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# 10. Water Environment

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## 10.1 Introduction

10.1.1 This chapter presents the preliminary assessment of the likely significant effects of the Project with respect to Water Environment, including flood risk and the Water Framework Directive (WFD). The preliminary assessment is based on information obtained to date. It should be read in conjunction with the Project description provided in **Chapter 4: Description of the Project** and with respect to relevant parts of the following chapters:

- Chapter 8: Biodiversity; and
- Chapter 11: Ground Conditions.

10.1.2 This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 10.2**);
- consultation and engagement that has been undertaken and how comments from consultees relating to Water Environment have been addressed (**Section 10.3**);
- the methods used for baseline data gathering (**Section 10.4**);
- the overall baseline (**Section 10.5**);
- embedded measures relevant to Water Environment (**Section 10.6**);
- the scope of the assessment for Water Environment (**Section 10.7**);
- the methods used for the assessment (**Section 10.8**);
- the preliminary assessment of Water Environment effects (**Section 10.9**);
- preliminary assessment of cumulative (inter-project) effects (**Section 10.10**);
- a summary of the preliminary significance conclusions (**Section 10.10.2**);
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 10.14**).

## Limitations and assumptions

10.1.3 The information provided in this Draft ES is preliminary, the final assessment of likely significant effects will be reported in the ES. The Draft ES has been produced to fulfil Pennant Walters' consultation duties and enable consultees to develop an informed view of the likely significant effects of the Project.

10.1.4 There are no limitations relating to Water Environment that affect the robustness of the assessment of the potential likely significant effects of the Project.

## 10.2 Relevant legislation, planning policy and technical guidance

10.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to Water Environment. Further

information on policies relevant to the Project is provided in **Chapter 5: Legislation and policy overview**.

## Legislation

10.2.2 A summary of the relevant legislation is given in **Table 10.1**.

**Table 10.1 Legislation relevant to the Water Environment assessment**

Legislation	Legislative context
<b>Control of Pollution Act 1974<sup>1</sup></b>	Make further provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.
<b>Reservoirs Act 1975<sup>2</sup></b>	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 them failing and giving rise to flooding problems is remote.
<b>Environmental Protection Act 1990<sup>3</sup></b>	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.
<b>Land Drainage Act 1991<sup>4</sup> and 1994<sup>5</sup></b>	Stipulates, in combination with the Water Resources Act, that before work on or near an 'Ordinary Watercourse <sup>6</sup> ' is carried out, an Ordinary Watercourse Consent is required. The Flood Defence consenting regime for 'Main Rivers <sup>7</sup> ', which used to be part of this Act, was replaced by flood risk activities permits under the Environmental Permitting Regulations 2016.
<b>Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009<sup>8</sup></b>	States that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter 'Controlled Waters <sup>10</sup> '. 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 Project is the potential requirement to obtain
<b>Water Act 2003<sup>9</sup></b>	

<sup>1</sup> UK Government. (1974). Control of Pollution Act 1974. [Online] Available at: [Control of Pollution Act 1974 \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukpga/1974/23) [Accessed 11 August 2022]

<sup>2</sup> UK Government. (1975). Reservoirs Act 1975. [Online] Available at: <https://www.legislation.gov.uk/ukpga/1975/23> [Accessed 11 August 2022]

<sup>3</sup> UK Government. (1990). Environmental Protection Act 1990. [Online] Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> [Accessed 11 August 2022]

<sup>4</sup> UK Government. (1991). Land Drainage Act 1991. [Online] Available at: <https://www.legislation.gov.uk/ukpga/1991/59/contents> [Accessed 11 August 2022]

<sup>5</sup> UK Government. (1994). Land Drainage Act 1994. [Online] Available at: <https://www.legislation.gov.uk/ukpga/1994/25/contents> [Accessed 11 August 2022]

<sup>6</sup> 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.

<sup>7</sup> Main rivers are usually larger rivers and streams. They are designated as such and shown on the Main River Map. The Environment Agency carries out maintenance, improvement and construction work on main rivers to manage flood risk.

<sup>8</sup> UK Government. (2009). The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009. [Online] Available at: <https://www.legislation.gov.uk/uksi/2009/3104/contents/made> [Accessed 11 August 2022]

<sup>9</sup> UK Government. (2003). Water Act 2003. (Online) Available from: <https://www.legislation.gov.uk/ukpga/2003/37/contents> [Accessed 11 August 2022]

<sup>10</sup> 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 August 2022]

Legislation	Legislative context
	<p>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.</p>
<p><b>Environment Act 1995<sup>11</sup></b></p>	<p>Established the Environment Agency (EA) and gave it 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</p>
<p><b>Water Quality (Water Supply) Regulations 2017 (as amended)<sup>12</sup></b></p>	<p>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.</p>
<p><b>Priority Substances Directive (2008/105/EC) Revision of the Priority Substances Directive (2013/39/EU)<sup>13</sup></b></p>	<p>Sets out environmental quality standards in the field of water policy for Europe, with the aim of minimising the threat to the aquatic environment and effects such as acute and chronic toxicity to aquatic organisms, accumulation in the ecosystem and losses of habitats and biodiversity, as well as a threat to human health.</p>
<p><b>The EU Floods Directive (2007/60/EC), as enacted into domestic law by the Flood Risk Regulations 2009<sup>14</sup></b></p>	<p>Enacted into domestic law by the Flood Risk Regulations 2009. It requires that in accordance with flood risk management plans, there should be a focus on the prevention of flooding, through avoidance of planned development in present and future flood prone areas, and protection by taking measures to reduce the likelihood of flooding.</p>
<p><b>Flood and Water Management Act 2010<sup>15</sup></b></p>	<p>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).</p>
<p><b>The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015<sup>16</sup></b></p>	<p>Sets out the environmental standards to be used for the second cycle of river basin plans, covering the period 2016-21. Along with the updated Water Environment (WFD) (England and Wales) Regulations 2003, they transpose Directive 2013/39/EC on environmental quality standards for priority substances.</p>

<sup>11</sup> UK Government. (1995). Environment Act 1995. [Online] Available at: <https://consult.environment-agency.gov.uk/engagement/bostonbarriertwao/results/b.10---environment-act-1995.pdf> [Accessed 11 August 2022]

<sup>12</sup> UK Government. (2017). Water Quality (Water Supply) Regulations 2017. [Online] Available at: <https://www.legislation.gov.uk/uksi/2000/3184/contents/made> [Accessed 11 August 2022]

<sup>13</sup> European Parliament. (2013). Directive 2013/39/EU of the European Parliament and of the Council amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy. [Online] Available at: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:226:0001:0017:EN:PDF> [Accessed 11 August 2022]

