Parc Ynni Calon y Gwynt

ENVIRONMENTAL STATEMENT

Chapter 9 Hydrology

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9 HYDROLOGY

9.1 INTRODUCTION

9.1.1. This chapter presents the assessment of the likely significant effects of the Proposed Development with respect to the Hydrology, including flood risk, water resources and the aquatic environment. This chapter should be read in conjunction with the development description provided in **Chapter 4: Description of the Proposed Development** and with respect to relevant parts of the following chapters:

- **Chapter 5: Ecology;** and
- **Chapter 10: Geology and Soils**.

This chapter is supported by the following appendices:

- **Appendix 9A: Flood Consequence Assessment (including the Outline Drainage Strategy[1]);** and
- **Appendix 9B: Water Framework Directive Assessment.**

9.1.2. This chapter describes:

- The legislation, policy and technical guidance that has informed the assessment (**Section 9.2**);
- Consultation and engagement that has been undertaken and how comments from consultees relating to the Hydrology have been addressed (**Section 9.3**);
- The methods used for baseline data gathering (**Section 9.4**);
- Overall baseline (**Section 9.5**);
- Embedded measures relevant to the Hydrology (**Section 9.6**);
- The scope of the assessment for the Hydrology (**Section 9.7**);
- The methods used for the assessment (**Section 9.8**);
- The assessment of the Hydrology effects (**Section 9.9**);
- The assessment of cumulative (inter-project) effects (**Section 9.10**); and
- A summary of the significance conclusions (**Section 9.11**).

LIMITATIONS AND ASSUMPTIONS

9.1.3. The Draft ES has been produced to fulfil the Applicants' consultation duties and enable consultees to develop an informed view of the likely significant effects of the Proposed Development.

9.1.4. Private Water Supply (PWS) data has been requested from the LPA but has not yet been received. As such, they have not been considered within this chapter. The PWS data will be assessed in the final ES in a Private Water Supply Risk Assessment (PWSRA).

[1] TAN15 requires the preparation of an FCA and Drainage Statement. The Outline Drainage Strategy provided within FCA (Appendix 9A) follows the principles for a Drainage Statement and meets the provision set out in TAN15

9.1.5. A site visit, informed by the frozen infrastructure layout / alignment, is to be undertaken in July 2026. Should the site visit walkover identify features which are of relevance to the assessment, this will be described in full within the final ES submission.

9.1.6. Despite the limitations and assumptions is it is our view that the assessment presented is both sufficient and robust.

9.2 RELEVANT LEGISLATION, PLANNING POLICY AND TECHNICAL GUIDANCE

9.2.1. This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to the Hydrology.

LEGISLATION

9.2.2. A summary of the relevant legislation is provided in **Table 9-1**.

Table 9-1 - Legislation Relevant to the Hydrology Assessment

Legislation	Legislative Context
Control of Pollution Act 1974[2]	Makes provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.
Reservoirs Act 1975[3]	Provides regulation for the operation and maintenance of reservoirs to ensure the design is fit for purpose, and that maintenance (including frequent inspections of reservoir embankments) ensures the condition of the embankments. As a consequence, the chance of reservoirs failing and giving rise to flooding problems is remote.
Environmental Protection Act 1990[4]	Makes provision for the improved control of pollution arising from certain industrial and other processes. It re-enacts the provisions of the Control of Pollution Act 1974 relating to waste on land, including modifications to the functions of the regulatory and other authorities concerned in the collection and disposal of waste and makes further provision in relation to such waste.
Land Drainage Act 1991[5] and 1994[6]	Stipulates, in combination with the Water Resources Act 1991, that before work on or near an 'Ordinary Watercourse[7]' is carried out, an Ordinary Watercourse Consent is required. The Flood Defence consenting regime for 'Main Rivers[8]',

[2] UK Government. (1974). Control of Pollution Act 1974. [Online] Available at: Control of Pollution Act 1974 (legislation.gov.uk) [Accessed 30 March 2026]
[3] UK Government. (1975). Reservoirs Act 1975. [Online] Available at: https://www.legislation.gov.uk/ukpga/1975/23 [Accessed 30 March 2026]
[4] UK Government. (1990). Environmental Protection Act 1990. [Online] Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents [Accessed 30 March 2026]
[5] UK Government. (1991). Land Drainage Act 1991. [Online] Available at: https://www.legislation.gov.uk/ukpga/1991/59/contents [Accessed 30 March 2026]
[6] UK Government. (1994). Land Drainage Act 1994. [Online] Available at: https://www.legislation.gov.uk/ukpga/1994/25/contents [Accessed 30 March 2026]
[7] An Ordinary Watercourse is any river, stream, brook, ditch, drain, culvert, pipe and any other passage through which water may flow which is not designated as Main River.
[8] Main rivers are usually larger rivers and streams. They are designated as such and shown on the Main River Map. Natural Resources Wales carries out maintenance, improvement and construction work on main rivers to manage flood risk.

Legislation	Legislative Context
	which used to be part of this Act, was replaced by flood risk activities permits under the Environmental Permitting (England and Wales) Regulations 2016.
Water Resources Act 1991[9] Water Act 2003[10]	States that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter 'Controlled Waters[11]'. The Act was revised by the Water Act 2003, which sets out regulatory controls for water abstraction, water impoundment and protection of water resources. Important for the Proposed Development is the potential requirement to obtain a licence for dewatering of engineering works and to ensure that any impact on the environment can be mitigated. Provisions for the regulation of water discharges to controlled waters are set out in the Environmental Permitting (England and Wales) Regulations 2016. These have replaced provisions in the earlier Acts.
Environment Act 1995[12]	Established the Environment Agency (EA) and gave the EA responsibility for environmental protection and flood defence. Natural Resources Wales (NRW) was formed in April 2013, largely taking over the functions of the Countryside Council for Wales, Forestry Commission Wales and the Environment Agency in Wales.
Water Quality (Water Supply) Regulations 2016 [13]	Primarily concerned with the quality of water supplied in England for drinking, washing, cooking and food preparation, and for food production, and with arrangements for the publication of information about water quality.
Flood and Water Management Act 2010[14]	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 Sustainable Drainage Systems (SuDS).
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[15]	Sets out the environmental standards to be used for the third cycle of river basin plans, covering the period 2021 -2027.
Environment (Wales) Act 2016[16]	Aims to enable resources in Wales to be managed in a more proactive, sustainable and joined-up way and to establish the legislative framework necessary to tackle climate change. Includes provisions relating to land drainage and establishes a Flood and Coastal Erosion Committee which oversees and

[9] UK Government. (1991) Water Resources Act 1991. Chapter 57. London: The Stationery Office. Available at: Legislation.gov.uk - Water Resources Act 1991 [Accessed: July 2026].
[10] UK Government. (2003). Water Act 2003. (Online) Available from: https://www.legislation.gov.uk/ukpga/2003/37/contents [Accessed 30 March 2026]
[11] This includes territorial waters, coastal waters, inland freshwaters and groundwaters (section 104, Water Resources Act 1991). [Online] Available at: https://www.legislation.gov.uk/ukpga/1991/57/section/104 [Accessed 30 March 2026]
[12] UK Government. (1995). Environment Act 1995. [Online] Available at https://www.legislation.gov.uk/ukpga/1995/25/contents [Accessed 30 March 2026]
[13] UK Government. (2017). Water Quality (Water Supply) Regulations 2016. [Online] Available at: https://www.legislation.gov.uk/uksi/2016/614/contents [Accessed 09 July 2026]
[14] UK Government. (2010). Flood and Water Management Act 2010. [Online] Available at: https://www.legislation.gov.uk/ukpga/2010/29/contents [Accessed 30 March 2026]
[15] UK Government. (2017). The Hydrology (Water Framework Directive) (England and Wales) Regulations. [Online] Available at: https://www.legislation.gov.uk/uksi/2017/407/contents [Accessed 09 July 2026]
[16] Welsh Government. (2016). Environment (Wales) Act. [Online] Available at: https://gov.wales/sites/default/files/publications/2019-05/environment-wales-act-2016-flood-risk-management-land-drainage.pdf [Accessed 30 March 2026]

Legislation	Legislative Context
	provides guidance on wider risks and benefits of flood and coastal erosion risk management in Wales.
Private Water Supplies (Wales) Regulations 2017[17]	The Regulations require Local Authorities to monitor Private Water Supplies.
Environmental Permitting (England and Wales) Regulations, 2016[18]	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 European Union (EU) Water Framework Directive (2000/60/EC) (WFD)[19] as enacted into domestic law by the Water Environment Water Framework Directive (England and Wales) Regulations 2017[20]	The EU WFD is enacted into domestic law by the Water Environment Water Framework Directive (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.
Environment Act 2021[21]	The Environment Act 2021 makes provision for Environmental Improvement Plans (EIPs), including a target based approach for water bodies, aligned with the WFD targets. Currently, only one EIP, the Defra 25-year plan has been produced, which sets out the high level (national aspirations) for the environment.

[17] UK Government. (2017). The Private Water Supplies (Wales) Regulations 2017. [Online] Available at: https://www.legislation.gov.uk/wsi/2017/1041/contents/made [Accessed 30 March 2026]

[18] UK Government. (2016). The Environmental Permitting (England and Wales) Regulations 2016. [Online] Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents resource.html (europa.eu) [Accessed 30 March 2026].

[19] European Parliament. (2000). Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy. [Online] Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF [Accessed 30 March 2026]

[20] UK Government. (2017). The Hydrology (Water Framework Directive) (England and Wales) Regulations. [Online] Available at: https://www.legislation.gov.uk/uksi/2017/407/contents/made [Accessed 30 March 2026]

[21] UK Government. (2021). The Environment Act (2021) UK. [Online] Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted [Accessed 30 March 2026]

PLANNING POLICY

9.2.3. A summary of the relevant national and local planning policy is provided in **Table 9-2**.

Table 9-2 - Planning Policy Relevant to the Hydrology Assessment

Policy	Policy Context
National Planning Policy	
National Development Framework (Future Wales: The National Plan 2040)[22]	This is the national development framework for Wales, which has development plan status. **Policy 8 - Flooding** The policy sets out the requirement for sustainable development which puts a priority on nature-based flood management solutions, as well as supporting strategic growth and regeneration in National and Regional Growth Areas. **Policy 19 - Strategic Policies for Regional Planning** The policy states that environmental consideration when planning developments and managing resources is vital, on a strategic and local scale. Environmental issues identified must be fully assessed and addressed. **Policy 25– Regional Growth Areas - Mid Wales** This policy sets out the ambitions for the Mid Wales region of Wales. This is inclusive of development and growth strategies with reference to natural resources, climate change, flooding and biodiversity.
Planning Policy Wales - Edition 12[23]	Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. It sets out numerous planning conditions for new developments in Wales, these include: ▪ Water resources and quality must be taken into account from an early stage in the process of identifying land for development and redevelopment. The protection of water resources should be based on ensuring sustainable use in the future; ▪ New development should be located and implemented with sustainable provision of water services in mind, using design approaches and techniques which improve water efficiency and minimise adverse impacts on water resources, including the ecology of rivers, wetlands and groundwater and thereby contributing towards ecological resilience; ▪ New developments of more than one dwelling or where the area covered by construction work equals or exceeds 100 square metres also require approval from the SuDS Approval Body (SAB) before construction can commence. Adoption and management

[22] Welsh Government. (2021). National Development Framework (Future Wales). [Online] Available at: https://gov.wales/sites/default/files/publications/2021-02/future-wales-the-national-plan-2040.pdf [Accessed 30 March 2026]

[23] Welsh Government (2024). Planning Policy Wales Editon 12 [Online]. Available at: https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf. [Accessed 15th June 2026].

Policy	Policy Context
	arrangements, including a funding mechanism for maintenance of SuDS infrastructure and all drainage elements are to be agreed by the SAB as part of this approval. This will ensure that SuDS infrastructure is properly maintained and functions effectively for its design life; ▪ The provision of SuDS must be considered as an integral part of the design of new development and considered at the earliest possible stage when formulating proposals for new development; and ▪ Development proposals should incorporate design for surface water management, based on principles which work with nature to facilitate the natural functioning of the water cycle, providing issues such as land contamination would not result in the mobilisation of contaminants which may have an impact over a wider area. Design for multiple benefits and green infrastructure should be secured wherever possible and as part of Green Infrastructure Assessments suitable approaches towards the provision of SuDS should be identified.
Sustainable Drainage (SuDS) Statutory Guidance, Welsh Government[24]	The SuDS Statutory Guidance establishes the requirements of Schedule 3 of the Flood and Water Management Act 2010; a framework for the approval and adoption of surface water management systems serving new developments. The SuDS Approval Bodies (SABs) are assigned under the same Act, which give local authorities the responsibility to approve drainage systems for new developments. The overall objective of the legislation is to deliver effective, multi-purpose SuDS, which will remain effective for the lifetime of the development.
The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales, Welsh Government[25]	The National Strategy for FCERM in Wales, as required under the Flood and Water Management Act 2010, set out the management approach for risks associated with flooding and coastal erosion across Wales over a 10-year period. Natural Resource Wales (NRW) are responsible for managing the flood risks from the main rivers and sea across Wales; whilst Local Authorities as Lead Local Flood Authorities (LLFA) are responsible for managing risks associated with surface water, groundwater, and Ordinary Watercourses.
Technical Advice Note 15 (TAN15)[26]	The Technical Advice Note 15: Development, Flooding and Coastal Erosion 2026 edition provides guidance in relation to development and flooding, and is supported by the Flood Map[27] for Planning which incorporates flood risk extents based on predicted climate change over the next century.

[24] Welsh Government. (2019). Sustainable Drainage (SuDS) Statutory Guidance. [Online] Available at: https://www.gov.wales/sites/default/files/publications/2026-03/sustainable-drainage-suds-statutory-guidance.pdf [Accessed 30 March 2026]

[25] Welsh Government. (2020). The National Strategy for Flood and Coastal Erosion Risk Management in Wales. [Online] Available at: https://gov.wales/sites/default/files/publications/2021-03/the-national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf [Accessed 30 March 2026]

[26] Welsh Government, (2026). Technical Advice Note (TAN) 15. Available at: https://www.gov.wales/technical-advice-note-tan-15-development-flooding-and-coastal-erosion [Accessed 30 March 2026].

[27] Natural Resources Wales (2026). Flood map for planning. (Online). Available at: https://naturalresources.wales/flooding/flood-map-for-planning/?lang=en. [Accessed 30 March 2026].

