, WE59, FM12 – FM14	No Measurable Impact Overall – **Very Low**	**Negligible (not significant)** during Construction, Operation, Maintenance and Decommissioning Phases
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
Nant y Garth GB110065058490	High	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, WE59, FM12 – FM14	No Measurable Impact Overall – **Low** during Construction & Decommissioning Phase **Very Low** during Maintenance Phase **No effects** during Operational Phase	**Minor (not significant)** during Construction & Decommissioning Phases Negligible (not significant) during Maintenance Phases **No effects** during Operational Phase

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
Cegin GB110065058540	Medium (construction) High (operation)	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, WE59, FM12 – FM14	**Very Low** during Construction, Maintenance and Decommissioning Phases **No effects** during Operational Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No effects** during Operational Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
Menai Strait (GB681010120000)	High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, WE59, FM12 – FM14	No Measurable Impact Overall – **Very Low** **No effect** during Operation Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No effect** during Operation Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance			
		Risk of pollution to coastal waters from tunnel blowout	WE511		
		Risk of pollution to coastal waters from tunnel blowout	WE511		
Water Resources – Licensed Abstractions					
Llyn Alaw Reservoir & Cefni Reservoir	Very High	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact **Very Low** during Construction, Maintenance and Decommissioning Phases **No effects** during Operational Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No effects** during Operational Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		

Table 12.21 Potential of the Proposed Development on Water Quality, Resources and Flood Risk

Resource/Receptor	Sensitivity Value	Potential effects	Control Mitigation Measures (CMMs) & Site specific measures	Residual Magnitude	Significance
		Fluvial flow impedance	FM14		
Water Resources – Private Water Supplies					
Tyn Llan, Old Rectory S060ILLANE/1 Pandy, Rhosmeirch S060ORHOSM/1 Glan Menai, Holyhead Road S060WHOLYH/1	Medium	Changes in water quality through mobilisation of sediment	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact **Very Low** during Construction, Maintenance and Decommissioning Phases **No effects** during Operational Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No effects** during Operational Phase
		Changes in water quality through accidental contamination	WE21 – WE23		
		Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14		
		Changes in river baseflow arising from dewatering	WE41, WE43, WE51 – WE56		
		Changes in patterns and rates of infiltration	WE41, WE43, WE51 – WE56		
		Surface water flow obstruction	FM13		
		Fluvial flow impedance	FM14		
		Fluvial flow impedance	FM14		
Water Resources – Licensed Discharges					
Llanfachell STW CG0058201 Llanfechell Pumping Station CG0058101	Medium	Changes in watercourse morphology	WE11, WE31, WE41, WE43, WE51 – WE56, FM12 – FM14	No Measurable Impact **Very Low** during Construction, Maintenance and Decommissioning Phases **No effects** during Operational Phase	**Negligible (not significant)** during Construction, Maintenance and Decommissioning Phases **No effects** during Operational Phase
Flood Risk Receptors					
Third Party Receptors	High, Medium, Low	Surface water flooding (increased runoff)	FM12 – FM14	Overall – **No Effects**	**Negligible (not significant)** during Construction, Operation, Maintenance and Decommissioning Phases
		Surface water obstruction	FM12 – FM14		
		Fluvial flow impedance			
		Flood storage displacement			

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