<sup>14</sup> European Parliament. (2007). Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks. [Online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0060&from=EN> [Accessed 11 August 2022]

<sup>15</sup> UK Government. (2010). Flood and Water Management Act 2010. [Online] Available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents> [Accessed 11 August 2022]

<sup>16</sup> UK Government. (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations. [Online] Available at: <https://www.legislation.gov.uk/uksi/2017/407/contents/made> [Accessed 11 August 2022]

Legislation	Legislative context
<b>Environment (Wales) Act 2016</b> <sup>17</sup>	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 provides guidance on wider risks and benefits of flood and coastal erosion risk management in Wales.
<b>Private Water Supplies (Wales) Regulations 2017</b> <sup>18</sup>	The Regulations require Local Authorities to monitor Private Water Supplies.
<b>Environmental Permitting (England and Wales) Regulations (EPR), 2016 (as amended)</b> <sup>19</sup>	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.
<b>The European Union (EU) Water Framework Directive (2000/60/EC) (WFD)</b> <sup>20</sup> as enacted into domestic law by the <b>Water Environment WFD (England and Wales) (Amendment) Regulations 2017</b> <sup>21</sup>	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.
<b>Environment Act, 2021</b> <sup>22</sup>	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.

## Planning policy

10.2.3 A summary of the relevant national and local planning policy is given in **Table 10.2**.

<sup>17</sup> 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 11 August 2022]

<sup>18</sup> UK Government. (2017). The Private Water Supplies (Wales) Regulations 2017. [Online] Available at:

<https://www.legislation.gov.uk/wsi/2017/1041/contents/made> [Accessed 11 August 2022]

<sup>19</sup> 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](https://www.legislation.gov.uk/uksi/2016/1154/contents_resource.html) (europa.eu)

<sup>20</sup> 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](https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF) [Accessed 11 August 2022]

<sup>21</sup> UK Government. (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations. [Online] Available at: <https://www.legislation.gov.uk/uksi/2017/407/contents/made> [Accessed 11 August 2022]

<sup>22</sup> UK Government. (2021). The Environment Act (2021) UK. [Online] Available at:

<https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted> [Accessed 11 August 2022]



**Table 10.2 Planning policy relevant to the Water Environment assessment**

Policy	Policy context
<b>National planning policy</b>	
<b>National Development Framework (Future Wales: The National Plan 2040)<sup>23</sup></b>	<p>This is the national development framework for Wales, which has development plan status.</p> <p><b>Policy 8 – Flooding</b> 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.</p> <p><b>Policy 19 – Strategic Policies for Regional Planning</b> 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.</p> <p><b>Policy 33 – Cardiff, Newport and the Valleys</b> This policy sets out the ambitions for the Cardiff, Newport and Valleys region of Wales, which includes the Rhondda Cynon Taf county. This is inclusive of development and growth strategies with reference to natural resources, climate change, flooding and biodiversity.</p>
<b>Sustainable Drainage (SuDS) Statutory Guidance, Welsh Government<sup>24</sup></b>	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.
<b>The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales, Welsh Government<sup>25</sup></b>	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.
<b>Technical Advice Note 15 (TAN15)<sup>26</sup></b>	Technical Advice Note 15: Development and Flood Risk (TAN15 – July 2004) was produced by the then Welsh Assembly Government (now the Welsh Government). TAN15 provides technical guidance which supplements the policy set out in Planning Policy Wales (Edition 10,

<sup>23</sup> 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 11 August 2022]

<sup>24</sup> Welsh Government. (2019). Sustainable Drainage (SuDS) Statutory Guidance. [Online] Available at: <https://gov.wales/sites/default/files/publications/2019-06/statutory-guidance.pdf> [Accessed 11 August 2022]

<sup>25</sup> 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 11 August 2022]

<sup>26</sup> Welsh Government. 2018. Technical Advice Note 15: Development and Flood Risk. [Online] Available at: <https://gov.wales/sites/default/files/publications/2018-09/tan15-development-flood-risk.pdf> [Accessed 11 August 2022]

Policy	Policy context
	<p>December 2018) (Welsh Assembly Government, 2018) in relation to development and flooding, providing a framework within which risks arising from both river and coastal flooding, and from additional run-off from development in any location, can be assessed. Consultation on an updated version of TAN15 has recently been prepared (January 2020). The draft update includes a range of changes to the guidance, in particular it removes reference to the Development Advice Map (DAM) and refers to a “Wales Flood Map” held by NRW. However, the consultation draft clearly states that TAN15 (2004) remains current until such a time that the replacement is confirmed (anticipated to be June 2023). TAN15 (2004) has therefore been used to underpin this assessment. TAN15 is supplemented by the Development Advice Map (DAM) which provides the basis for assessment under TAN15. The DAM was last updated in July 2017.</p> <p><b>Justification Test</b> The Justification Test is intended to assess the appropriateness of proposed developments, based upon location in respect of flood zones and the type of development proposed.</p>
<p><b>Local planning policy</b></p>	
<p><b>Rhondda Cynon Taf County Borough Council Local Development Plan up to 2021 (Adopted March 2011)</b><sup>27</sup></p>	<p><b>DM1 New Development</b> This policy set out the sustainability, accessibility and amenity requirements of proposed developments, which must be met in order to be approved. New developments are required to have sufficient surface water management systems which make suitable use of SuDS systems where possible. The policy also states that there should be no adverse effects on the water environment or controlled waters, and should aim to improve water quality, where practicable.</p>
<p><b>Rhondda Cynon Taf County Borough Council Preferred Strategy Sustainability Appraisal (Part of Local Development Plan 2006-2021)</b><sup>28</sup></p>	<p><b>SP3 Climate Change</b> This policy sets out the criteria for developments to meet in terms of climate change. The requirements relating to flooding are of relevance, as new developments must aim to minimise flood risk and ensure SuDS systems are incorporated wherever is reasonably practicable.</p> <p><b>SP15 Environmental Protection</b> The policy sets out the development requirements in regard to environmental protections, particularly from pollution. The policy requires developments to demonstrate protections of the water environment and resources from potential pollutant.</p> <p>The Replacement Local Development Plan noted that the Development Management Policies (including DM1) require revision</p>

<sup>27</sup> Rhondda Cynon Taf CBC. 2011. Local Development Plan up to 2021. [Online] Available at: <https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/RelateddocumentsLDP20062021/AdoptedLocalDevelopmentPlan.pdf> [Accessed 11 August 2022]