Policy	Policy Context
Local Planning Policy	
Powys County Council Local Development Plan 2011 - 2026 (adopted April 2018).	The Powys Local Development Plan consists of a Written Statement and the Proposals and Inset Maps and it sets out the Council's policies for the development and use of land in Powys. Together with national planning policy it will guide decisions on planning applications on all future development and land use planning within the Plan area during the Plan period. **Policy DM5 - Development and Flood Risk** Development proposals must be located away from tidal or fluvial flood plains unless it can be demonstrated that the site is justified in line with national guidance and an appropriate detailed technical assessment has been undertaken to ensure that the development is designed to reduce / avoid the threat and alleviate the consequences of flooding over its lifetime. In addition the development must not increase flood risk elsewhere, and shall where possible allow floodplains to provide water storage to reduce flooding in the catchment, unless the development is of a very minor nature such as an extension to a dwelling, or there is an overriding need in the public interest for the development. **Policy DM6 - Flood Prevention Measures and Land Drainage** Development proposals must avoid unnecessary flood risk by assessing the implications of development within areas susceptible to all types of flooding; any development that unacceptably increases risk will be refused. Proposals near a watercourse or within an area of floodplain must comply with the following: 1. In areas identified at risk of flooding (fluvial, tidal, surface water and groundwater) or where a watercourse has insufficient channel capacity, opportunities to improve existing flood risk by using Sustainable Drainage Systems (SuDS), wetlands or other agreed and appropriate measures are investigated and implemented wherever possible. 2. Where possible, opportunities are taken on previously developed land to make space for water by reinstating the functional floodplain. 3. Opportunities to make space for water by undertaking restoration and enhancement as part of the development, are identified and implemented. 4. Actions are taken to de-culvert wherever possible. Where this is not possible, an assessment of the structural integrity of the culvert, with any required remedial work, should be carried out prior to the development. A maintenance schedule should be developed for all culverts to ensure regular clearance, and 5. Any developments located adjacent to a watercourse should leave an appropriate undeveloped buffer strip, maintaining the watercourse and the immediate riparian zone as an enhancement feature and allowing for routine maintenance. The width of any buffer strip should be agreed with the relevant authorities on a site by site basis. Such sites should have a maintenance strategy for clearing and maintaining the channel, with particular regard to structures such as trash screens and bridges. Satisfactory provision shall be made for land drainage in all developments and this should include consideration of the use of (SuDS).

TECHNICAL GUIDANCE

9.2.4. A summary of the technical guidance for the Hydrology is provided in **Table 9-3** below.

Table 9-3 - Technical guidance relevant to the Hydrology assessment

Technical Guidance Document	Context
NRW - Flood consequence assessments: climate change allowances[28]	Guidance regarding uplifts to be applied to hydrological modelling inputs to be used to help minimise vulnerability and provide resilience to the impacts of climate change.
Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive[29]	This Advice Note is primarily applicable to Nationally Significant Infrastructure Projects (NSIPs) and applies to both England and Wales but has no statutory status and forms part of a suite of advice notes provided by the Planning Inspectorate. Annex A of the Advice Note includes the role of Natural Resources Wales in ensuring compliance with the WFD environmental objectives.
Sustainable Drainage (SuDS) Statutory Guidance[30]	The Welsh Government's Sustainable Drainage (SuDS) Statutory Guidance provides guidance to SuDS Approving Bodies (SABs) on the implementation of Schedule 3 of the Flood and Water Management Act 2010. This sets out the processes for the approval, adoption, maintenance and enforcement of sustainable drainage systems in Wales and promotes the use of SuDS to manage surface water runoff sustainably, reduce flood risk, improve water quality, enhance biodiversity and deliver wider environmental and community benefits in new developments.
Construction Industry Research and Information Association (CIRIA) reports	
Report C532: Control of Water Pollution from Construction Sites (2001)[31]	Provides practical support for consultants and contractors on how to plan and manage construction projects to control water pollution.
Report C624: Development and Flood Risk - Guidance for the Construction Industry (2004)[32]	Guidance for developers and the construction industry on the implementation of good practice in the assessment and management of flood risk as part of the development process and is intended to promote development that is sustainable in terms of flood risk.

[28] Natural Resource Wales. (2018). Flood consequence assessments: climate change allowances. [Online] Available at: https://gov.wales/sites/default/files/publications/2018-11/flood-consequence-assessments.pdf [Accessed 01 April 2026]

[29] The Planning Inspectorate (2024). Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive. (Online). Available at https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-the-water-framework-directive. [Accessed 09 July 2026]

[30] Sustainable Drainage (SuDS) Statutory Guidance (2026) [Online] Available at: https://www.gov.wales/sites/default/files/publications/2026-03/sustainable-drainage-suds-statutory-guidance.pdfhttps://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/ [Accessed 01 April 2026]

[31] Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Hendrie, M. and Owens, D. 2001. Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. C532. London: CIRIA.

[32] Lancaster, J., Preene, M. and Marshall, C. 2004. Development and Flood Risk - Guidance for the Construction Industry. C624. London: CIRIA.

Technical Guidance Document	Context
Report C648: Control of Water Pollution from Linear Construction Projects (2006)[33]	Guidance for clients, consultants, designers, contractors, and regulators on how to plan and manage water pollution from linear construction projects.
Report C649: Control of Water Pollution from Linear Construction Projects - Site Guidance (2006)[34]	Guidance specifically aimed at on-site construction personnel working on linear infrastructure construction projects.
Report C650: Environmental Good Practice on Site, second edition (2005)[35]	Provides practical guidance about managing construction on-site to control environmental impacts.
Report C651: Environmental Good Practice - Pocket Book (2005)[36]	Contains a series of good practice checklists to follow while working on a project, from design and planning through the construction phase on-site, to project completion.
Report C689: Culvert Design and Operation Guide (2010)[37]	Comprehensive guidance covering a range of issues pertinent to the management and design of culverts.
Report C692: Environmental Good Practice on Site (2010)[38]	General good practice guidance and practical advice for the management of construction sites to minimise environmental impacts.
Report C698: Site Handbook for the Construction of SuDS (2007)[39]	Guidance for site engineers and SuDS practitioners on the construction of SuDS to facilitate their effective implementation within developments.
Report C753: The SuDS Manual (2015)[40]	Best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.

[33] Murnane, E., Heap, A. and Swain, A. 2006. Control of Water Pollution from Linear Construction Projects - Technical Guidance. C648. London: CIRIA.
[34] Murnane, E., Heap, A. and Swain, A. 2006. Control of water pollution from Linear Construction Projects - Site Guide. C649. London: CIRIA.
[35] Charles, P. and Connely, S. 2005. Environmental Good Practice Site Guide (second edition). C650. London: CIRIA.
[36] Chant-Hall, G., Charles, P. and Connolly, S. (2005). Environmental good practice on site - pocket book. C651. London: CIRIA.
[37] Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. (2010). Culvert design and operation guide. C689. London: CIRIA.
[38] Audus, I., Charles, P. and Evans, S. (2010). Environmental good practice on site (third edition). C692. London: CIRIA.
[39] Woods Ballard, B., Kellagher, R., Martin, P., Jefferies, C., Bray, R. and Shaffer, P. (2007). Site Handbook for the Construction of SUDS. C698. London: CIRIA.
[40] Woods Ballard, S., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. (2015). The SuDS Manual. C753. London: CIRIA.

9.3 CONSULTATION AND ENGAGEMENT

OVERVIEW

9.3.1. The assessment has been informed by consultation response and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 2.4** of **Chapter 2: Approach to EIA**.

SCOPING DIRECTION

9.3.2. A Scoping Direction (**Appendix 1B**) was issued by PEDW on behalf of the Welsh Ministers, on 06 March 2025. A summary of the relevant responses received in the Scoping Direction in relation to Hydrology and confirmation of how these have been addressed within the assessment to date is presented in **Table 9-4**.

Table 9-4 - Summary of EIA Scoping Direction responses for Hydrology

Consultee	Consideration	How addressed in this Draft ES
NRW	NRW concur with the approach set out in the Scoping Report (SR) that all aspects of hydrology are scoped into the ES. NRW advise that any changes to the drainage regime should be avoided. The installation of buried cabling or access roads / road drainage has the potential to alter the drainage regime via preferential pathways and crosscutting natural drainage patterns. The baseline drainage prior to infrastructure installation and operational drainage must be considered as part of the ES.	The baseline drainage prior to infrastructure installation and operational drainage has been considered as part of the Draft ES.
NRW	Ground investigations should be undertaken for each turbine location to understand the groundwater regime, notably the nature of the ground conditions including permeability and groundwater levels across the site. The surveyed information should inform the need and nature of dewatering required for turbine excavation. The information would also inform the understanding of the degree to which peat is supported by of groundwater, the nature of surface-water and groundwater connectivity, groundwater flow paths and gradients, and how conditions across the site change with rainfall events. These matters are important considerations for in the drainage assessment of the site. The ES must include a detailed layout plan including any cabling, and detailed turbine foundation design to inform the impact assessment on groundwater.	Following a step-wise approach, with input of phased soil depth and coring surveys, turbine locations have been sited away from 'peat soils' (using National Peatland Action Programme definition, i.e. > 0.3m peat profiles). Interference between peat soils and turbine foundations is not expected for that reason. T8 is located on peaty soils, however, considering mean soil depth to substrate across the platform is 0.29m, significant effects are not expected to hydrological connectivity, or changes in ground water dynamics /gradient pressures (if present close to surface at all) due to turbine foundation placement. Geotechnical Investigation (GI) work would be carried out at the pre-construction stage to determine detailed ground conditions to allow for the design of foundations and micro-siting of turbines, along access tracks, and at the construction compound and onsite substation locations. This would provide support to the project team to develop further phases of detailed design

Consultee	Consideration	How addressed in this Draft ES
		work. The geotechnical fieldwork undertaken may include (but not be limited to): visual inspections; machine and hand excavated trial pits; windowless sample boreholes; rotary core boreholes; and sampling and laboratory based geotechnical and geochemical testing. This information would inform the detailed track design, the turbine foundation design and identify any micro-siting requirements. The Draft ES includes a detailed layout plan including indicative cable trench arrangement (**Figure 4.7**), and indicative turbine foundation design (**Figure 4.2**) to inform the impact assessment on groundwater.
NRW	NRW highlight that the scheme involves the storage of a large BESS containing lithium-ion electrolytes and hydrocarbons which have the potential to cause pollution in the event of fire at the site as a result of battery failure. Risk of fire should be covered in the Major accidents and hazards chapter, however NRW advise that the ES should include measures to prevent pollution from contaminated firewater. The applicant should refer to detailed comments from NRW at appendix 1 regarding requirements for mitigation.	Allowance will need to be made as part of the detailed drainage strategy (to be secured via planning condition) for the containment of potentially contaminated fire-fighting water in the event of a fire within the BESS. This could comprise of an underground storage tank through which runoff from the BESS is passed. During normal conditions this tank is allowed to drain via the infiltration process outlined above, however in the event of a fire, a control valve on the outlet of the tank is closed prior to the deployment of firefighting water. Further details can be found in the Outline Drainage Strategy contained within **Appendix 9A: Flood Consequence Assessment.**
NRW	The ES should confirm whether fluid filled cables will be used for onsite cabling. If this is the case, the risk assessment should be provided in accordance with the Environment Agency's approach to groundwater protection.	Fluid-filled cabling is not anticipated to be used for the Proposed Development. On-site cabling is expected to comprise XLPE-insulated cables.
NRW	It is welcomed that an FCA would be provided as a technical appendix to the ES. TAN 15 was updated on 31 March 2025.	It is acknowledged that TAN 15 was updated on 31 March 2025, and subsequently on 20 March 2026 and the application will follow the TAN 15 advice. The FCA in **Appendix 9A** demonstrates that the Proposed Development will be compliant with TAN 15.
NRW	Information should be provided on any proposed access crossings, new surface water culverts, or alterations to existing structures along watercourses. Impacts on water quantities or flow pathways should be avoided.	Information regarding any proposed access crossings, new surface water culverts, or alterations to existing structures along watercourses is provided in **Chapter 4: Description of the Proposed Development**. Impacts on water quantities

Consultee	Consideration	How addressed in this Draft ES
		and flow pathways would be avoided via embedded environmental measures.
NRW	The CEMP should be site-specific, with identified pollution pathways and measures implemented to avoid pollution. The CEMP should include mitigation measures to prevent silty water run-off from areas such as exposed excavation areas, hardstanding areas and access tracks. The ES must demonstrate that the design and construction of the site ensures that all potential pollution pathways are protected. A draft CEMP should be included as a technical appendix to the ES.	An Outline CEMP (oCEMP)has been submitted alongside this Draft ES. The Final CEMP, to be informed by oCEMP submitted as part of the DNS application, will be site-specific, with implemented pollution pathway measures and will include mitigation measures to prevent the run-off of silty water from exposed excavation, hardstanding, and access track areas. For the design and construction of the site, the Draft ES demonstrates that all potential pollution pathways are protected.
NRW	NRW advise that further information should be gathered regarding any specific actions within the River Basin Management Plan for waterbodies in this area for opportunities to improve the water environment.	Further details provided in **Appendix 9B: Water Framework Directive Assessment.**
NRW	The SR states that temporary site offices and welfare facilities will be installed. However, no details regarding the method of foul waste disposal onsite are provided. NRW advise that the ES includes details on the proposed foul drainage system.	Details of foul waste disposal are outlined in the oCEMP. All sewage will be captured in an enclosed self-contained septic tank, which will be emptied by a certified waste carrier. These assets will be routinely emptied and inspected.
NRW	The applicant is advised that ordinary watercourse consent is required for any proposed alterations, interference or erection of any structure that affects an ordinary watercourse. It is likely that SAB approval for a SuDS scheme will also be required.	Ordinary watercourse consent would be gained for proposed alterations, interferences, and erection of any structures that impacts an ordinary watercourse. Indicative bridge plans and typical culvert designs are shown in **Chapter 4 Proposed Development** (**Figure 4.5** and **Figure 4.6**). SAB approval for a SuDS scheme will be obtained, typically this process is concurrent with planning or discharge of conditions, due to the level of detailed design required for a SAB Full Application

9.4 DATA GATHERING METHODOLOGY

DESK STUDY

9.4.1. A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 9-5**.

Table 9-5 - Data sources used to inform the Hydrology assessment

Organisation	Data Provided
British Geological Survey (BGS)	BGS Geoindex[41] Onshore - Aquifer Designation
British Geological Survey (BGS)	BGS Geology Viewer[42]
Cranfield University viewer for soil classification	LandIs Soilscapes[43]
Ordnance Survey (OS)	Local Ordnance Survey (OS) mapping, 1:25k. Topography and location of springs
Natural Resources Wales	DataMapWales - for Source Protection Zones[44]
Natural Resources Wales	Water Framework Directive (WFD) Cycle 3 Rivers and water bodies for WFD water bodies and status[45]
Natural Resources Wales	Licenced Water Abstractions[46]
Natural Resources Wales	Natural Resources Wales - Flood Map for Planning - Flood Risk Maps[47]
Natural Resources Wales	Natural Resources Wales Flood Risk Management plan: Mid Wales Place[48]. Provides information on the scale of flood risk, as well as NRW's priorities for managing the risk of flooding, and measures that they propose to take, over the coming years. It covers flooding from rivers, reservoirs and the sea only.
Natural Resources Wales	Natural Resources Wales - Rainfall data[49]

[41] British Geological Survey. (2026). BGS GeoIndex Onshore. [Online] Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ [Accessed 01 April 2026]
[42] British Geological Society. (2026). BGS Geology Viewer. [Online] Available at: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/ [Accessed 01 April 2026]
[43] LandIS. (2026). Soilscapes soil types viewer - National Soil Resources Institute. Cranfield University. [Online] Available at: http://www.landis.org.uk/soilscapes/ [Accessed 01 April 2026]
[44] Natural Resource Wales. (2026). DataMapWales - Source Protection Zones [Online] Available at: https://datamap.gov.wales/layers/inspire-nrw:NRW_Source_Protection_Zones [Accessed 01 April 2026]
[45] Natural Resources Wales. (2026). Water Watch Wales - Water Framework Directive Cycle 3. [Online] Available at: https://waterwatchwales-nrw.hub.arcgis.com/ [Accessed 06 April 2026]
[46] Natural Resources Wales. (2026). DataMapWales - .Water Resource Permits [Online] Available at: https://datamap.gov.wales/layers/geonode:nrw_water_resource_permits [Accessed 01 April 2026]
[47] Natural Resources Wales (2026). Flood Map for Planning. https://naturalresources.wales/flooding/flood-map-for-planning/?lang=en [Accessed 01 April 2026].
[48] Natural Resources Wales (2023). Natural Resources Wales Flood Risk Management Plan: Mid Wales Place [online] Available at: https://cdn.cyfoethnaturiol.cymru/3hwgt4vp/frmp-cycle-2-place-section-mid.pdf [Accessed 09 June 2026]
[49] Natural Resources Wales (2026). River levels, rainfall and sea data [online]. Available at: https://rivers-and-seas.naturalresources.wales/?ngr=ST0730882629&layers=rainfall. [Accessed 15 June 2026].