<sup>28</sup> Rhondda Cynon Taf CBC. 2007. Preferred Strategy Sustainability Appraisal. [Online] Available at: <https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/LDPEvidenceBaseLibraryandAnnualMonitoringRe/RelateddocumentsEvidenceBase/EB4.pdf#:~:text=Rhondda%20Cynon%20Taf%E2%80%99s%20Preferred%20Strategy%20LDP%20has%20been.life%20for%20everyone%2C%20now%20and%20in%20the%20future> . [Accessed 11 August 2022]



## Technical guidance

10.2.4 A summary of the technical guidance for Water Environment is given in **Table 10.3**.

**Table 10.3 Technical guidance relevant to the Water Environment assessment**

Technical guidance document	Context
<b>NRW - Flood consequence assessments: climate change allowances<sup>29</sup></b>	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.
<b>PINS Advice Note 18: The Water Framework Directive<sup>30</sup></b>	This Advice Note has no statutory status and forms part of a suite of advice notes provided by the Planning Inspectorate.
<b>Construction Industry Research and Information Association (CIRIA) reports</b>	
<b>Report C532: Control of Water Pollution from Construction Sites (2001)<sup>31</sup></b>	Provides practical support for consultants and contractors on how to plan and manage construction projects to control water pollution.
<b>Report C624: Development and Flood Risk - Guidance for the Construction Industry (2004)<sup>32</sup></b>	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.
<b>Report C648: Control of Water Pollution from Linear Construction Projects (2006)<sup>33</sup></b>	Guidance for clients, consultants, designers, contractors, and regulators on how to plan and manage water pollution from linear construction projects.
<b>Report C649: Control of Water Pollution from Linear Construction Projects - Site Guidance (2006)<sup>34</sup></b>	Guidance specifically aimed at on-site construction personnel working on linear infrastructure construction projects.
<b>Report C650: Environmental Good Practice on Site, second edition (2005)<sup>35</sup></b>	Provides practical guidance about managing construction on-site to control environmental impacts.

<sup>29</sup> 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 11 August 2022]

<sup>30</sup> The Planning Inspectorate. (2017). Advice note eighteen: The Water Framework Directive. [Online] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/> [Accessed 11 August 2022]

<sup>31</sup> 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.

<sup>32</sup> Lancaster, J., Preene, M. and Marshall, C. 2004. Development and Flood Risk – Guidance for the Construction Industry. C624. London: CIRIA.

<sup>33</sup> Murnane, E., Heap, A. and Swain, A. 2006. Control of Water Pollution from Linear Construction Projects – Technical Guidance. C648. London: CIRIA.

<sup>34</sup> Murnane, E., Heap, A. and Swain, A. 2006. Control of water pollution from Linear Construction Projects – Site Guide. C649. London: CIRIA.

<sup>35</sup> Charles, P. and Connely, S. 2005. Environmental Good Practice Site Guide (second edition). C650. London: CIRIA.

Technical guidance document	Context
<b>Report C651: Environmental Good Practice - Pocket Book (2005)</b> <sup>36</sup>	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.
<b>Report C689: Culvert Design and Operation Guide (2010)</b> <sup>37</sup>	Comprehensive guidance covering a range of issues pertinent to the management and design of culverts.
<b>Report C692: Environmental Good Practice on Site (2010)</b> <sup>38</sup>	General good practice guidance and practical advice for the management of construction sites to minimise environmental impacts.
<b>Report C698: Site Handbook for the Construction of SuDS (2007)</b> <sup>39</sup>	Guidance for site engineers and SuDS practitioners on the construction of SuDS to facilitate their effective implementation within developments.
<b>Report C753: The SuDS Manual (2015)</b> <sup>40</sup>	Best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.
<b>Pollution Prevention Guidance Notes (PPGs) and Guidance for Pollution Prevention Notes (GPPs)</b> <sup>41</sup> (both are maintained by NetRegs and provide environmental good practice guidance for the whole UK, and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only.)	
<b>GPP 1: Understanding your environmental responsibilities - good environmental practices (October 2020)</b> <sup>42</sup>	Guidance document based on relevant legislation and reflects current good practice.
<b>GPP 2: Above ground oil storage tanks (January 2018)</b> <sup>43</sup>	Guidance to support the safety of above ground oil storage tanks and minimise the risk of causing pollution.
<b>GPP 3: Use and design of oil separators in surface</b>	Guidelines to support decision making on whether an oil separator is needed for a site, and if so what size and type of separator is appropriate.

<sup>36</sup> Chant-Hall, G., Charles, P. and Connolly, S. (2005). Environmental good practice on site – pocket book. C651. London: CIRIA.

<sup>37</sup> Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. (2010). Culvert design and operation guide. C689. London: CIRIA.

<sup>38</sup> Audus, I., Charles, P. and Evans, S. (2010). Environmental good practice on site (third edition). C692. London: CIRIA.

<sup>39</sup> 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.

<sup>40</sup> Woods Ballard, S., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. (2015). The SuDS Manual. C753. London: CIRIA.

<sup>41</sup> NetRegs. (2021). Guidance for Pollution Prevention (GPPs) - Full list. [Online] Available at:

<https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/guidance-for-pollution-prevention-gpps-full-list/> [Accessed 11 August 2022]

<sup>42</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency. (2020). GPP 1: A general guide to preventing pollution. [Online] Available at:

<https://www.netregs.org.uk/media/1835/gpp-1.pdf> [Accessed 11 August 2022]

<sup>43</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017). Above ground oil storage tanks: GPP 2. [Online] Available at: <https://www.netregs.org.uk/media/1475/gpp-2-pdf-jan-2018.pdf> [Accessed 11 August 2022]

Technical guidance document	Context
<b>water drainage systems (March 2022)</b> <sup>44</sup>	
<b>GPP 5: Works and maintenance in or near water (February 2018)</b> <sup>45</sup>	Guidance document based on relevant legislation and setting out current good practice for working in or near water.
<b>PPG 6: Working at construction and demolition sites (2012)</b> <sup>46</sup>	Practical advice and guidance to help prevent pollution from construction and demolition sites. Sets out legislative requirements and good practice measures to reduce the risk of a pollution incident.
<b>GPP 8: Safe storage and disposal of used oils (July 2017)</b> <sup>47</sup>	Guidance based on relevant legislation and setting out current good practice for the safe storage and disposal of used oils.
<b>GPP 20: Dewatering underground ducts and chambers (January 2018)</b> <sup>48</sup>	Guidelines for dewatering underground ducts and chambers, based on relevant legislation and setting out current good practice.
<b>GPP 21: Pollution incident response planning (June 2021)</b> <sup>49</sup>	Guidelines setting out current best practice for producing an incident response plan.
<b>GPP 22: Dealing with spills (October 2018)</b> <sup>50</sup>	Guidance applicable to those responsible for storing and transporting materials that could cause pollution if they spill. It may also be useful for those who respond to spills, or those responsible for transporting or storing waste from spills.
<b>GPP 26 Safe storage - drums and intermediate bulk containers (IBCs) (February 2019)</b> <sup>51</sup>	Guidance aimed at site operators and those responsible for the storing and handling of drums and IBCs.