Organisation	Data Provided
Natural Resources Wales	Natural Resources Wales Severn Preliminary Flood Risk Assessment (PFRA)[50]

9.5 OVERALL BASELINE

9.5.1. This section summarises the baseline Hydrology conditions determined through the course of desk-based investigations. This section identifies and evaluates those Hydrology features/receptors that lie within the relevant Study Area(s) and which are pertinent in the context of the Proposed Development.

SURVEY WORK

9.5.2. A hydrological site walkover is to be undertaken following pre-application consultation. A site visit is to be undertaken in July 2026. Should the site visit walkover identify features which are of relevance to the assessment, this will be described in full within the final ES submission.

CURRENT BASELINE

Study Area

9.5.3. The Site is situated within the administrative area of Powys, in mid Wales. The Site is located on hills to the north of the A470 trunk road, approximately 2.7km north of the village of Clatter, 3.5km northeast of the village of Carno, 3.5km north of the village of Pontdolgoch and 12km northwest of Newtown. The Site is located within the local authority area of Powys County Council (PCC). The Site covers an area of approximately 381ha.

9.5.4. The geographical extent of the Study Area extends 1.5km from the Site at all points and is shown on **Figure 9.1**. This nominated area of interest is considered conservative and sufficient for the purposes of this baseline appraisal, based on hydrological knowledge of the area and professional experience that standard avoidance and management measures would prevent significant effects occurring at a greater distance due to the dilution effects beyond this distance. Thus, the Study Area has been set to include all land potentially subject to effects from the Site, and sufficient to demonstrate that these can be managed within. This will enable demonstration that effects at a greater distance from the Site would also be avoided.

Land Use and Topography

9.5.5. Based on Ordnance Survey (OS) 1:25k Mapping, and aerial photography, the Site is largely covered with grassland, with rough grassland interspersed with areas of bracken, especially in the north and western areas. There are areas of marsh in the westerly quadrant surrounding the headwaters of the watercourses draining the Site. The southern section of the Site passes by the occurrence of deciduous woodland which tend to form corridors along the streams and field boundaries. There are areas of coniferous plantation and areas of timber harvesting outside the Site, to the west of Llyn Du. The occurrence of plantations and timber harvesting will likely have a significant hydrological influence on the local catchment both currently and in the future. The area is largely undeveloped, with the main land use that of agriculture, being sheep farming in this case. Located, just within the

[50] Natural Resources Wales (2018). Severn Preliminary Flood Risk Assessment (PFRA) [online]. Available at: https://naturalresources.wales/media/687716/pfra-severn.pdf [Accessed 09 June 2026]

south of the Site, is Llyn Mawr, a Site of Special Scientific Interest (SSSI), on the basis of oligotrophic (nutrient-poor) standing water, as per SSSI citation.. The Site is approximately 2.7km north of the village of Clatter, 3.5km northeast of the village of Carno, 3.5km north of the village of Pontdolgoch and 12km northwest of Newtown. The A470 runs from the south and along the western side of the Site, while the A483 road runs to the east.

9.5.6. The elevation varies across the Site (see **Figure 9.2**), with the highest point being 485m Above Ordnance Datum (AOD), whilst the turbines are situated on land ranging from 345m to 458m AOD. The lowest point of the Site in the valley near the village of Pontdolgoch, at 140m AOD, where the Site joins the B4568 before then joining the A470 in the bottom of the Afon Carno valley.

9.5.7. The area on which the Site is located has a broad ridge (Craig y Llyn-mawr) which runs from south to north across the western quadrant. This ridge forms the hydrological divide, as the Site drains westward (into the Afon Carno WFD surface waterbody) and eastward (into the Afon Rhiw WFD surface waterbody) respectively, with both watersheds draining into the River Severn.

Climate and rainfall

9.5.8. Wales is characterised by weather that is often cloudy, wet and windy but mild. Rainfall varies widely, with the highest average annual totals being recorded in the central upland spine from Snowdonia to the Brecon Beacons[51].

9.5.9. NRW rainfall data[49] is available for the Henfryn rainfall gauge in Caersws ~4km southeast of the Proposed Development) and the Cefn Coch raingauge (~4.7km northeast of the Proposed Development). From June 2025 to May 2026 the annual rainfall totalled 1077mm and 1335.8mm respectively.

Geology

9.5.10. The British Geological Survey (BGS)[52] mapping indicates that superficial deposits are thin or absent across most of the western part of the Site. However, a number of pockets of Glacial Till (diamicton) and peat are identified. The eastern part of the Site is shown to be underlain by Glacial Till (diamicton) and a large area of peat is identified immediately to the north-west of Llyn Mawr within the Site. Along the access track the lower slopes of the Afon Carno valley are dominated Glacial Till (diamicton) and higher elevations are underlain by thin or absent deposits. Additionally, BGS mapping indicates the proposed access road passes through a pocket of peat to the west of Pant-y-bryn at SO0116395859. Alluvial Fan Deposits of sand and gravel are identified at Henblas. Further details of peat on the Site can be found in **Chapter 10: Geology and Soils**.

9.5.11. The BGS indicates that the Site is underlain by five bedrock formations. The majority of the Site is shown to be underlain by the Penstrowed Grits Formation of sandstone and mudstone which is described as comprising mudstones with thick beds of medium to coarse-grained greywacke sandstones. The access track is shown to be underlain by the Nant-Ysgollon Mudstone Formation and a further three mudstone formations that include the Dolgau, Caerau and Glanyrafon Formation (Upper Tongue) with the latter also containing interbedded sandstones.

9.5.12. The BGS GeoIndex reveals that there are no borehole records within the boundary of the Site.

[51] Met Office, 2016. [Online] available at: https://www.metoffice.gov.uk/ (Accessed 30 March 2026)
[52] British Geological Survey (BGS) [Online] available at: GeoIndex (onshore) - British Geological Survey (accessed 01 April 2026)

Soils

9.5.13. The LandIS Soilscapes[53] map indicates the Site is primarily characterised by very acid loamy upland soils with varying presence of organic soils:

- Very acid loamy upland soils, with a wet peaty surface: a peaty texture and high carbon content;
- Slowly permeable wet very acid uplands soils, with a peaty surface: a peaty or humose loamy texture and a high carbon content;
- Freely draining acid loamy soils over rock: with a loamy texture and medium carbon content; and
- Freely draining slightly acid loamy soils: with a loamy texture and a low carbon content.

9.5.14. Peat desk studies and site surveys have been conducted, the results of these and a more in-depth analysis of soils and peat on the Site can be found in **Chapter 10: Geology and Soils**.

Hydrology

9.5.15. An overview of the hydrological features in the Study Area is presented in **Figure 9.3**.

Watercourses

9.5.16. There are three watercourses and several smaller tributaries in the vicinity of the Site. The Afon Carno is located to the south of the Site and the Nant Cwmgerwyn is located to the west of the Site. The Nant y Llyn Mawr crosses the Site Boundary in the northern area of the Site. The Afon Carno is classified by the NRW as a main river and the Nant Cwmgerwyn and Nant y Llyn Mawr are classified as Ordinary Watercourses.

WFD Surface Water Bodies

9.5.17. The Site is located within the Severn River Basin District (**Figure 9.4**), and intersects the catchments of four Water Framework Directive (WFD) river water bodies: Afon Carno (confluence of Afon Cwm-llwyd to confluence River Severn) to the southwest of the Study Area, Afon Rhiw (South Arm) (Ty-Newydd to Dwyrhiew) to the northeast of the Study Area, Nant Rhyd-ros Ian (source to confluence with River Severn) to the east, and Severn (confluence Afon Dulas to confluence River Camland) to the southeast, all detailed in **Table 9-6.**

9.5.18. The Site is located on the watershed divide between the Afon Carno (GB109054049250) and Afon Rhiw (GB109054049350) waterbodies. The Afon Carno waterbody is situated to the southwest of the Site, with the Afon Rhiw located to the northeast. Both waterbodies are tributaries to the River Severn. The eastern section of the Site drains into the Afon Rhiw (~63% of total Site area), while the western section drains into the Afon Carno (~35% of total Energy Park Site area).

9.5.19. The access road intersects a further two waterbodies. The Nant Rhyd-ros Ian (source to conf R Severn) (GB109054049220), and the Severn (conf Afon Dulas to conf R Camlad) (GB109054049310). The Nant Rhyd-ros Ian drains to the east initially before turning south where the river flows into the Severn, while the Severn water body drains in a southerly direction from the proposed access road and into the River Severn. The Afon Carno, Afon Rhiw, and Nant Rhyd-ros Ian WFD surface water bodies achieved an overall classification of 'Good' in the 2021 WFD classification (Cycle 3), while the Severn WFD achieved a 'Moderate'.

[53] LandIS (2026) Soilscapes soil types viewer - National Soil Resources Institute. Cranfield University [Online] available at: (https://www.landis.org.uk/soilscapes/) (accessed 01 April 2026)

9.5.20. The Study Area intersects a further four WFD waterbodies, the Afon Cwm-llwyd (GB109054049370) to the northwest, the Bechan Bk (GB109054049330) to the east, the Afon Cerist (GB109054044840) to the south and the Afon Trannon (GB109054049230) to the southwest. These four water bodies are not considered further as they are not seen to be hydrologically significant, as any disturbances by the Site would be intercepted by other rivers before reaching the source areas of these waterbodies, as the topography separates them hydrologically from the Site.

Table 9-6 - Summary of the WFD Surface Water Body and its Associated Status Definitions within the Study Area

	Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn)	Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew)	Nant Rhyd-ros Ian (source to Confluence River Severn)	Severn (confluence Afon Dulas to Confluence River Camlad)
Type	River	River	River	River
Water body identifier	GB109054049250	GB109054049350	GB109054049220	GB109054049310
Catchment	Severn Uplands	Severn Uplands	Severn Uplands	Severn Uplands
HMWB[54]	No	No	No	Heavily Modified
Overall status	Good	Good	Good	Moderate
Ecological status	Good	Good	Good	Moderate
Chemical status	High	High	High	High
Objectives for 2027[55]	Hydromorphological supporting elements Morphology	Morphology	Hydromorphological supporting elements Morphology	Ecological Physico-chemical quality elements Phosphate Supporting elements (surface water) Mitigation Measures Assessment Hydromorphological Supporting Elements Morphology
% of Site which drains into Surface Water Body	35	63	1	1

[54] Note: HMWB - heavily modified water body
[55] Source: https://cyfoethnaturiolcymru.sharefile.eu/share/view/sc0c2a20ae9c2429394326eb75e0eda5d River Basin Management Plan (RBMP) Measures and Objectives: Objectives for 2027 (Last accessed May 2026)

Groundwater WFD

9.5.21. The Lower Palaeozoic underlying the Study Area is a designated WFD groundwater body (Severn Uplands - Lower Palaeozoic GB40902G205300) and achieved 'Good' quantitative status and 'Poor' chemical status in the 2021 WFD classification (Cycle 3)[45].

Springs, Wells and Issues

9.5.22. OS mapping shows there are two individual springs (S2 and S3) which are located within the Site (adjacent to the existing access track). Within the Study Area, there are 14 wells and six springs including S2 and S3. A record of these wells and springs is available in **Table 9-7.** On the basis of no more detailed information as to the use and condition of these features, the approach to assessment in this Draft ES is to take a generic approach across all these features. OS mapping also indicates numerous 'Headwater Issues' across the Study Area, these are indicated by boggy and marshy terrain and the start of small watercourses.

Table 9-7 - The Wells and Springs Identified within the 1.5km Study Area

Name	Type*	NGR	Distance (m) from Site
W1	Well	SN981970	1,132
W2	Well	SO016958	496
W3	Well	SO003953	614
W4	Well	SO004952	483
W5	Well	SO021947	1,017
W6	Well	SO021946	1,003
W7	Well	SO005944	479
W8	Well	SO004944	539
W9	Well	SO022943	1,006
W10	Well	SO014943	243
W11	Well	SO014938	153
W12	Well	SO002932	1,106
W13	Well	SO000927	1,459
W14	Well	SO014924	1,174
S1	Spring	SO021968	888
S2	Spring	SO012966	Within the Site
S3	Spring	SO012960	Within the Site

Name	Type*	NGR	Distance (m) from Site
S4	Spring	SO016958	462
S5	Spring	SO020948	937
S6	Spring	SO002939	875

* It should be noted the terms 'well', 'spring' (as well as 'issues') are often used interchangeably and not imply a specific hydrological feature on OS maps. Also, many points where watercourses initiate may appear similar yet be unlabelled. Key locations will be appraised further as required if a potential for impact is identified.

Lake waterbodies

9.5.23. There are three lakes of varying size within the Study Area (as shown in **Figure 9.3**), however, none occur within the Site. Both Llyn Mawr (115m southeast of the Proposed Development), and Llyn Du (210m south of the Proposed Development), are located at an elevation of 390m AOD. Llyn y Tarw is located approximately 590m to the east of the Site at an elevation of 420m AOD.

Designated Sites

9.5.24. A number of designated sites for biodiversity conservation have been identified within or close to the Site area in **Chapter 5: Ecology**.

9.5.25. The only statutory designated site with a hydrological component is that of Llyn Mawr SSSI, which falls within the Study Area. Llyn Mawr SSSI is located partially within the Site Boundary and wholly within the Study Area. Llyn Mawr is a good example of a moderately oligotrophic upland lake in a catchment only partially modified by agricultural improvement. Llyn Mawr is however, predominantly upstream and upgradient of the majority of the Site, with only one section of the existing access track being downstream.

Ground Water Dependant Terrestrial Ecosystems

9.5.26. NRW mapping indicates that there are no Groundwater Dependant Terrestrial Ecosystems (GWDTE) within the Site or Study Area. The closest GWDTE (Waun Cwm Calchis) is shown to be over 9km west of the Study Area. GWDTE have been initially identified in the updated 2026 NVC reporting **(Appendix 5C).** Work is still ongoing to determine their extents and this will be detailed in the final ES submission.

Water Resources

NRW Licensed Abstractions

9.5.27. Based on the NRW Licensed Water Abstractions database there are no points of abstraction within the Site or Study Area.

Licensed discharges

9.5.28. There are four licensed discharges in the Study Area, however none are located within the Site. The four consented discharges are all located to the south of the Site, adjacent to the A470, and on the opposing side of the Afon Carno.

Table 9-8 - NRW Consented Discharges in the Study Area

ID	Permit Number	Operator	Site Name	Outlet NGR	Discharge	Receiving watercourse	Release type
D1	S/01/22 421/S	T R WILLIAMS	TIR NA NOG	SO 00700 93790	Sewage - non Water Undertaker	Trib of Afon Carno	Sewage discharges - final/treated effluent - not water company
D2	CB3798 HB	Owain Gerwyn Hughes	Erwgoch	SO 00654 94000	Sewage - non Water Undertaker	Unnamed trib of the Afon Carno	Sewage discharges - final/treated effluent - not water company
D3	S/01/22 560/S	MR & MRS S H JONES	CEFN Y WERN	SO 00600 94080	Sewage - non Water Undertaker	Trib of Afon Carno	Sewage discharges - final/treated effluent - not water company
D4	S/01/55 800/R	Hafren Dyfrdwy Cyfyngedig	Clatter Sewage Treatment Works	SO 00120 94860	Sewage - Water Undertaker	Trib of Afon Garno	Sewage discharges - final/treated effluent - water company

Hydrogeology

9.5.29. The Site is located within the WFD groundwater body Severn Uplands - Lower Palaeozoic. The Penstrowed Grits Formation, which underlies the majority of the study area is classified by NRW as Secondary Undifferentiated aquifers. These are assigned in: "*cases where it has not been possible to attribute either category Secondary A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type*"[41]. The southern area, and for majority of the area covered by the access road, the aquifer designation changes to that of Secondary B Aquifer, which are defined as "*predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering". These are generally the water-bearing parts of the former non-aquifers. Along areas of the Afon Carno in the valley bottom, the designation changes to that of Primary Aquifer, which are defined as "layers of rock or drift deposits which have high intergranular and/or fracture permeability*"[41] which means they usually provide a high level of water storage.

Source Protection Zones

9.5.30. Source Protection Zones (SPZ) show the risk of contamination from any activities that might cause pollution to public drinking water supplies. The Site and the wider Study Area are not within a SPZ and the closest SPZ is located 4km to the southeast of the Site.

Flood Risk

9.5.31. An overview of flood risk is shown in **Figure 9.5** and the following section and detailed in **Appendix 9A: Flood Consequence Assessment**.

9.5.32. In this report, the probability of a flood occurring is expressed in terms of Annual Exceedance Probability (AEP), which is the inverse of the annual maximum return period. For example, the 100 year flood can be expressed as the 1% AEP flood, i.e. a flood that has a 1% chance of being exceeded in any year.

9.5.33. Fluvial flooding occurs when flows exceed the capacity of the watercourse, such as rivers, causing out of bank flows. NRW's Flood Map for Planning (FMfP)[47] categorises fluvial flood risk as follows and includes an allowance for climate change:

- Flood Zone 1 (FZ1) - Land assessed as having less than a 1 in 1,000 (plus climate change) annual probability of flooding from rivers or the sea (<0.1%);
- Flood Zone 2 (FZ2) - Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% to 0.1%), or between a 1 in 200 and 1 in 1,000 annual probabilities of coastal flooding (0.5% to 0.1%);
- Flood Zone 3 (FZ3) - Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%).

Historical Flooding

9.5.34. NRW's online FMfP does not show historical flooding records at or close to the Site. The closest area of historical flooding occurred below the point at which the Afon Carno River meets the Severn River, 2.7km south of the Site in the village of Caersws. It is also noted in the NRW Flood Risk Management Plan: Mid Wales Place[48] that Caersws and Newtown were noted as experiencing flooding during wet weather in February 2021.

Fluvial and Tidal Flood Risk

9.5.35. NRW's FMfP[47] shows that the Site lies entirely in Flood Zone 1 (**Figure 9.5**). Within the Study Area to the north of the Site, there are areas of both Flood Zones 2 and 3, associated with the Nant y Llyn Mawr and the Afon Rhiw. In the southern and southwestern extents of Study Area, there is a band of Flood Zones 2 and 3 along the extent of the Afon Carno, and the Southern edge of the Study Area intersects the extensive fluvial floodplain (Flood Zone 2 and 3) of the River Severn.

9.5.36. The NRW Flood Risk Management Plan: Mid Wales Place[48] lists the downstream settlement of Caersws as one of the communities at most risk from flooding.

9.5.37. Due to the Site's elevation, tidal flooding is not considered a risk to the Proposed Development.

Surface Water Flood Risk

9.5.38. NRW's FMfP[47] Flood risk from surface water and small watercourses (**Figure 9.5**) gives an indication of the broad areas likely to be at risk of surface water flooding at present as follows:.

- Flood Zone 1 - Areas with less than 0.5% (1 in 1000) chance of flooding from surface water and/or small watercourses in a given year, including climate change;
- Flood Zone 2 - Areas with more than 0.1% (1 in 1000 to 1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including climate change; and
- Flood Zone 3 - Areas with more than 1% (1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including climate change.

9.5.39. NRW mapping shows that the majority of the Site is within Flood Zone 1. However, there are areas located within Flood Zone 2 and 3 which are areas with medium to high risk of flooding (1% to>3.3%AEP) associated with small watercourses. Small areas of medium to high flood risk are shown on localised lower-lying areas associated with the Nant y Llyn Mawr, two tributaries of the Afon Rhiw, a tributary of the Nant Cwmgerwyn, Nant yr Arian, tributaries of the Afon Carno and Llyn Du, Llyn Mawr and Llyn y Tarw.

9.5.40. The mapping also shows surface water flow pathways draining northeastwards towards the Nant y Llyn Mawr which confluences with the Afon Rhiw and south westwards towards the Afon Carno. The closest areas of high flood risk are associated with the Nant y Llyn Mawr in the eastern section of the Site, the Nany yr Arian in the western section of the Site and Llyn Mawr, Llyn Du and Llyn y Tarw.

9.5.41. Details of how the Proposed Development would interact with existing surface water flowpaths are detailed in **Appendix 9A: Flood Consequence Assessment**.

Groundwater Flood Risk

9.5.42. The Severn Preliminary Flood Risk Assessment (PFRA)[50] states that the risk of groundwater flooding is low within Wales due to the geology (underlying rock type) and topography (steep sided valleys). There is no mention of groundwater flooding in the NRW Flood Risk Management Plan: Mid Wales Place[48] .

9.5.43. Although groundwater emergence is highly unlikely, any flows are expected to be limited as the Site is on a topographic high and the underlying geology comprises bands of both higher and lower permeability bedrock layers. The elevated topography is likely to channel surface water to the valley floors relatively quickly, limiting the amount of percolation and increasing the amount of surface runoff. The same understanding applies to the area of the Site which descends into the Afon Carno valley where the slope is steady and should promote surface water runoff into the drainage channels.

9.5.44. This suggests that although some groundwater may be encountered during excavations in the Site area, groundwater is unlikely to be found in significant quantities.

Sewer Flood Risk

9.5.45. Due to the rural nature and hilltop location, it is anticipated that there are no/few sewer drainage networks within the Site and the surrounding area of interest.

Artificial Flood Risk

9.5.46. NRW's online FMfP shows that the Site and the wider Study area are not at risk of flooding in the extreme (unlikely) event of a reservoir failure. There are no canals or flood defences within the Study Area.

FUTURE BASELINE

9.5.47. Hydrology baseline conditions may change even if the Proposed Development is not built, for the following reasons:

- Climate change will result in increased rainfall seasonality, with generally wetter winters and drier summers, high-intensity rainfall events will become more common. This will lead to greater variation in river flows (low flows and high flows), and increases in flood risk;

- The location and rate of surface water and groundwater abstractions in the area could vary over time and may result in changes to the WFD surface water and groundwater body status and SPZ designations;
- Improvements to WFD water body status associated with improvements to individual quality elements would result in higher-quality, more sensitive water bodies; and
- Other new development (e.g. urbanisation settlements) along the valley bottoms may result in changes in hydrological baseline such as surface water runoff (flow and pathways) and increase the number of development receptors.

9.5.48. The Outline Drainage Strategy (contained within **Appendix 9A**) accounts for future climate change. The proposed drainage strategy will be developed in accordance with the Welsh Government guidance on climate change allowances. It states that "When using these allowances to consider drainage assessments, it is important that drainage systems are designed to ensure there is no increase in site run-off when assessed against the upper allowance.". The guidance also states that a lifetime of 75 years "is considered a reasonable rule of thumb for all other [non-residential] developments", however the Proposed Development only has a design life of 40 years. On this basis, the SAB should be engaged at the earliest opportunity to discuss and agree suitable design criteria, including return period and climate change rainfall allowance. A rainfall allowance of 40% has been considered to size the required attenuation for this development, however any attenuation proposed as part of the drainage strategy will be designed in accordance with SAB requirements. Details should be confirmed as part of a SAB Pre- and Full App submission process (and in accordance with any formal planning conditions).

EMBEDDED MEASURES

9.5.49. A range of environmental measures have been embedded into the Proposed Development. **Table 9-9** details the receptors, potential changes and effects to the receptors, embedded measures and the compliance mechanisms.

9.5.50. Standard good practice mitigation measures to be delivered during the construction of the Proposed Development will be delivered through the approval and implementation of the CEMP. The CEMP will be developed from the Outline CEMP provided alongside this ES and will be the master document for consolidating all environmental requirements and undertakings that relate to the Site during the construction phase of the Proposed Development.

9.5.51. During operation the implementation of the outline Drainage Strategy will ensure potential flood risk and water quality impacts are effectively mitigated.

Table 9-9 - Embedded measures.

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
Construction / Decommissioning Phase			
Flood Risk Receptors Third party receptors including third-party people, property and infrastructure within and outside of the Study Area. The Proposed Development	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g. compounds, access tracks, crane pads). Changes to watercourse flow conveyance as a result of new or modified temporary watercourse.	As part of the layout design strategy, interactions with watercourses have been limited wherever possible. No works are to be undertaken within 50m of mapped watercourses, with the exception of watercourse crossings, which have been minimised as far as possible. Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. To service both impermeable and semi-permeable surfaces during construction and decommissioning the Water Management Plan (WMP) will be installed following SuDS principles. SuDS provide benefits in terms of flow attenuation and water quality and are standard practice on new developments, typically including measures such as attenuation basins, swales and filter drains. These measures are framed within a hierarchy of Source and Site control measures that prioritise infiltration to ground or use a combination of measures to retain or slow surface water runoff to at least the 1 in 2-year baseline (greenfield) runoff rate (for up to the 1 in 200-year critical storm plus climate change uplift) prior to reaching watercourses. The final layout of the SuDS will be confirmed at detailed design and will take account of ground conditions, gradient, constraints, temporary works and maintenance requirements, and will aim to mimic natural site drainage. The governing principles outlined above will be used to ensure the SuDS design operates effectively in managing runoff and flood risk. Construction works will take place during periods of normal to low flow conditions to avoid conveyance-related flood risk effects. The CEMP will detail that no works (in, over or under) will be undertaken within 20 m of a watercourse bank without technical environmental advice regarding the requirement for a permit (FRAP). Works will only proceed once appropriate mitigation (within technical environmental advice and/or FRAP) has been installed and all conditions have been Proposed new culverts will be designed to be a suitable size. Any existing culverts to be re-used should ideally be upsized to suitable sizes to consider future climate change.	CEMP / Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
		A Flood Evacuation Plan should produce to ensure that all personnel will be evacuated before a potential flood event, during construction, operation and decommissioning. During construction, a flood evacuation plan will be in place with safe egress to the south via the A470 or B4568. The Site manager (or appropriate person) will sign up to receive NRW flood warnings and evacuate all personnel upon receipt of one.	
WFD Groundwater Bodies	Potential to impact status of WFD classifications.	The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects aquifers based on information gathered to date. The CEMP will also detail that storage and handling of hazardous substances (including fuels) should not occur within 10 m of any inland freshwater, or within 50 m from a well, spring or borehole. Implementation of an appropriate Water Management Plan (WMP), contained within the CEMP, for the construction phase of the Proposed Development, utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage where suitable. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of the Proposed Development. Sufficient capacity will be provided onsite to hold runoff prior to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. A water quality monitoring programme will be agreed with NRW and implemented prior, during and following construction. A Pollution Prevention Plan (PPP) within the CEMP will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) within the CEMP will be prepared to minimise and mitigate the magnitude of change on potential receptors. At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	CEMP / Planning Condition
WFD River Waterbodies	Potential to impact status of WFD classifications for ecological, chemical, hydromorphological,	The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects on watercourses based on information gathered to date. As part of the layout design strategy, interactions with watercourses have been limited wherever possible. No works are to be undertaken within 50m of a watercourse, with the exception of watercourse crossings, which have been minimised as far as possible.	CEMP / Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
	and physiochemical classifications.	Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. To service both impermeable and semi-permeable surfaces, the surface water drainage system will be installed following SuDS principles. SuDS provide benefits in terms of flow attenuation and water quality and are standard practice on new developments, typically including measures such as attenuation basins, swales and filter drains. These measures are framed within a hierarchy of Source and Site control measures that prioritise infiltration to ground or use a combination of measures to retain or slow surface water runoff to at least the 1 in 2-year baseline (greenfield) runoff rate (for up to the 1 in 200-year critical storm plus climate change uplift) prior to reaching watercourses. TAN15 requires the preparation of an FCA and Drainage Statement. The FCA (Appendix 9A) contains the Outline Drainage Strategy, which follows these principals and meets the provision set out in TAN15. The final layout of the SuDS will be confirmed at detailed design and will take account of ground conditions, gradient, constraints, temporary works and maintenance requirements, and will aim to mimic natural site drainage. The governing principles outlined above will be used to ensure the SuDS design operates effectively in managing runoff and flood risk. The CEMP will detail that no works (in, over or under) will be undertaken within 20 m of a watercourse bank without technical environmental advice regarding the requirement for a permit (FRAP). Works will only proceed once appropriate mitigation (within technical environmental advice and/or FRAP) has been installed and all conditions have been met. The CEMP will also detail that storage and handling of hazardous substances (including fuels) should not occur within 10 m of any inland freshwater, or within 50 m from a well, spring or borehole. Implementation of an appropriate Water Management Plan (WMP) for the construction phase of the Proposed Development, utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage where suitable. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of the Proposed Development. Sufficient capacity will be provided onsite to hold runoff prior to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. A	