<sup>44</sup> Environment and Heritage Service, Scottish Environmental Protection Agency and Environment Agency (2022). Use and design of oil separators in surface water drainage systems: GPP 3. [Online] Available at: <https://www.netregs.org.uk/media/1899/guidance-for-pollution-prevention-3-2022-update-v2.pdf> [Accessed 11 August 2022]

<sup>45</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). Works and maintenance in or near water: GPP 5. Version 1.2. [Online] Available at: [https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm\\_source=website&utm\\_medium=social&utm\\_campaign=GPP5%2027112017](https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017) [Accessed 11 August 2022]

<sup>46</sup> Environment Agency (2012) Working at construction and demolition sites: PPG6. Second edition. Bristol: Environment Agency.

<sup>47</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017). GPP 8 Safe storage and disposal of used oils. [Online] Available at: <https://www.netregs.org.uk/media/1435/gpp-8-v3-swni.pdf> [Accessed 11 August 2022]

<sup>48</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (n.d.) GPP 20 Dewatering underground ducts and chambers. [Online] Available at: <https://www.netregs.org.uk/media/1477/gpp-20-publisher-pdf-version.pdf> [Accessed 11 August 2022]

<sup>49</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2021). GPP 21: Pollution Incident Response Plans. [Online] Available at: <https://www.netregs.org.uk/media/1436/gpp-21-final.pdf> [Accessed 11 August 2022]

<sup>50</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). Dealing with spills: GPP 22. Version 1. [Online] Available at: <https://www.netregs.org.uk/media/1643/gpp-22-dealing-with-spills.pdf> [Accessed 11 August 2022]

<sup>51</sup> Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2019). GPP 26: Safe storage of Drums and Intermediate Bulk Containers (IBCs). [Online] Available at: <https://www.netregs.org.uk/media/1885/guidance-for-pollution-prevention-26-2022-updated.pdf> [Accessed 11 August 2022]

## 10.3 Consultation and engagement

### Overview

- 10.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 4.4 of Chapter 4: Approach to preparing the Environmental Statement.**

### Scoping Opinion

- 10.3.2 A Scoping Direction was issued by the Planning and Environment Decisions Wales (PEDW), on behalf of the Welsh Ministers, on 01 December 2021. A summary of the relevant responses received in the Scoping Opinion in relation to Water Environment, and confirmation of how these have been addressed within the assessment to date is presented in **Table 10.4.**
- 10.3.3 The information provided in the Draft ES is preliminary and not all of the Scoping Direction comments have been addressed at this stage, however all comments will be addressed within the ES.

**Table 10.4 Summary of EIA Scoping Direction responses for Water Environment**

Consultee	Consideration	How scoping response has been addressed in this Draft ES
PEDW	<u>ID 47: Scoping reference Section 9.3</u> PEDW notes the intention to conduct a two steps peat probing exercise. The Applicant is reminded that in Wales any peat deposit deeper than 0.5 m is considered deep peat. It is recommended that a survey area is clearly identified on a plan. Areas where peat is deeper than 0.5 m should be avoided. Peaty areas that cannot be avoided should be surveyed in accordance with the Scottish Government Guidance "Guidance on Developments on Peatland" (2017) - Phase 2. A 10 m by 10 m grid is considered acceptable.	The Phase 1 peat depth survey found peat/bog pockets in the west of the summit of Mynydd y Glyn with depths ranging from 2.4m bgl to 4.10m bgl. An additional Phase 1 peat depth survey is currently being undertaken and will be presented in the final submission of the ES. (details provided in <b>Chapter 11: Ground Conditions</b> ).
PEDW	<u>ID 46: Scoping reference 9.2.19</u> NRW confirms that it will comment on the FCA that is produced at the application stage. The applicant's attention is drawn to the Ministerial Letter that postponed the coming into force of the new TAN15 until June 2013	The Draft FCA is provided in <b>Appendix 10A</b> . The draft TAN15 update includes a range of changes to the guidance, in particular it removes reference to the Development Advice Map (DAM) and refers to a Flood Map for Planning held by NRW. However, the consultation draft clearly states that TAN15 (2004) remains current until such a time that the replacement is confirmed. TAN15 (2004) has therefore been used to underpin the FCA. In addition, the updated FMfP mapping have been used as a further reference point for the assessment of flood risk to the Site, given that this is understood to be a more contemporary

Consultee	Consideration	How scoping response has been addressed in this Draft ES
<b>Natural Resources Wales</b>	<p><u>Site Hydrology and Hydrogeology</u> The potential impacts from a development to the hydrogeology of the site and its surrounding area should be considered within the ES. This should consider possible impacts from the construction, operation and decommissioning of the development to the hydrology and hydrogeology of the site and its surrounding area. This can affect flood risk, drainage, water quality and lead to possible pollution incidents.</p>	<p>dataset utilising the latest and improved datasets.</p> <p>An assessment of the potential impacts of the Proposed Development throughout its lifetime on the local hydrological and hydrogeological environment is provided in <b>Section 10.9</b> (Preliminary assessment of Water Environment effects).</p>
<b>Natural Resources Wales</b>	<p><u>Surface and Subsurface Water Drainage</u> The proposed development has the potential to alter the natural drainage of the area by disturbing surface and subsurface water flows. This could also have potential impacts on aquatic habitat and species as well as water resources. We consider that a hydrological features survey should form part of the ES, extending to 500 m beyond the site boundary. The report should also identify the main water courses and associated catchment or sub-catchment boundaries. The key principles of development should be to protect site hydrology, in particular through maintenance of existing surface water features and hydrological regime.</p>	<p>A hydrological features survey was undertaken within the study area (1.5km from the Site boundary) and the features identified are discussed in <b>Section 10.5</b> (Overall baseline). An assessment of the potential impacts of the Proposed Development throughout its lifetime on the local hydrological and hydrogeological features is provided in <b>Section 10.9</b> (Preliminary assessment of Water Environment effects).</p>
<b>Natural Resources Wales</b>	<p><u>Surface and Subsurface Water Drainage</u> The construction phase of the development has the greatest risk of impacts to surface and subsurface water drainage. Road and track construction; other hardstanding areas; and trench construction (including any backfill or packing of trenches) have the potential to create new preferential pathways which could interfere with the retention of flows within each catchment (or inter-catchment transfer of flow). This can result in interception and conveyance of subsurface flow to an alternative point of discharge. For example, new roads may block existing overland flow/run-off routes changing the natural drainage of an area. If this is not mitigated against then the development may result in increased surface water run-off, localised drying out, increased flood risk, pollution incidents and water</p>	<p>The principles of the surface water management for the Proposed Development during both the construction and operational phases are provided in the Draft FCA report (<b>Appendix 10A</b>). Surface water runoff from the Proposed Development site will be managed and attenuated on site, if required, using SuDS so that the risk of flooding is not increased off-site.</p> <p>An assessment of the potential impact of proposed new or modified watercourse crossings on watercourse flow conveyance is provided in <b>Section 10.9</b> (Preliminary assessment of Water Environment effects) and embedded environmental measures are set out in <b>Section 10.6</b> (Embedded Measures).</p> <p>The Proposed Development is described in <b>Chapter 4: Development Description</b>.</p>