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
		water quality monitoring programme will be agreed with NRW and implemented prior, during and following construction. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Watercourses (Ordinary Watercourses and Main Rivers)	Potential for accidental contamination entering watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals. Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects on watercourses based on information gathered to date. As part of the layout design strategy, interactions with watercourses have been limited wherever possible. No works are to be undertaken within 50m of a watercourse, with the exception of watercourse crossings, which have been minimised as far as possible. Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. To service both impermeable and semi-permeable surfaces, the surface water drainage system will be installed following SuDS principles. SuDS provide benefits in terms of flow attenuation and water quality and are standard practice on new developments, typically including measures such as attenuation basins, swales and filter drains. These measures are framed within a hierarchy of Source and Site control measures that prioritise infiltration to ground or use a combination of measures to retain or slow surface water runoff to at least the 1 in 2-year baseline (greenfield) runoff rate (for up to the 1 in 200-year critical storm plus climate change uplift) prior to reaching watercourses. TAN15 requires the preparation of an FCA and Drainage Statement. The FCA (Appendix 9A) contains the Outline Drainage Strategy, which follows these principals and meets the provision set out in TAN15. The final layout of the SuDS will be confirmed at detailed design and will take account of ground conditions, gradient, constraints, temporary works and maintenance requirements, and will aim to mimic natural site drainage. The governing principles	CEMP / Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
		outlined above will be used to ensure the SuDS design operates effectively in managing runoff and flood risk. The CEMP will detail that no works (in, over or under) will be undertaken within 20 m of a watercourse bank without technical environmental advice regarding the requirement for a permit (FRAP). Works will only proceed once appropriate mitigation (within technical environmental advice and/or FRAP) has been installed and all conditions have been met. The CEMP will also detail that storage and handling of hazardous substances (including fuels) should not occur within 10 m of any inland freshwater, or within 50 m from a well, spring or borehole. Implementation of an appropriate Water Management Plan (WMP) for the construction phase of the Proposed Development, utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage where suitable. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of the Proposed Development. Sufficient capacity will be provided onsite to hold runoff prior to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. A water quality monitoring programme will be agreed with NRW and implemented prior, during and following construction. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Springs, Wells and Headwater Issues	Potential for accidental contamination entering springs, wells or headwater issues associated with spillage or	The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects on springs, wells and headwater issues based on information gathered to date. During construction the locations of springs, wells and headwater issues will be avoided to ensure there is no pathway for potential effects. Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads	CEMP / Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
	leakage of fuels, lubricants or other chemicals.	and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. The CEMP will also detail that storage and handling of hazardous substances (including fuels) should not occur within 10 m of any inland freshwater, or within 50 m from a well, spring or borehole. Implementation of an appropriate Water Management Plan (WMP) for the construction phase of the Proposed Development, utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage where suitable. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of the Proposed Development. Sufficient capacity will be provided onsite to hold runoff prior to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. A water quality monitoring programme will be agreed with NRW and implemented prior, during and following construction. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Lake Waterbodies	Potential for accidental contamination entering lakes associated with spillage or leakage of fuels, lubricants or other chemicals.	Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. The CEMP will also detail that storage and handling of hazardous substances (including fuels) should not occur within 10 m of any inland freshwater, or within 50 m from a well, spring or borehole. Implementation of an appropriate Water Management Plan (WMP) for the construction phase of the Proposed Development, utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage where suitable. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of the	CEMP / Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
		Proposed Development. Sufficient capacity will be provided onsite to hold runoff prior to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. A water quality monitoring programme will be agreed with NRW and implemented prior, during and following construction. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. The BESS fire suppression system will be self-contained so that in the event of it being triggered all fire suppression liquids will be contained on-site to prevent runoff to offsite receptors. Further detail in relation to fire risk associated with the BESS is detailed in the Outline Battery Fire Safety Management Plan (Appendix 4A). At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Designated Sites	Potential for accidental contamination entering designated sites and effects on designation status, associated with spillage or leakage of fuels, lubricants or other chemicals.	The CEMP will also detail that storage and handling of hazardous substances (including fuels) should not occur within 10 m of any inland freshwater, or within 50 m from a well, spring or borehole. Implementation of an appropriate Water Management Plan (WMP) for the construction phase of the Proposed Development, utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage where suitable. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of the Proposed Development. Sufficient capacity will be provided onsite to hold runoff prior to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. A water quality monitoring programme will be agreed with NRW and implemented prior, during and following construction. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors.	CEMP / Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
		At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Licensed discharges	Direct physical impingement on licensed discharges.	Direct physical impingement would be avoided through the imposition of suitable stand-off distances between working areas and discharge infrastructure.	CEMP
Operation Phase			
Flood Risk Receptors Third party receptors including third-party people, property and infrastructure within and outside of the Study Area. The Proposed Development	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g. compounds, access tracks, crane pads). Changes to watercourse flow conveyance as a result of new or modified temporary watercourse.	Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. To service both impermeable and semi-permeable surfaces for the operation phase, the surface water drainage system as described in the Outline Drainage Strategy and refined by the Detailed Drainage Strategy, which will be secured via planning permission, will be installed following SuDS principles. SuDS provide benefits in terms of flow attenuation and water quality and are standard practice on new developments, typically including measures such as attenuation basins, swales and filter drains. These measures are framed within a hierarchy of Source and Site control measures that prioritise infiltration to ground or use a combination of measures to retain or slow surface water runoff to at least the 1 in 2-year baseline (greenfield) runoff rate (for up to the 1 in 200-year critical storm plus climate change uplift) prior to reaching watercourses. TAN15 requires the preparation of an FCA and Drainage Statement. The FCA (Appendix 9A) contains the Outline Drainage Strategy, which follows these principals and meets the provision set out in TAN15. The final layout of the SuDS will be confirmed at detailed design and will take account of ground conditions, gradient, constraints, temporary works and maintenance requirements, and will aim to mimic natural site drainage. The governing principles outlined above will be used to ensure the SuDS design operates effectively in managing runoff and flood risk. Finished floor levels, or flood sensitive assets within for the control building and BESS compound will be raised to at least 300mm above the maximum depths such that they remain dry in the design event (1% AEP) and such that the maximum predicted depths in the extreme (0.1%AEP) event to ensure that they will remain dry in the event of a flood.	Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
		Proposed new culverts will be designed to be a suitable size. Any existing culverts to be re-used should ideally be upsized to suitable sizes to consider future climate change.	
WFD Groundwater Bodies	Potential to impact status of WFD classifications.	The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects aquifers based on information gathered to date. Implementation of an appropriate Water Management Plan (WMP) for the construction phase of the Proposed Development, utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage where suitable. Sufficient capacity will be provided onsite to hold runoff prior to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. A water quality monitoring programme will be agreed with NRW and implemented prior, during and following construction. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. The BESS fire suppression system will be self-contained so that in the event of it being triggered all fire suppression liquids will be contained on-site to prevent runoff to offsite receptors. Further detail in relation to fire risk associated with the BESS is detailed in the Outline Battery Fire Safety Management Plan (Appendix 4A). At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	Planning Condition
WFD River Waterbodies	Potential to impact status of WFD classifications for ecological, chemical, hydromorphological, and physiochemical classifications.	The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects on watercourses based on information gathered to date. Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. To service both impermeable and semi-permeable surfaces, the surface water drainage system will be installed following SuDS principles. SuDS provide benefits in terms of flow attenuation and water quality and are standard practice on new developments, typically including measures such	Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
		as attenuation basins, swales and filter drains. These measures are framed within a hierarchy of Source and Site control measures that prioritise infiltration to ground or use a combination of measures to retain or slow surface water runoff to at least the 1 in 2-year baseline (greenfield) runoff rate (for up to the 1 in 200-year critical storm plus climate change uplift) prior to reaching watercourses. TAN15 requires the preparation of an FCA and Drainage Statement. The FCA (Appendix 9A) contains the Outline Drainage Strategy, which follows these principals and meets the provision set out in TAN15. The final layout of the SuDS will be confirmed at detailed design and will take account of ground conditions, gradient, constraints, temporary works and maintenance requirements, and will aim to mimic natural site drainage. The governing principles outlined above will be used to ensure the SuDS design operates effectively in managing runoff and flood risk. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. The BESS fire suppression system will be self-contained so that in the event of it being triggered all fire suppression liquids will be contained on-site to prevent runoff to offsite receptors. Further detail in relation to fire risk associated with the BESS is detailed in the Outline Battery Fire Safety Management Plan (Appendix 4A). At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Watercourses	Potential for accidental contamination entering watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals.	The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects on watercourses based on information gathered to date. Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. To service both impermeable and semi-permeable surfaces, the surface water drainage system will be installed following SuDS principles. SuDS provide benefits in terms of flow attenuation and water quality and are standard practice on new developments, typically including measures such	Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
	Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	as attenuation basins, swales and filter drains. These measures are framed within a hierarchy of Source and Site control measures that prioritise infiltration to ground or use a combination of measures to retain or slow surface water runoff to at least the 1 in 2-year baseline (greenfield) runoff rate (for up to the 1 in 200-year critical storm plus climate change uplift) prior to reaching watercourses. TAN15 requires the preparation of an FCA and Drainage Statement. The FCA (Appendix 9A) contains the Outline Drainage Strategy, which follows these principals and meets the provision set out in TAN15. The final layout of the SuDS will be confirmed at detailed design and will take account of ground conditions, gradient, constraints, temporary works and maintenance requirements, and will aim to mimic natural site drainage. The governing principles outlined above will be used to ensure the SuDS design operates effectively in managing runoff and flood risk. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. The BESS fire suppression system will be self-contained so that in the event of it being triggered all fire suppression liquids will be contained on-site to prevent runoff to offsite receptors. Further detail in relation to fire risk associated with the BESS is detailed in the Outline Battery Fire Safety Management Plan (Appendix 4A). At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Springs, Wells and Headwater Issues	Potential for accidental contamination entering springs, wells or headwater issues associated with spillage or leakage of fuels,	Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors.	Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
	lubricants or other chemicals.	The BESS fire suppression system will be self-contained so that in the event of it being triggered all fire suppression liquids will be contained on-site to prevent runoff to offsite receptors. Further detail in relation to fire risk associated with the BESS is detailed in the Outline Battery Fire Safety Management Plan (Appendix 4A). At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Lake Waterbodies	Potential for accidental contamination entering lakes associated with spillage or leakage of fuels, lubricants or other chemicals.	Increases in surface water runoff from new completely impermeable surfaces will be limited to concrete turbine foundations only. Other new infrastructure such as access tracks, crane pads and ancillary infrastructure will be constructed so as not to be completely impermeable and will permit some infiltration through semi-permeable unbounded aggregates. A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. The BESS fire suppression system will be self-contained so that in the event of it being triggered all fire suppression liquids will be contained on-site to prevent runoff to offsite receptors. Further detail in relation to fire risk associated with the BESS is detailed in the Outline Battery Fire Safety Management Plan (Appendix 4A). At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	Planning Condition
Designated Sites	Potential for accidental contamination entering designated sites and effects on designation status, associated with spillage or leakage of	A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. The BESS fire suppression system will be self-contained so that in the event of it being triggered all fire suppression liquids will be contained on-site to prevent runoff to offsite receptors. Further detail in relation to fire risk associated with the BESS is detailed in the Outline Battery Fire Safety Management Plan (Appendix 4A).	Planning Condition

Receptor	Potential changes and Effects	Embedded Measures	Compliance Mechanism
	fuels, lubricants or other chemicals.	At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	
Licensed abstractions	Potential for accidental contamination entering watercourses associated with licensed abstractions which could affect the quantity and quality of the supplies, associated with spillage or leakage of fuels, lubricants or other chemicals.	A Pollution Prevention Plan (PPP) will be prepared to minimise the risk to surface and groundwater quality during construction, operation, and decommissioning. In the unlikely event of a pollution incident, a Pollution Incident Response Plan (PIRP) will have been prepared to minimise and mitigate the magnitude of change on potential receptors. The BESS fire suppression system will be self-contained so that in the event of it being triggered all fire suppression liquids will be contained on-site to prevent runoff to offsite receptors. Further detail in relation to fire risk associated with the BESS is detailed in the Outline Battery Fire Safety Management Plan (Appendix 4A). At the detailed design stage a foul water drainage strategy for the Proposed Development will be developed.	Planning Condition
Licensed discharges	Direct physical impingement on licensed discharges.	Direct physical impingement would be avoided through the imposition of suitable stand-off distances between working areas and discharge infrastructure.	Planning Condition

9.6 SCOPE OF THE ASSESSMENT

OVERVIEW

9.6.1. The scope of the following assessment is based upon a review of the baseline information detailed in **Section 9.5.**

SPATIAL SCOPE

9.6.2. The Study Area for Hydrology is a 1.5km buffer of the Proposed Development, based on hydrological knowledge of the area and professional experience that standard avoidance and management measures would prevent significant effects occurring at a greater distance due to the dilution effects beyond this distance.

TEMPORAL SCOPE

9.6.3. The temporal scope of the assessment of effects on Hydrology is consistent with the period over which the proposed works would be carried out and therefore covers the construction, operation and decommissioning phases. The construction works are planned to be undertaken over a period of approximately 24 months. The operational lifetime of the Proposed Development is anticipated to be 40 years, and operation works will occur throughout this period. Following the operational lifetime, the Proposed Development would be decommissioned.

POTENTIAL RECEPTORS

9.6.4. Three types of Hydrology receptors have been identified with respect to the hydrology assessment:

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

9.6.5. Each of these receptor types are discussed below.

Identification of Receptors

9.6.6. The baseline characterisation enables identification of potential flood risk, aquatic environment and water resources receptors:

- Flood risk receptors are defined within this assessment as people, property and infrastructure that could be at risk of flooding (both on site and off site);
- Aquatic environment receptors are defined within this assessment as either WFD surface and groundwater water bodies or water-dependent designated conservation sites. The basic unit for identification of aquatic environment receptors is WFD surface and groundwater water bodies, as defined in the NRW's Cycle 3 River Basin Management Plans. Groundwater WFD water bodies have been considered under these receptors due to their potential to feed aquatic environment receptors. 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. SAC, SPA, Ramsar sites, SSSI and NNR). In this context, the potential 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. All conservation sites outside of the Study Area, or those within which have been deemed to not have a hydrological or hydrogeological component to their designation, have been screened out from further assessment here; and

- Water resources receptors are defined as surface water and groundwater abstractions including their associated catchment areas. The potential for impacts on water quality, and water balance and flow regime in the catchments upstream of abstraction locations are assessed to determine potential effects on the abstractions themselves. The assessment of abstractions considers both those from surface water and groundwater sources. Discharges to surface water are also considered, although there is little scope for effects of the proposed works during construction on discharges, apart from direct physical impingement, which will be avoided through the imposition of suitable stand-off distances between working areas and discharge infrastructure.