Consultee	Consideration	How scoping response has been addressed in this Draft ES
	<p>quality issues. Ideally, road layouts should be planned so as to avoid unnecessary interception and rerouting of surface water flows through road drainage systems. Any crossings should also be minimised. Where a surface water feature, such as stream, spring or depression that would discharge storm run-off, has been identified in the route of the road, an appropriately sized culvert should be included to allow existing stream flow and storm run-off to flow unimpeded along its natural course. (Please note that consent will be required from the lead local flood authority if new surface water culverts are constructed or alterations made to existing structures or watercourses.)</p> <p>The ES should consider how the layout of the proposed development (including associated development) could impact on surface and subsurface drainage while identifying appropriate mitigation measures. The ES should include design details for and an assessment of the impact of the proposed windfarm infrastructure, both temporary and permanent, including cable routes and depths (typically 1.3m deep), access road design and layout, borrow pit depths and locations, laydown areas, foundation design for the turbines and potentially stormwater ponds required for each turbine. The need and importance of both temporary and permanent drainage controls should be discussed within the ES. The ES should assess the impact of the spatial arrangements of the design (the spatial arrangements can have a major influence on the degree to which natural drainage and shallow groundwater may be altered by the operational site including the potential effects from hundreds of metres of cable trenches and access road drainage).</p>	<p>It is noted that the Proposed Development does not include borrow pits</p>
<p><b>Natural Resources Wales</b></p>	<p><u>Surface and Subsurface Water Drainage</u> The ES also needs to assess impacts on groundwater. As such the baseline groundwater conditions/levels across the proposed development area need to be established, notably within the locales of the proposed turbines and within areas that may have shallow groundwater such as the blanket bog, wet heath and springs. (This is important because dewatering effects from the sizeable excavations</p>	<p>An assessment of the potential impact of dewatering of the excavations on local water environment receptors is provided in <b>Section 10.9</b> (Preliminary assessment of Water Environment effects) and embedded environmental measures are set out in <b>Section 10.6</b> (Embedded Measures).</p>



Consultee	Consideration	How scoping response has been addressed in this Draft ES
<b>Natural Resources Wales</b>	<p>required for the turbines may result in impacts some distance away from the excavations such as areas of blanket bog.)</p> <p><u>Peat</u> Potential damage to peatland habitats and carbon stores is a potential likely significant effect. Development on peat has the potential to damage peat through direct disturbance or indirectly through the effects of changes to site hydrology leading to drainage, during out and subsequent oxidation of peat.</p> <p>An investigation focused on groundwater and the relationship of groundwater levels to areas of peatland and wet heath, proposed turbine locations, springs and any private water supplies. The groundwater level information should be used to help inform how the numerous springs that exist both within the development site boundary but also along what appears to be a spring line along the western portion of the proposed development area. There is a potential that springs may dry out if the operational windfarm has not considered potential alterations to the natural hydrodynamics that currently support the springs. Groundwater levels should be investigated with appropriately positioned monitoring wells including proposed turbine locations through the use of dataloggers as these would drive real-time continuous data of groundwater levels across the site. A groundwater Monitoring Plan should therefore be provided within the ES.</p>	<p>An assessment of the potential impact of dewatering of the excavations on local water environment receptors including peatland is provided in <b>Section 10.9</b> (Preliminary assessment of Water Environment effects) and embedded environmental measures are set out in <b>Section 10.6</b> (Embedded Measures).</p>
<b>Rhondda Cynon Taff County Borough Council</b>	<p><u>Flood risk</u> In the addition to the comments sent to the Applicant from NRW on 28/10/21, the Councils' Flood Risk Management team advise that the site is a Greenfield area as such the key element required to satisfy TAN15 will be the sites surface water discharge rates, both pre and post catchment discharge. The applicant should note that where the site is proposed on a Greenfield a like for like discharge rate will be required to reduce the inherent surface water.</p>	<p>The Draft FCA report and supporting outline drainage strategy are provided in <b>Appendix 10A</b>. The Draft FCA identified that the main flood mechanism at the Proposed Development area is from surface water (Wind Farm development and Grid Connection) and fluvial sources (Grid Connection). Flood risk sources such as groundwater, sewer and artificial sources pose a limited risk to the Proposed Development. Where required, a Land Drainage Consent will be sought from the LPA for any works in the vicinity of watercourses.</p>

Consultee	Consideration	How scoping response has been addressed in this Draft ES
<b>Rhondda Cynon Taff County Borough Council</b>	The Coal Authority advise that areas of the site are located within the defined Development High Risk Area and therefore the site has been subject to past coal mining activity. Consequently, any ES should properly address the risks posed and access routes should be informed by the findings of appropriate site investigations, especially in relation to any site on site mine entries and their associated zones of influence.	This is assessed in <b>Chapter 11: Ground Conditions</b> .
<b>Rhondda Cynon Taff County Borough Council</b>	The applicant should be made aware of the requirement of Schedule 3 of the Flood and Water Management Act 2010, notably that the development will also be subject to the requirements of Part H of the Building Regulations and a separate SuDS application to the SAB.	The proposed outline surface water drainage strategy for the Proposed Development included in the Draft FCA ( <b>Appendix 10A</b> ) will be agreed in consultation with RCTCBC (as the SuDS Approval Body, SAB) and confirmed in the ES.
<b>Welsh Water</b>	<u>Flood risk</u> In the event this proposed development amounts to a total impermeable area of 100sqm or more, approval of SuDS features will be required in accordance with the 'Statutory standards for sustainable drainage systems - designing, constructing, operating and maintaining surface water drainage systems'. It would therefore be recommended that the developer engage in consultation with Rhondda Cynon Taff County Borough Council, as the determining SAB, in relation to their proposals for SuDS features.	A call is to be arranged with RCTCBC (the SuDS approval body). The proposed outline surface water drainage strategy for the Proposed Development is included in the Draft FCA ( <b>Appendix 10A</b> ) and will be agreed in consultation with RCTCBC (as the SuDS Approval Body, SAB) and confirmed in the ES.

## Technical engagement

- 10.3.4 Data requests were sent to NRW and RCTCBC (**Appendix 10B**) to establish the current baseline for the Proposed Development area.

## 10.4 Data gathering methodology

### Study area

- 10.4.1 The study area for the purposes of this Chapter is defined as the geographic area where direct effects of the Proposed Development on hydrology, hydrogeology and flood risk receptors may occur. The study area shown on **Figure 10.1** covers a 1.5 km buffer from the Proposed Development area boundary. Given that the construction works and proposed permanent infrastructure are unlikely to interact directly with watercourses (absence of in-channel permanent works, standoff distance from watercourses), it is considered that any potential impacts on watercourses would be negligible (and therefore scoped out) beyond 1.5km downstream of Site boundary for the Proposed Development.

The 1.5 km buffer is taken as an initial study area, which was further refined where hydraulic connectivity was not present.

## Desk study

10.4.2 A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 10.5**.

**Table 10.5 Data sources used to inform the Water Environment assessment**

Organisation	Data source	Data provided
<b>British Geological Survey (BGS)</b>	<a href="https://www.bgs.ac.uk">GeoIndex (onshore) - British Geological Survey (bgs.ac.uk)</a> <sup>52</sup> (accessed August 2022)	BGS Geoindex Onshore - Aquifer Designation
<b>Rhondda Cynon Taf County Borough Council (2013)</b>	<a href="https://www.rctcbc.gov.uk">Local Flood Risk Management Strategyv1 (rctcbc.gov.uk)</a> <sup>53</sup> (accessed August 2022)	Local Flood Risk Management Strategy
<b>British Geological Survey (BGS)</b>	<a href="https://www.bgs.ac.uk">BGS Geology Viewer - British Geological Survey</a> <sup>54</sup> (accessed August 2022)	BGS Geology Viewer
<b>Cranfield University viewer for soil classification</b>	<a href="https://www.landis.org.uk">Soilscapes soil types viewer - National Soil Resources Institute. Cranfield University (landis.org.uk)</a> <sup>55</sup> (accessed August 2022)	LandIS soilscapes
<b>Ordnance Survey (OS)</b>	Local Ordnance Survey (OS) mapping	Topography and location of springs
<b>Natural Resources Wales</b>	<a href="https://www.gov.wales">Lle - Source Protection Zones (SPZ) Merged (gov.wales)</a> <sup>56</sup> (accessed August 2022)	Geo Portal for Wales (Lle) for Source protection zones
<b>Natural Resources Wales</b>	<a href="https://www.naturalresourceswales.gov.uk">Water Watch Wales (naturalresourceswales.gov.uk)</a> <sup>57</sup> (accessed August 2022)	Water Framework Directive (WFD) Cycle 2 Rivers and water bodies for WFD water bodies and status
<b>Natural Resources Wales</b>	<a href="https://www.gov.wales">Lle - Licenced Water Abstractions (gov.wales)</a> <sup>58</sup>	Licensed Water Abstractions

<sup>52</sup> British Geological Survey. (2021). BGS GeoIndex Onshore. [Online] Available at: <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> [Accessed 11 August 2022]

<sup>53</sup> Rhondda Cynon Taf County Borough Council (2013). Local Flood Risk Management Strategy. [Online] Available at: <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/RelatedDocuments/localfloodriskmanagementstrategyv1.pdf> [Accessed 11 August 2022]

<sup>54</sup> British Geological Society. (2022). BGS Geology Viewer. [Online] Available at: <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/> [Accessed 11 August 2022]

<sup>55</sup> LandIS. (2022). Soilscapes soil types viewer - National Soil Resources Institute. Cranfield University. [Online] Available at: <http://www.landis.org.uk/soilscapes/> [Accessed 30 August 2022]

<sup>56</sup> Natural Resource Wales. (2022). Lle - Source Protection Zones (SPZ) Merged. [Online] Available at: <http://lle.gov.wales/catalogue/item/SourceProtectionZonesSPZMerged/?lang=en> [Accessed 11 August 2022]

<sup>57</sup> Natural Resource Wales. (2022). Lle - Source Protection Zones (SPZ) Merged. [Online] Available at: <https://waterwatchwales.naturalresourceswales.gov.uk/en/> [Accessed 11 August 2022]

<sup>58</sup> Natural Resource Wales. (2022). Lle – Licenced Water Abstractions. [Online] Available at: <http://lle.gov.wales/catalogue/item/LicencedWaterAbstractions> [Accessed 11 August 2022]

Organisation	Data source	Data provided
Natural Resources Wales	Natural Resources Wales / Check your flood risk by postcode <sup>59</sup> (accessed September 2022)	Flood Risk Maps

## Survey work

- 10.4.3 A water environment and flood risk walkover survey across the Wind Farm development area was undertaken by a hydrogeologist on 24 August 2022. The objective of the walkover was to visit areas identified within the desk-based review, as being of particular hydrological, hydrogeological or flood risk interest. This included any area with potential to impact the surface water environment or be at risk of flooding due to the proximity of certain construction and operational activities to watercourses and flood zones. Photographs from the site visit are provided within **Appendix 10C**.

## 10.5 Overall baseline

### Current baseline

- 10.5.1 This section provides a review of the current baseline environmental characteristics for the Proposed Development and wider study area, with particular reference to the water environment. The current baseline is described separately for the Wind Farm development (wind turbines and crane pads, access tracks, temporary construction compounds (TCCs) and substation within red line boundary), and the Grid Connection Corridor (overhead line (OHL), which lies within the red line boundary, and underground cable, which lies outside the red line boundary) which are collectively referred to as the Proposed Development (**Figure 10.1**). Key hydrological features within the Water Environment study area are identified on **Figure 10.2**.