9.6.7. **Table 9-10** summarises the Hydrology receptors that are subject to potential effects from the Proposed Development.

Table 9-10 - Hydrology receptors subject to potential effects

Receptor	Reason
Flood Risk Receptors	
Third party receptors including third-party people, property and infrastructure within and outside of the Study Area. The Proposed Development	Planning policy states that a project cannot increase flood risk to third parties or in watercourses downstream, or the Proposed Development itself.
Aquatic Environment Receptors	
WFD Groundwater Bodies Severn Uplands - Lower Palaeozoic (GB40902G205300)	One WFD groundwater body which is intersected by the Study Area
WFD River Waterbodies Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn) (GB109054049250) Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew) Surface Water Body (GB109054049350) Nant Rhyd-ros Ian (source to Confluence River Severn) (GB109054049220) Severn (confluence Afon Dulas to Confluence River Camlad) (GB109054049310)	Four WFD river waterbodies are intersected by the Study Area.
Watercourses Afon Carno (NRW Main River) Nant Cwmgerwyn (Ordinary Watercourse) Nant y Llyn Mawr (Ordinary Watercourse)	Three watercourses are located within the Study Area and are downgradient of the Proposed Development.

Receptor	Reason
Springs, Wells and Headwater Issues S1 to S5 W1 to W14	Two individual springs (S2 and S3) which are located within the Site (adjacent to the existing access track). Within the Study Area, there are 14 wells and six springs including S2 and S3. Numerous unlabelled headwater issues are present across the Study Area.
Lake Waterbodies Llyn Mawr Llyn Du Llyn y Tarw	Three named lakes are located within the Study Area.
Designated Sites Llyn Mawr SSSI	Llyn Mawr SSSI is a designated conservation site and identified as water dependant. It is partially located within the Site Boundary and within the Study Area.
GWDTEs	There are no mapped GWDTEs in the Study Area. GWDTE have been initially identified in the updated 2026 NVC reporting **(Appendix 5C).** Work is still ongoing to determine their extents and this will be detailed in the final ES submission.
Water Resources Receptors	
Licensed abstractions	There are no licensed abstractions in the Study Area.
Licensed discharges (D1 to D4)	Four licensed discharges are within the Study Area.

LIKELY SIGNIFICANT EFFECTS

9.6.8. The effects on Hydrology receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 9-11**.

Table 9-11 - Likely Significant Effects on Hydrology Receptors Scoped in for Further Assessment

Receptor Type	Likely Significant Effects
Construction	
Aquatic environment receptors **WFD Groundwater Bodies** Severn Uplands - Lower Palaeozoic (GB40902G205300) **WFD River Waterbodies** Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn) (GB109054049250) Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew) Surface Water Body (GB109054049350) Nant Rhyd-ros Ian (source to Confluence River Severn) (GB109054049220) Severn (confluence Afon Dulas to Confluence River Camlad) (GB109054049310) **Watercourses** Afon Carno (NRW Main River) Nant Cwmgerwyn (Ordinary Watercourse) Nant Llyn Mawr (Ordinary Watercourse) **Springs, Wells and Headwater Issues** S1 to S5 W1 to W14 **Lake Waterbodies** Llyn Mawr Llyn Du Llyn y Tarw **Designated Sites** Llyn Mawr SSSI	Temporary increase sediment-loading of surface water runoff from construction areas leading to deterioration in the water quality environment of the aquatic environment receptors. Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance. Accidental release of pollution by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration. Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, surface water runoff) into surface water or groundwater leading to deterioration in the water quality of the Hydrology receptors. Potential change in groundwater levels due to dewatering resulting in decrease in groundwater baseflow to aquatic environment receptors.
Flood Risk Flood risk receptors (third party receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g. compounds, access tracks, crane pads). Changes to watercourse flow conveyance as a result of new or modified temporary watercourse.
Operation	
Aquatic environment receptors **WFD Groundwater Bodies**	Accidental spillage of pollutants (fuel or oil) during maintenance activities or in the event of fire suppression systems being triggered, and release to

Receptor Type	Likely Significant Effects
Severn Uplands - Lower Palaeozoic (GB40902G205300) **WFD River Waterbodies** Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn) (GB109054049250) Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew) Surface Water Body (GB109054049350) Nant Rhyd-ros Ian (source to Confluence River Severn) (GB109054049220) Severn (confluence Afon Dulas to Confluence River Camlad) (GB109054049310) **Watercourses** Afon Carno (NRW Main River) Nant Cwmgerwyn (Ordinary Watercourse) Nant Llyn Mawr (Ordinary Watercourse) **Springs, Wells and Headwater Issues** S1 to S5 W1 to W14 **Lake Waterbodies** Llyn Mawr Llyn Du Llyn y Tarw **Designated Sites** Llyn Mawr SSSI	the aquatic environment at the BESS leading to deterioration in the water quality of the aquatic environment receptors.
Flood Risk Flood risk receptors (third party receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., compounds, access tracks, crane pads). Changes to watercourse flow conveyance as a result of new or modified temporary watercourse.
Decommissioning	
Aquatic environment receptors **WFD Groundwater Bodies** Severn Uplands - Lower Palaeozoic (GB40902G205300) **WFD River Waterbodies** Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn) (GB109054049250) Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew) Surface Water Body (GB109054049350) Nant Rhyd-ros Ian (source to Confluence River Severn) (GB109054049220) Severn (confluence Afon Dulas to Confluence River Camlad) (GB109054049310) **Watercourses**	Temporary increase sediment-loading of surface water runoff from decommissioning areas leading to deterioration in the water quality environment of the aquatic environment receptors. Accidental release of pollution into the water environment by leaks/spillages of oil/fuel, leading to deterioration. Discharge of potentially polluted water generated from decommissioning activities into surface water or groundwater leading to deterioration in the water quality of the aquatic environment receptors.

Receptor Type	Likely Significant Effects
Afon Carno (NRW Main River) Nant Cwmgerwyn (Ordinary Watercourse) Nant Llyn Mawr (Ordinary Watercourse) **Springs, Wells and Headwater Issues** S1 to S5 W1 to W14 **Lake Waterbodies** Llyn Mawr Llyn Du Llyn y Tarw **Designated Sites** Llyn Mawr SSSI	
Flood Risk Flood risk receptors (third party receptors)	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g. temporary compounds).

9.6.9. The effects detailed in **Table 9-12** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant. Comments raised in the Scoping Direction (**Appendix 1B**) are covered in **Table 9-4**.

Table 9-12 - Summary of Pathways and Effects Scoped Out of this Assessment

Potential Effects	Justification
Flood risk to The Proposed Development	TAN-15 will not permit new development at risk of flooding and the **Appendix 9A: Flood Consequence Assessment** demonstrates how this can be achieved.
Potential effects to aquatic environment for Lake Waterbodies Llyn Mawr Llyn Du Llyn y Tarw	Three named lakes are located within the Study Area but are topographically and hydrologically upgradient of the Proposed Development.
Potential effects to aquatic environment for Designated Sites Llyn Mawr SSSI	Llyn Mawr SSSI is a designated conservation site and identified as water dependant. It is partially located within the Site Boundary and within the Study Area. However, the SSSI is topographically and hydrologically upgradient of all new infrastructure in the Proposed Development and it is anticipated that no effects from the Proposed Development would propagate upstream.
Potential effects to aquatic environment for GWDTEs Waun Cwm Calchis	The nearest mapped GWDTE is over 9km west of the Study Area. GWDTE have been initially identified in the updated 2026 NVC reporting **(Appendix 5C).** Work is still ongoing to determine their extents and this will be detailed in the final ES submission.

Potential Effects	Justification
Potential effects to aquatic environment for licensed abstractions	There are no licensed abstractions in the Study Area.
Potential effects to aquatic environment for Licensed discharges D1 D2 D3 D4	Four licensed discharges are within the Study Area, however, there is little scope for effects of the Proposed Development on discharges, apart from direct physical impingement, which will be avoided through the imposition of suitable stand-off distances between working areas and discharge infrastructure.

9.7 ASSESSMENT METHODOLOGY

OVERVIEW

9.7.1. The generic project-wide approach to the assessment methodology is set out in **Chapter 2: Approach to EIA.** However, whilst this has informed the approach that has used in this Hydrology assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this hydrology assessment. Assessment criteria are defined and applied based on professional judgement, using recognised approaches to classification relevant to the receptor types, including the WFD and TAN15, all of which represent good practice for water environment assessments within an EIA.

DETERMINATION OF SIGNIFICANCE

9.7.2. The significance of an effect resulting from a development will be assessed with reference to the sensitivity of a given water receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where additional mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the Proposed Development. The residual effects of the Proposed Development on hydrology will be evaluated assuming that identified additional mitigation measures, if necessary, are fully implemented.

9.7.3. The assessment is largely based on professional judgement, based on experience and the use of best practice guidance, such as that published by the Natural Resources Wales, Environment Agency, CIRIA and Defra. The key determinants of sensitivity and magnitude relate to the Aquatic Environment (used here to refer to surface water quality/quantity and hydromorphology aspects) and Flood Risk. **Table 9-13** details the basis for assessing receptor sensitivity.

Table 9-13 - Receptor Sensitivity

Sensitivity	Criteria	Receptor Type	Examples
Very High	Feature with a high quality and rarity at an international scale, with little potential for substitution	Aquatic environment Flood risk	Conditions supporting sites with international conservation designations (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites), where the designation is based specifically on aquatic features. Receptor water body: all relevant WFD supporting elements* at least High status/potential. Land use types defined as 'Emergency Services' (i.e. critical national infrastructure) in the TAN 15 flood risk vulnerability classification.
High	Feature with a high yield and/or quality and rarity at a national scale, with a limited potential for substitution	Aquatic environment Flood risk	Conditions supporting sites with national conservation designations (i.e. Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs)) where the designation is based specifically on aquatic features. Receptor water body: all relevant WFD supporting elements* at least good status/potential. Land use types defined as 'Highly Vulnerable' in the TAN15 flood risk vulnerability classification.
Medium	Feature with a medium yield and/or quality at a regional scale or good quality at a local scale, with some potential for substitution	Aquatic environment Flood risk	Sites with local conservation designations where the designation is based specifically on aquatic features. Receptor water body: all relevant WFD elements* at least moderate status/potential. Land use types defined as 'More Vulnerable' in the TAN15 flood risk vulnerability classification.
Low	Feature with a low yield and/or quality at a local scale, with some potential for substitution	Aquatic environment Flood risk	Receptor water body: relevant WFD elements* at less than moderate status/potential. Small watercourses not classified as a WFD river water body. Minor springs, wells and Issues Land use types defined as 'Less Vulnerable' in the TAN15 flood risk vulnerability classification.

Sensitivity	Criteria	Receptor Type	Examples
Very Low	Feature with minimal yield and/or very low quality at a local scale, with a high potential for substitution	Aquatic environment Flood risk	Receptor water body: relevant WFD elements* at poor status/potential. Minor water features such as ditches, not classified as a WFD river water body. Land use types which are considered to be exceptions under TAN 15 as they are required in a fluvial, tidal or coastal location by virtue of their nature.

*For the purposes of this assessment, 'relevant WFD elements' are taken to mean:

- all biological quality elements e.g. fish, invertebrates etc.;
- all physico-chemical quality elements e.g. dissolved oxygen, phosphate etc.; and
- hydromorphological supporting elements.

The definition of 'relevant WFD elements' (given the lack of potential for the Proposed Development to influence these substances, with BESS fire suppression system consisting of gas or water) excludes:

- Priority Hazardous Substances;
- Priority Substances; and
- Specific Pollutants.

9.7.4. **Table 9-14** details the basis for assessing the magnitude of change to the hydrology receptors.

Table 9-14 - Magnitude of change

Magnitude	Criteria	Receptor type	Examples of negative change
Very High	Results in major change to feature, of sufficient magnitude to affect its use/integrity	Aquatic environment Flood risk	Deterioration in river flow regime, morphology or water quality and or water quantity, leading to sustained, permanent or long-term breach of relevant Conservation Objectives (COs) or downgrading of WFD status (including downgrading of individual WFD supporting elements). Change in flood risk resulting in potential loss of life or major damage to property and infrastructure.
High	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances	Aquatic environment Flood risk	Deterioration in river flow regime, morphology or water quality and or water quantity, leading to periodic, short-term and reversible breaches of relevant COs, or downgrading of WFD status. (including downgrading of individual WFD supporting elements or ability to achieve future WFD objectives). Change in flood risk resulting in potential for moderate damage to property and infrastructure.
Medium	Results in minor change to feature, with insufficient	Aquatic environment	Measurable deterioration in river flow regime, morphology or water quality and or water quantity, but remaining generally within COs, and with no change

Magnitude	Criteria	Receptor type	Examples of negative change
	magnitude to affect its use/integrity in most circumstances	Flood risk	to WFD status (of overall status or supporting element status). Change in flood risk resulting in potential for minor damage to property and infrastructure.
Low	Results in little change to feature, with insufficient magnitude to affect its use/integrity	Aquatic environment Flood risk	Limited measurable deterioration in river flow regime, morphology or water quality and or water quantity and limited probability of consequences in terms of COs or WFD designations. Increased frequency of flood flows, but which does not pose an increased risk to people, property and infrastructure.
Very Low	Results in no change to feature, with insufficient magnitude to affect its use/integrity	Aquatic environment Flood risk	No measurable deterioration in river flow regime, morphology or water quality and or water quantity and no consequences in terms of COs or WFD designations. No increase in frequency of flood flows, and no increase in risk to people, property and infrastructure.

SIGNIFICANCE EVALUATION METHODOLOGY

9.7.5. The significance of hydrology related effects is derived by considering both the sensitivity of the feature and the magnitude of change. In this assessment, effects are considered to be significant or not significant according to the matrix in **Table 9-15**.

Table 9-15 - Significance Evaluation Matrix Relating to Hydrology

		Magnitude of change				
		Very high	High	Medium	Low	Very low
Sensitivity	Very high	Major (Significant)	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Potentially significant)*
	High	Major (Significant)	Major (Significant)	Major (Significant)	Moderate (Potentially significant)*	Minor (Not significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Potentially significant)*	Minor (Not significant)	Negligible (Not significant)
	Low	Major (Significant)	Moderate (Potentially significant)*	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Potentially significant)*	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

** Potentially significant - in these cases, professional judgement will be used to determine whether effects are likely to be significant or not.*

9.8 ASSESSMENT OF HYDROLOGY EFFECTS

PREDICTED EFFECTS AND THEIR SIGNIFICANCE - CONSTRUCTION & DECOMMISSIONING

9.8.1. The following section summarises the predicted effects and their significance for the construction and decommissioning phases of the Proposed Development for the Aquatic Environment and Flood Risk, further details of the receptors, predicted effects, sensitivity, magnitude of change, and significance can be found **Table 9-17**.