### Land use and topography

#### *Wind Farm development*

- 10.5.2 The Wind Farm development is located on the summit (peaks at 377 m AOD) and upper slopes of the steep-sided hill of Mynydd-y-Glyn. The highest elevations are located on the northern half and towards the centre of the Proposed Development site with ground levels falling in all directions but more steeply on the western edge. The Proposed Development site boundary roughly flanks the 300 m AOD elevation contour. The Afon Rhondda Fawr valley is to the north, Nant Muchudd valley is to the southwest, and Nant Gelliwion valley is to the southeast of the Wind Farm development site (**Figure 10.2**).
- 10.5.3 Land use within the Wind Farm development almost entirely consists of improved and semi-improved grazing. There is a single plantation of deciduous woodland located towards the southern boundary. There is no other tree cover within the Site except a few stream-side trees in the southeast and scattered patches of scrub in the northeast. There is no built development within the Site, but it is traversed by an overhead electricity transmission line supported by double pole pylons. The closest built development is located to the southeast, at Langton Court Farm, and to the east at Rhiw-garn-fach and Rhiw-garn-fawr. The closest towns/villages include Porth approximately 0.6 km northwest,

<sup>59</sup> Natural Resource Wales. (2021). Check your flood risk by postcode. [Online] Available at: <https://naturalresources.wales/flooding/check-your-flood-risk-by-postcode/?lang=en> [Accessed 11 August 2022]

Tonyrefail approximately 0.9 km southwest and Pontypridd approximately 2 km east of the Wind Farm development site. The A4058 and A423 roads are located to the north and west, respectively, of the Wind Farm development site connecting Porth with Pontypridd and Tonyrefail (**Figure 10.2**).

### Grid Connection

- 10.5.4 The Grid Connection corridor is located on the south-eastern face of the Mynydd y Glyn, with the overhead line (OHL) route extending to approximately NGR ST 04359 88432 south of Cefn-Coed farm and the underground cable route extending to the WPD connection point on the western bank of Afon Taf near Upper Boat. Ground levels (from west to east) drop from about 350 m AOD to 210 m AOD within the OHL route and drop further to 50 m AOD within the underground cable route. The land use is mainly pasture and arable, with access via informal tracks and footpaths, with the eastern section of the underground cable route running along roads across the villages of Pen-y-coedcae and Church Village (**Figure 10.2**).

### Rainfall

- 10.1.1 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 (Met Office, 2016<sup>60</sup>).
- 10.1.2 Data has been provided by NRW for Dyffryn Isaf Telemetry (3.7 km from the Proposed Development), Rhiwsaeson STW Telemetry RG (6.4 km from the Proposed Development) and Nelson Telemetry RG (8.7 km from the Proposed Development) which indicate a long-term total annual rainfall of 1603.6 mm/yr (1994 - 2022), 1279.3 mm/yr (2010 - 2022) and 1394.2 mm/yr (2010 to 2022) respectively.

### Hydrology

#### Wind Farm development

- 10.5.5 The Wind Farm development site extends over three hydrological catchments, the northern part draining to the Afon Rhondda Fawr, the southern part draining to the Nant Muchudd and a small section of the access road in the west draining to Afon Elai. The Afon Rhondda Fawr joins the Afon Taf 1.3 km east of the study area whilst Nant Muchudd joins Afon Elai 3.7 km south of the study area. A number of tributaries of the Afon Rhondda Fawr and Nant Muchudd issue within the study area. The Afon Rhondda Fawr, Afon Taf and Afon Elai are classified by NRW as Main Rivers whilst their tributaries are ordinary watercourses (**Figure 10.2**).
- 10.5.6 The Afon Rhondda Fawr flows southeast within the northern edge of the study area. Six tributaries of the Afon Rhondda Fawr issue within the northern and western edges of the Wind Farm development site with additional tributaries issuing in the wider study area. One of these tributaries is Nant Gelliwion which flows to the east before joining the Afon Rhondda Fawr in Pontypridd. OS mapping shows that the Nant Gelliwion starts at the eastern end of the Wind Farm development site. During the Site walkover on the 24 August 2022, a culvert was observed where an existing footpath crosses the stream (NGR ST 04034 89207), but the watercourse was dry. This is likely due to low seasonal summer groundwater levels and low rainfall rates. Downgradient of this point was inaccessible due

<sup>60</sup> Met Office, (2016). UK Regional Climate Summaries: Wales. [Online] Available at: [https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/regional-climates/wales\\_-\\_climate---met-office.pdf](https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/regional-climates/wales_-_climate---met-office.pdf) [Accessed 30 August 2022]



to trees and fencing so it is unclear where the non-ephemeral part of the stream starts flowing.

- 10.5.7 Two tributaries of Nant Muchudd issue within the southern edge of the Proposed Development site with several additional tributaries issuing in the wider study area. One of these tributaries is Nant Castellau which flows to the south and joins Nant Muchudd approximately 2.4 km south of the study area. OS mapping shows that the Nant Muchudd issues at a disused quarry south of a housing estate at Trebanog and flows towards the southeast, crossing the location of the proposed access track to the Wind Farm development at NGR ST 01918 89597 (**Figure 10.2**). No flow was observed at the proposed crossing location during the Site walkover on 24<sup>th</sup> August 2022 (NGR ST 01911 89618).
- 10.5.8 The OS map shows five springs issuing within the southern and eastern parts of the Wind Farm development area. The southern springs drain south to the Nant Muchudd, whilst the eastern springs drain east to the Nant Gelliwion. There are numerous springs in the wider study area, including a spring line to the west of the Wind Farm development area.
- 10.5.9 There are two ponds within the Wind Farm development area, one at an elevation of 330 m AOD and a second which was recorded as dry during the Site visit on 29/04/2022 and 05/07/2022 at an elevation of around 350 m AOD. There are a further two ponds in within 500 m of the Wind Farm development area (**Figure 10.2**). The ponds are described in more detail in **Section 10.5**.

### *Grid Connection*

- 10.5.10 The Grid Connection Corridor extends over four hydrological catchments, the OHL section draining to the Nant Muchudd and the underground cable section draining (from west to east) to Afon Rhondda Fawr, Nant Clun and Afon Taf. The Afon Rhondda Fawr, Afon Taf and Nant Clun are classified by NRW as Main Rivers whilst their tributaries are ordinary watercourses (**Figure 10.2**). The OS mapping shows that tributaries of Nant Gelliwion, Nant Muchudd and Nant Ty'rarlwydd (Ordinary Watercourses) cross the proposed underground cable route.
- 10.5.11 There are no mapped ponds or springs within the Grid Connection Corridor. A number of ponds and springs are present in the wider study area.