Aquatic environment receptors

9.8.2. The embedded measures detailed in **Section 9.5** are considered to fully mitigate against any potentially significant effects. Through the assessment of receptors and their sensitivity and magnitude of change from the Proposed Development activities, it has been assessed that there would be **no significant effect** on aquatic environment receptors (WFD groundwater bodies, WFD surface (river) waterbodies, watercourses (Main River and Ordinary Watercourses), springs, wells and headwater issues). The oCEMP consolidates all appropriate embedded measures and would clearly outline what should be implemented, where, and by whom.

WFD Groundwater Bodies

9.8.3. The Proposed Development is located on the Severn Uplands Lower Palaeozoic WFD Groundwater Body. The predicted effects on the receptor are a decline in groundwater levels arising from dewatering of excavations for cabling, wind turbine foundations, and temporary construction compounds establishment reducing infiltration, and potential for accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals. The sensitivity of the receptor is very low as the relevant WFD elements of the Severn Upland Lower Palaeozoic WFD Groundwater Body are at poor status/potential. The anticipated magnitude of change is also very low, as with the implementation of the embedded measures a contamination or pollution event is unlikely to occur, and in any event, there will be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs or WFD designations. As the sensitivity and magnitude of change have both been judged as very low, the effects on the receptor have been assessed as **negligible (not significant).**

9.8.4. The measures set out in **Table 9-9**will prevent the Proposed Development from having a significant effect on the Severn Uplands Lower Palaeozoic WFD Groundwater Body.

WFD Surface (River) Waterbodies (Good Status)

9.8.5. The Proposed Development Study Area intersects three WFD Surface (River) Waterbodies of Good Status, these are the Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn), (Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew)) and the Nant Rhyd-ros Ian (source to Confluence River Severn). The predicted effects on the receptors are the potential for accidental contamination entering watercourses arising from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite, and potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance. The sensitivity of the receptor is high, as all relevant WFD elements are at least good status/potential, and the magnitude of change is very low, as with the implementation of the embedded measures, a contamination or pollution event is unlikely to occur, and in any event, there would be no measurable deterioration in river flow regime, morphology or water quality and no consequences in

terms of COs or WFD designations. As the sensitivity of the receptors are high and the magnitude of change is very low, the effects on the receptor have been assessed as **minor (not significant).**

9.8.6. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the WFD Surface (River) Waterbodies of Good Status.

WFD Surface (River) Waterbodies (Moderate Status)

9.8.7. The Proposed Development Study Area intersects one WFD Surface (River) Waterbody at Moderate Status, The Severn (confluence Afon Dulas to Confluence River Camlad). The predicted effects on the receptor are the potential for accidental contamination entering watercourses arising from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite, and potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance. The sensitivity of the receptor is medium as all relevant WFD elements are at least moderate status/potential, and the magnitude of change is very low, as with the implementation of the embedded measures, a contamination or pollution event is unlikely to occur, and in any event, there would be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs or WFD designations. As the sensitivity of the receptor is medium and the magnitude of change is very low the effect on the receptor have been assessed as **negligible (not significant).**

The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the WFD Surface (River) Waterbodies of Moderate Status.

Watercourses

9.8.8. The Proposed Development Study Area intersects the Afon Carno (NRW Main River), the Nant Cwmgerwyn (Ordinary Watercourse), The Nant y Llyn Mawrand (Ordinary Watercourse) and their tributaries. The predicted effects on the receptors are the potential for accidental contamination entering watercourses arising from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite, and potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance. The sensitivity of the receptors are low, as the watercourses and their tributaries are small watercourses not classified as WFD Surface (River) Waterbodies, and the magnitude of change is very low, as with the implementation of the embedded measures, a contamination or pollution event is unlikely to occur, and in any event, there would be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs. As the sensitivity of the receptors are low and the magnitude of change is very low, the effect on the receptors have been assessed as **negligible (not significant).**

9.8.9. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the Watercourses intersecting the Study Area.

Springs, Wells and Headwater Issues

9.8.10. The Proposed Development Study Area contains numerous mapped springs, wells and headwater issues. The predicted effects on the receptors are the potential for accidental contamination entering the groundwater and effecting the water quality of the springs, wells and headwater issues arising from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite. The sensitivity of the receptors are low as they are springs, wells and Issues, and the magnitude of change is very low, as with the implementation of the embedded measures, a

contamination or pollution event is unlikely to occur, and in any event, there would be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs. As the sensitivity of the receptors are low and the magnitude of change is very low, the effect on the receptors have been assessed as **negligible (not significant).**

9.8.11. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the Springs, Wells and Headwater Issues in the Study Area.

Flood risk receptors

9.8.12. The predicted effects are increased flood risk to third party receptors including third-party people, property and infrastructure within and outside of the Study Area and the Proposed Development. The embedded measures detailed in **Section 9.5** are considered to fully mitigate against any potentially significant effects. Through the assessment of receptors and their sensitivity and magnitude of change from the Proposed Development activities (see **Table 9-17**), is has been assessed that there would be **no significant effect** on flood risk receptors (Third party receptors including third-party people, property and infrastructure within and outside of the Study Area, and the Proposed Development itself). The oCEMP will consolidate all appropriate embedded measures, and additional mitigation and enhancement strategies where required, and would clearly outline what should be implemented, where, and by whom. The implementation of the Drainage Strategy will ensure there will be no change in flood risk to flood risk receptors.

Flood Risk

9.8.13. The predicted effects on this receptor from the Proposed Development are changes in watercourse conveyance associated with new or modified access tracks and watercourse crossings, changes in runoff rates and new flow pathways associated with ground disturbance and the development of existing and new access tracks, wind turbine foundations, crane pad hard standings and temporary construction compound areas, and changes to hydromorphology associated with new watercourse crossings (as described in **Chapter 4 Proposed Development**). Both the Proposed Development and third party flood receptors are receptors of High sensitivity as both land use types are defined as ‘Highly Vulnerable’ in the TAN15 flood risk vulnerability classification. The magnitude of change has been judged as very low as it has been determined that there will be no increase in frequency of flood flows, and no increase in risk to people, property and infrastructure. As the sensitivity is high and the magnitude of change is very low, the significance of the effects on the receptor have been judged as **Minor (Not significant).**

9.8.14. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the third party receptors including third-party people, property and infrastructure within and outside of the Study Area and the Proposed Development.

PREDICTED EFFECTS AND THEIR SIGNIFICANCE - OPERATION

9.8.15. The following section summarises the predicted effects and their significance for the operation phases of the Proposed Development for the Aquatic Environment and Flood Risk, further details of the receptors, predicted effects, sensitivity, magnitude of change, and significance can be found **Table 9-17**.

Aquatic environment receptors

9.8.16. The embedded measures detailed in **Section 9.5** are considered to fully mitigate against any potentially significant effects the operation phase of the Proposed Development. Through the assessment of receptors and their sensitivity and magnitude of change from the Proposed Development activities, it has been assessed that there would be **no significant effect** on aquatic environment receptors (WFD groundwater bodies, WFD surface (river) waterbodies, watercourses (Main River and Ordinary Watercourses), springs, wells and headwater issues). The oCEMP will consolidate all appropriate embedded measures, and would clearly outline what should be implemented, where, and by whom.

WFD Groundwater Bodies

9.8.17. The Proposed Development is located on the Severn Uplands Lower Palaeozoic WFD Groundwater Body. The predicted effects on the receptor are the potential for accidental contamination entering groundwater, associated with spillage or leakage of fuels, lubricants or other chemicals. The sensitivity of the receptor is very low as the relevant WFD elements of the Severn Upland Lower Palaeozoic WFD Groundwater Body are at poor status/potential. The anticipated magnitude of change is also very low, as with the implementation of the embedded measures, a contamination or pollution event is unlikely to occur, and in any event, there will be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs or WFD designations. As the sensitivity and magnitude of change have both been judged as very low, the effects on the receptor have been assessed as **negligible (not significant).**

9.8.18. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the Severn Uplands Lower Palaeozoic WFD Groundwater Body.

WFD Surface (River) Waterbodies (Good Status)

9.8.19. The Proposed Development Study Area intersects three WFD Surface (River) Waterbodies. Two of these are at Good Status, these are the Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn), and the Nant Rhyd-ros Ian (source to Confluence River Severn). The predicted effects on the receptors are the potential for accidental contamination entering watercourses arising the leakage or spillage of fuels and chemicals from stores and vehicles onsite. The sensitivity of the receptor is high, as all relevant WFD elements are at least good status/potential, and the magnitude of change is very low, as with the implementation of the embedded measures, a contamination or pollution event is unlikely to occur, and in any event, there would be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs or WFD designations. As the sensitivity of the receptors are high and the magnitude of change is very low, the effects on the receptor have been assessed as **minor (not significant).**

9.8.20. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on WFD Surface (River) Waterbodies of Good Status.

WFD Surface (River) Waterbodies (Moderate Status)

9.8.21. The Proposed Development Study Area intersects one WFD Surface (River) Waterbody at Moderate Status, The Severn (confluence Afon Dulas to Confluence River Camlad). The predicted effects on the receptor are the potential for accidental contamination entering watercourses arising from the leakage or spillage of fuels and chemicals from stores and vehicles onsite. The sensitivity of the receptor is medium as all relevant WFD elements are at least moderate status/potential, and

the magnitude of change is very low, as with the implementation of the embedded measures, there would be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs or WFD designations. As the sensitivity of the receptor is medium and the magnitude of change is very low the effect on the receptor have been assessed as **negligible (not significant).**

9.8.22. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the WFD Surface (River) Waterbodies of Moderate status.

Watercourses

9.8.23. The Proposed Development Study Area intersects the Afon Carno (NRW Main River) and the Nant Cwmgerwyn (Ordinary Watercourse) and their tributaries. The predicted effects on the receptors are the potential for accidental contamination entering watercourses arising from the leakage or spillage of fuels and chemicals from stores and vehicles onsite, and potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance. The sensitivity of the receptors are low, as the watercourses and their tributaries are small watercourses not classified as WFD Surface (River) Waterbodies, and the magnitude of change is very low, as with the implementation of the embedded measures, there would be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs. As the sensitivity of the receptors are low and the magnitude of change is very low, the effect on the receptors have been assessed as **negligible (not significant).**

9.8.24. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the WFD Surface (River) Waterbodies of Moderate status.

Springs, Wells and Headwater Issues

9.8.25. The Proposed Development Study Area contains numerous mapped springs, wells and headwater issues. The predicted effects on the receptors are the potential for accidental contamination entering the groundwater and effecting the water quality of the springs, wells and headwater issues arising from the leakage or spillage of fuels and chemicals from stores and vehicles onsite. The sensitivity of the receptors are low as they are minor springs, wells and Issues, and the magnitude of change is very low, as with the implementation of the embedded measures, there would be no measurable deterioration in river flow regime, morphology or water quality and no consequences in terms of COs. As the sensitivity of the receptors are low and the magnitude of change is very low, the effect on the receptors have been assessed as **negligible (not significant).**

9.8.26. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the mapped spring, wells and headwater Issues.

Flood risk receptors

9.8.27. The predicted effects are increased flood risk to third party receptors including third-party people, property and infrastructure within and outside of the Study Area and the Proposed Development. The embedded measures detailed in **Section 9.5** are considered to fully mitigate against any potentially significant effects. Through the assessment of receptors and their sensitivity and magnitude of change from the Proposed Development activities, is has been assessed that there would be no significant effect on flood risk receptors (Third party receptors including third-party people, property and infrastructure within and outside of the Study Area, and the Proposed Development itself). The oCEMP will consolidate all appropriate embedded measures, and

additional mitigation and enhancement strategies where required, and would clearly outline what should be implemented, where, and by whom.

Flood Risk

9.8.28. The predicted effects on this receptor from the Proposed Development are changes in watercourse conveyance associated with new or modified access tracks and watercourse crossings, changes in runoff rates and new flow pathways associated with new access tracks, wind turbine foundations, crane pad hard standings. The sensitivity of the receptor (third party receptors including third-party people, property and infrastructure within and outside of the Study Area and the Proposed Development) is high as the Proposed Development is within the land use types defined as 'Highly Vulnerable' in the TAN15 flood risk vulnerability classification. The magnitude of change has been judged as very low as it has been determined that there will be no increase in frequency of flood flows, and no increase in risk to people, property and infrastructure. As the sensitivity is high and the magnitude of change is very low, the significance of the effects on the receptor have been judged as **Minor (Not significant).**

9.8.29. The measures set out in **Table 9-9** will prevent the Proposed Development from having a significant effect on the on third party receptors including third-party people, property and infrastructure within and outside of the Study Area and the Proposed Development.

9.9 ASSESSMENT OF CUMULATIVE (INTER-PROJECT) EFFECTS

9.9.1. A cumulative effects assessment (CEA) has been undertaken for the Proposed Development which considers the combined impacts with other developments on the same single receptor or resource (inter-project effects). The detailed method followed in identifying and assessing potential cumulative effects is set out in **Section 2.8 of Chapter 2: Approach to EIA**.

9.9.2. The EIA process includes consideration as to whether any of the individual effects of the Proposed Development would combine to create a cumulative effect greater than the sum of the individual effects. All available documentation submitted in support of the projects has been reviewed to identify programmes, sensitive receptors and relevant effects to determine the projects that should be considered for further assessment.

9.9.3. **Table 9-16** details the shortlisted cumulative projects and summarises the likelihood of any cumulative effects.

Table 9-16 - Hydrology Cumulative Effects from Construction, Decommissioning and Operation.

Project Name	Cumulative Effects	Significance Evaluation
Carno III Windfarm	Based on the substantial distance (7.9km) from the Proposed Development, this is outside of the Hydrology Study Area and therefore there is no pathway that could lead to significant cumulative hydrological effects. There is one common receptor which is the Severn Uplands Lower Palaeozoic WFD groundwater body, however the anticipated effectiveness of embedded environmental measures from both the Proposed Development and the Carno III Windfarm	No significant cumulative effects

Project Name	Cumulative Effects	Significance Evaluation
	combine to ensure there is no effect pathway and limit magnitude of change to negligible. It is therefore concluded that the potential effects to hydrology receptors, as a result of the Carno III Windfarm and the Proposed Development will be negligible.	
Llanbrynmair Wind Farm 1 (DNS)	Based on the substantial distance (7.6km) from the Proposed Development this is outside of the Hydrology Study Area and therefore there is no pathway that could lead to significant cumulative hydrological effects. There is one common receptor which is the Severn Uplands Lower Palaeozoic WFD groundwater body, however, the anticipated effectiveness of embedded environmental measures from both the Proposed Development and Llanbrynmair Wind Farm 1 (DNS) combine ensure there is no effect pathway and limit magnitude of change to negligible. It is therefore concluded that the potential cumulative effects to hydrology receptors, as a result of the Llanbrynmair Wind Farm 1 (DNS) and the Proposed Development, will be negligible.	No significant cumulative effects
Llanbrynmair Wind Farm 2 (DNS)	Based on the substantial distance (7.6km) from the Proposed Development this is outside of the Hydrology Study Area and therefore there is no pathway that could lead to significant cumulative hydrological effects. There is one common receptor which is the Severn Uplands Lower Palaeozoic WFD groundwater body, however, the anticipated effectiveness of embedded environmental measures from both the Proposed Development and Llanbrynmair Wind Farm 2 (DNS) combine to ensure there is no effect pathway and limit magnitude of change to negligible. It is therefore concluded that the potential cumulative effects to hydrology receptors, as a result of the Llanbrynmair Wind Farm 2 (DNS) and the Proposed Development will be negligible.	No significant cumulative effects
Llyn Lort Energy Park	Based on the distance (3km) from the Proposed Development this is outside of the Hydrology Study Area. There is one common receptor which is the Severn Uplands Lower Palaeozoic WFD groundwater body, however the anticipated effectiveness of embedded environmental measures from both the Proposed Development and Llyn Lort Energy Park	No significant cumulative effects

Project Name	Cumulative Effects	Significance Evaluation
	combine to ensure there is no effect pathway and limit magnitude of change to negligible . It is therefore concluded that the potential cumulative effects to hydrology receptors as a result of the Llyn Lort Energy Park and the Proposed Development will be negligible.	
Mynydd Lluest y Graig Energy Project	Based on the substantial distance (7.5km) from the Proposed Development this is outside of the Hydrology Study Area and therefore there is no pathway that could lead to significant cumulative hydrological effects. There is one common receptor which is the Severn Uplands Lower Palaeozoic WFD groundwater body, however anticipated effectiveness of embedded environmental measures from both the Proposed Development and Mynydd Lluest y Graig Energy Project combine to ensure there is no effect pathway and limit magnitude of change to negligible. It is therefore concluded that the potential cumulative effects to hydrology receptors, as a result of the Mynydd Lluest y Graig Energy Project and the Proposed Development, will be negligible.	No significant cumulative effects
SP Mid Wales (Electricity Connections Project (grid line)	Based on the substantial distance (5.6km) from the Proposed Development this is outside of the Hydrology Study Area and therefore there is no pathway that could lead to significant cumulative hydrological effects. There is one common receptor which is the Severn Uplands Lower Palaeozoic WFD groundwater body, however anticipated effectiveness of embedded environmental measures from both the Proposed Development and SP Mid Wales (Electricity Connections Project (grid line) combine to ensure there is no effect pathway and limit magnitude of change to negligible. It is therefore concluded that the potential cumulative effects to hydrology receptors, as a result of the SP Mid Wales and the Proposed Development, will be negligible.	No significant cumulative effects
Green GEN Vyrnwy Frankton	Based on the distance (3.5km) from the Proposed Development this is outside of the Hydrology Study Area and therefore there is no pathway that could lead to cumulative hydrological effects. There is one common receptor which is the Severn Uplands Lower Palaeozoic WFD groundwater body, however the anticipated	No significant cumulative effects.

Project Name	Cumulative Effects	Significance Evaluation
	effectiveness of embedded environmental measures from both the Proposed Development and the Green GEN Vyrnwy Frankton Project combine to ensure there is no effect pathway and limit magnitude of change to negligible. It is therefore concluded that the potential cumulative effects to hydrology receptors, as a result of the Green Gen Vyrnwy Frankton Project and the Proposed Development will be negligible.	
Land At Plas Maldwyn Caersws Powys SY17 5HG (residential development)	Based on the distance (2.2km) from the Proposed Development this is outside of the Hydrology Study Area and therefore there is no pathway that could lead to significant cumulative hydrological effects. There is one common receptor which is the Severn Uplands Lower Palaeozoic WFD groundwater body, however the anticipated effectiveness of embedded environmental measures from both the Proposed Development and the 5HG residential development combine ensure there is no effect pathway and limit magnitude of change to negligible. It is therefore concluded that the potential effects to hydrology receptors, as a result of the 5HG residential development and the Proposed Development will be negligible.	No significant cumulative effects.
Rhiwlas Green Energy Network (Rhiwlas GEN)	The Rhiwlas GEN project intersects the western boundary of the Proposed Development and the construction is expected to last 12 months and be in operation by 2029, with 40 years of operation. However, the Proposed Development would be constructed over ~24 months and be operational between 2031-2035, as such there is no anticipated overlap in the construction timeframes of the two projects. As Rhiwlas GEN is within the boundary of the Proposed Development there are multiple common receptors, however the anticipated effectiveness of embedded environmental measures from both the Proposed Development and Rhiwlas GEN would combine to ensure there is no effect pathway and limit magnitude of change to negligible. It is therefore concluded that the potential effects to hydrology receptors, as a result of the Rhiwlas GEN and the Proposed Development, will be negligible.	No significant cumulative effects.

9.9.4. Following an assessment of potential cumulative effects, the Proposed Development would cause no significant cumulative effects with the identified projects. All of the projects, with the exception of Rhiwlas GEN, are outside of the Hydrology Study Area and therefore have no effect pathway which could lead to significant cumulative hydrological effects occurring. Rhiwlas GEN is within the boundary of the Proposed Development, however there will be no overlap in the construction periods and both projects will have suitable environmental embedded measures. All of the projects will have embedded measures included which will be suitable to fully avoid, manage and if appropriate, mitigate the potential cumulative hydrology effects associated with that development and they are agreed via planning conditions. These include CEMPs to manage potential effect during construction and SuDS which will be in place during operation. There is a common receptor between the identified projects and the Proposed Development which is the Severn Uplands Lower Palaeozoic WFD groundwater body. However, the embedded environmental measures for Proposed Development and the identified projects ensure there will be no effect pathway to this receptor during construction and decommissioning or operation to WFD status through managing the risk of chemical spills, dewatering and changes to shallow surface water flow pathways through the CEMP, thereby limiting the magnitude of change to negligible.

9.10 SIGNIFICANCE CONCLUSIONS

9.10.1. A summary of the results of the Hydrology assessment is provided in **Table 9-17** below.

Table 9-17 - Summary of Significance of Effects

Receptor and Summary of Potential Effects	Sensitivity/ Importance/ value of receptor	Magnitude of Change	Significance	Summary Rationale
Flood Risk				
Flood Risk (Construction & Decommissioning) **Receptors** Third party receptors including third-party people, property and infrastructure within and outside of the Study Area. **Potential Effects** Changes in watercourse conveyance associated with new or modified access tracks and watercourse crossings. Changes in runoff rates and new flow pathways associated with ground disturbance and the development of existing and new access tracks, wind turbine foundations, crane pad hard standings and temporary construction compound areas. Changes to hydromorphology associated with new watercourse crossings.	High	Very Low	Minor (Not significant)	The receptors are of classified as highly vulnerable development under TAN-15 and are therefore of High sensitivity. However, the magnitude of change is categorised as Very Low, as with the implementation of the embedded measures there would be no increase in frequency of flood flows, and no increase in risk to people, property and infrastructure during construction and decommissioning.
Flood Risk (Operation) **Receptors** Third party receptors including third-party people, property and infrastructure within and outside of the Study Area.	High	Very Low	Minor (Not significant)	The receptors are of classified as highly vulnerable development under TAN-15 and are therefore of High sensitivity. However, the magnitude of change is categorised as Very Low, as with the implementation of the embedded measures there would be no increase in

Receptor and Summary of Potential Effects	Sensitivity/ Importance/ value of receptor	Magnitude of Change	Significance	Summary Rationale
Potential Effects Changes in watercourse conveyance associated with new or modified access tracks and watercourse crossings. Changes in runoff rates and new flow pathways associated with ground disturbance and the development of existing and new access tracks, wind turbine foundations, crane pad hard standings and temporary construction compound areas. Changes to hydromorphology associated with new watercourse crossings.				frequency of flood flows, and no increase in risk to people, property and infrastructure during operation.
Aquatic Environment				
WFD Groundwater Bodies (Construction & Decommissioning) **Receptors** (Severn Uplands - Lower Palaeozoic) **Potential Effects** A decline in groundwater levels arising from dewatering of excavations for cabling, wind turbine foundations, and temporary construction compounds establishment reducing infiltration. Potential for accidental contamination entering groundwater or watercourses,	Very Low	Very Low	Negligible (Not significant)	The Severn Uplands - Lower Palaeozoic WFD Groundwater Body has overall Poor Status and is therefore of Very Low Sensitivity. Due to limited extent of proposed works compared to the area of the groundwater body, and the anticipated effectiveness of environmental embedded measures, the magnitude of change to the baseline condition is Very Low. Dewatering of excavations will be carefully monitored, and groundwater flow disruption and drawdown would be minimised via good construction practices. The time any excavation is open would be kept to a minimum to minimise ingress of water and dewatering requirements. Dewatering of excavations will be undertaken in line with good practice. Effects of dewatering on potential receptors

Receptor and Summary of Potential Effects	Sensitivity/ Importance/ value of receptor	Magnitude of Change	Significance	Summary Rationale
associated with spillage or leakage of fuels, lubricants or other chemicals.				will be incorporated into the proposed approaches for each piece of infrastructure. Appropriate treatment would be installed before discharge to surface or groundwater. Appropriate licences and permits will be applied for if required.
WFD Groundwater Bodies (Operation) **Receptors** (Severn Uplands - Lower Palaeozoic) **Potential Effects** Potential for accidental contamination entering groundwater or watercourses, associated with spillage or leakage of fuels, lubricants or other chemicals.	Very Low	Very Low	Negligible (Not significant)	The Severn Uplands - Lower Palaeozoic WFD Groundwater Body has overall Poor Status and is therefore of Very Low Sensitivity. Due to limited extent of proposed works compared to the area of the groundwater body, and the anticipated effectiveness of environmental embedded measures, the magnitude of change to the baseline condition is Very Low. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from operation related pollution. These would include information on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning.
WFD Surface (River) Waterbodies at Good Status (Construction & Decommissioning) **Receptors** (Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn)) (Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew)) (Nant Rhyd-ros Ian (source to Confluence River Severn))	High	Very Low	Minor (Not significant)	The WFD waterbodies are of Good Status and as such are classed as High sensitivity receptors. The anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to baseline conditions. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from construction and operation related pollution. These would include information on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning.

Receptor and Summary of Potential Effects	Sensitivity/ Importance/ value of receptor	Magnitude of Change	Significance	Summary Rationale
Potential Effects Potential for accidental contamination entering watercourses. This could arise from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite. Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.				
WFD Surface (River) Waterbodies at Good Status (Operation) **Receptors** (Afon Carno (confluence of Afon Cwm-llwyd to Confluence River Severn)) (Afon Rhiw (South Arm) (Ty-newydd to Dwyrhiew)) (Nant Rhyd-ros Ian (source to Confluence River Severn)) **Potential Effects** Potential for accidental contamination entering watercourses. This could arise from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite. Potential effects on the hydromorphology and flow conveyance as a result of	High	Very Low	Minor (Not significant)	The WFD waterbodies are of Good Status and as such are classed as High sensitivity receptors. The anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to baseline conditions. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from construction and operation related pollution. These would include information on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning.

Receptor and Summary of Potential Effects	Sensitivity/ Importance/ value of receptor	Magnitude of Change	Significance	Summary Rationale
increased sediment inputs or direct watercourse disturbance.				
WFD Surface (River) Waterbodies at Moderate Status (Construction & Decommissioning) **Receptors** (Severn (confluence Afon Dulas to Confluence River Camlad)) **Potential Effects** Potential for accidental contamination entering watercourses. This could arise from cable installation and the leakage or spillage of fuels and chemicals from stores and vehicles onsite. Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	Medium	Very Low	Negligible (Not significant)	The WFD waterbody is of Moderate Status, as such, classified as a Medium sensitivity receptor. The anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to baseline conditions. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from operation related pollution. These would include information on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning.
WFD Surface (River) Waterbodies at Moderate Status (Operation) **Receptors** (Severn (confluence Afon Dulas to Confluence River Camlad)) **Potential Effects** Potential for accidental contamination entering watercourses. This could arise	Medium	Very Low	Negligible (Not significant)	The WFD waterbody is of Moderate Status, as such, classified as a Medium sensitivity receptor. The anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to baseline conditions. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from operation related pollution. These would include information on the use and storage of any fuels, oils and

Receptor and Summary of Potential Effects	Sensitivity/ Importance/ value of receptor	Magnitude of Change	Significance	Summary Rationale
from the leakage or spillage of fuels and chemicals from stores and vehicles onsite.				other chemicals, and pollution incidence response planning.
Watercourses (Construction & Decommissioning) **Receptors** Afon Carno Nant Cwmgerwyn **Potential Effects** Potential for accidental contamination entering watercourses. This could arise from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite. Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	Low	Very Low	Negligible (Not significant)	The Afon Carno and Nant Cwmgerwyn are not classified WFD waterbodies and are therefore of Low sensitivity. The anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to baseline conditions. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from construction and operation related pollution. These would include information on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning.
Watercourses (Operation) **Receptors** Afon Carno Nant Cwmgerwyn **Potential Effects** Potential for accidental contamination entering watercourses. This could arise from the leakage or spillage of fuels and chemicals from stores and vehicles onsite.	Low	Very Low	Negligible (Not significant)	The Afon Carno and Nant Cwmgerwyn are not classified WFD waterbodies and are therefore of Low sensitivity. The anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to baseline conditions. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from construction and operation related pollution. These would include information on the use and storage of any fuels,

Receptor and Summary of Potential Effects	Sensitivity/ Importance/ value of receptor	Magnitude of Change	Significance	Summary Rationale
				oils and other chemicals, and pollution incidence response planning.
Springs, Wells and Headwater Issues (Construction & Decommissioning) **Receptors** S1 to S5 W1 to W14 **Potential Effects** Potential for accidental contamination entering the groundwater and effecting the water quality of the springs, wells and headwater issues. This This could arise from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite.	Low	Very Low	Negligible (Not significant)	The Springs, Wells and Headwater Issues are of Low Sensitivity. The anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to baseline conditions. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from construction and operation related pollution. These would include information on the use and storage of any fuels, oils and other chemicals, and pollution incidence response planning. The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects on springs, wells and headwater issues based on information gathered to date. During construction the locations of springs, wells and headwater issues will be avoided to ensure there is no pathway for potential effects.
Springs, Wells and Headwater Issues (Operation) **Receptors** S1 to S5 W1 to W14 **Potential Effects** Potential for accidental contamination entering the groundwater and effecting the water quality of the springs, wells and	Low	Very Low	Negligible (Not significant)	The Springs, Wells and Headwater Issues are of Low Sensitivity. The anticipated effectiveness of embedded environmental measures and considerable attenuation and dilution combine to limit magnitude of change to baseline conditions. In line with good practice, PPPs will be developed to detail how ground and surface waters would be protected from construction and operation related pollution. These would include information on the use and storage of any fuels,

Receptor and Summary of Potential Effects	Sensitivity/ Importance/ value of receptor	Magnitude of Change	Significance	Summary Rationale
headwater issues. This This could arise from cable installations or the leakage or spillage of fuels and chemicals from stores and vehicles onsite.				oils and other chemicals, and pollution incidence response planning. The layout and location of the Proposed Development has, as far as possible, been selected to avoid direct effects on springs, wells and headwater issues based on information gathered to date.

APPENDIX TITLE

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