## Geology and Soils

### *Wind Farm development*

- 10.5.12 The BGS online geology mapping indicates that there are limited superficial deposits across the Wind Farm development area. These comprise localised areas of peat in the centre and Glacial Till in the north of the Wind Farm development area. Within the wider study area, superficial deposits are mainly present in valley floors as areas of alluvium (clay, silt, sand and gravel), Glaciofluvial Deposits (sand, and gravel), River Terrace Deposits (sand, and gravel) and Glacial Till (clay). The Afon Rhondda Fawr flows over alluvium deposits, Glaciofluvial Deposits, River Terrace Deposits and Glacial Till. The Nant Muchudd and its tributaries, Nant Gelliwion and Nant Castellau flow over Glacial Till.
- 10.5.13 The regional bedrock geology is dominated by a thick sequence of Carboniferous sedimentary rocks which are preserved in and around the South Wales Coalfield Basin, a structurally complex, west-northwest-trending trough-shaped structure that extends westwards into Pembrokeshire. These Carboniferous rocks include the Carboniferous



South Wales Upper Coal Measures Formation which underlies the study area<sup>61</sup>. This is described as grey (productive) coal-bearing mudstones/siltstones with seat-earths and minor grey, quartz-rich sandstones, coals, and ironstones. There are numerous coal seams within the sequence, most of which have been worked. The South Wales Upper Coal Measures Formation beneath the Wind Farm development area comprises sandstones of the Brithdir and Rhondda Members and alternating bands of mudstone, siltstone and sandstone of the Rhonda Member. The Brithdir and Rhonda Members are described as Pennant Sandstones with thin mudstone/siltstone and seat-earth interbeds and mainly thin coals. In the wider study area, the Hughes Member (sandstone) is present to the south and the Llynfi Member (mudstone, siltstone and sandstone) is present to the west of the Proposed Development site. BGS boreholes in the centre of the Wind Farm development area describe the bedrock geology as cyclical layers of shale and coal.

- 10.5.14 The LANDIS mapping indicates that the Wind Farm development area is dominated by a very acidic loamy upland soil with a wet peaty surface. The peaty soils are associated with areas of blanket bog and marshy grassland. Surrounding this soil type and covering much of the wider study area is freely draining acid loamy soil. Soils to the south, southeast and west of the study area include a slowly permeable wet very acid upland soil with a peaty surface. Soils to the east of the study area and those associated with Afon Rhondda Fawr to the north of the study area comprise freely draining slightly acid loamy soils.
- 10.5.15 A Phase 1 peat depth survey was undertaken by Wood as is discussed in detail **Chapter 11: Ground Conditions**. The survey indicated that the Wind Farm development area is generally not underlain by peat. However, a localised peat bog is present to the west of the summit of Mynydd y Glyn with depths ranging from 2.4m bgl to a maximum surveyed depth of at least 4.10m bgl. Delineation of the identified peat/bog features within the Wind Farm development area will be completed by the end of 2022 (details in **Chapter 11: Ground Conditions**).

### Grid Connection

- 10.5.16 The OHL route is underlain by the South Wales Upper Coal Measures comprising the Brithdir Member (Pennant Sandstones with thin mudstone / siltstone and seat-earth interbeds and mainly thin coals). The underground cable route is underlain by the Brithdir Member and the Hughes Member (sandstone). There is some superficial cover, comprised of Glacial Till and alluvium at Upper Boat.
- 10.5.17 The LANDIS mapping indicates that soils in the OHL route are slowly permeable wet very acid upland soils with a peaty surface and freely draining acid loamy soils over rock. Soils in the underground cable route are slowly permeable seasonally wet acid loamy and clayey soils, freely draining acid loamy soils over rock and freely draining floodplain soils. The Phase 1 peat depth survey shows no peat along the OHL route. No peat depth survey information is available for the underground cable route.

### Hydrogeology

#### Wind Farm development

- 10.5.18 The South Wales Upper Coal Measures is classified by NRW as a Secondary A Aquifer. The superficial deposits alluvium, Glaciofluvial Deposits and River Terrace Deposits are also classified as Secondary A aquifers. Secondary A Aquifers are defined as “*permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers*”. These are generally

<sup>61</sup> NRW (2014) National Landscape Character. NLCA37. South Wales Valleys. [Online] Available at: <https://naturalresources.wales/media/682625/nlca37-south-wales-valleys-description-1.pdf> [Accessed 31 August 2022]

aquifers formerly classified as minor aquifers. The Till is classified as a Secondary Undifferentiated aquifer. This is 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. The peat deposits are classified as unproductive strata reflecting the thin peat horizon's limited overall volume.

- 10.5.19 The groundwater vulnerability of the bedrock and superficial deposits is categorised as High Vulnerability in the north and south and Medium Vulnerability in the centre, southeast and southwest of the study area.
- 10.5.20 The South Wales Upper Coal Measures underlying the study area is a designated WFD groundwater body (SE Valleys Carboniferous Coal Measures GB40902G201900) and achieved 'Good' quantitative status and 'Poor' chemical status in the 2016 WFD classification (Cycle 2).
- 10.5.21 The Proposed Development site and the wider study area are not within a source protection zone (SPZ). The closest SPZ is located approximately 10 km south-west of the Proposed Development. SPZs show the risk of contamination from any activities that might cause pollution to public drinking water supplies.

#### *Grid Connection*

- 10.5.22 The Grid Connection corridor and wider study area are underlain by the South Wales Upper Coal Measures which is a Secondary A Aquifer and WFD groundwater body (SE Valleys Carboniferous Coal Measures GB40902G201900).
- 10.5.23 The Grid Connection corridor and wider study area do not lie within a SPZ for a public water supply.

### Water Resources – Abstractions

#### *Wind Farm development*

- 10.5.24 The South East Valleys Abstraction Licensing Strategy<sup>62</sup> which encompasses the Wind Farm development area, indicates that both the Afon Elai and Nant Muchudd have water resources available at least 70% of the time and Afon Rhondda Fawr has water resources available at least 50% of the time. However, there is no water available during low flows at Afon Elai and Afon Rhondda Fawr and restricted water available during low flows at Nant Muchudd.
- 10.5.25 According to the data provided by NRW, there are no licensed groundwater and surface water abstractions within the Wind Farm development area or within the wider 1.5 km study area.
- 10.5.26 Data provided by RTCBC indicates that there are no private abstractions within the Wind Farm development area, but a number are present within the wider study area. These are shown on Figure 10.6 and details are provided in **Table 10.6**.

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<sup>62</sup> NRW (2017) South East Valleys Abstraction Licensing Strategy: A licensing strategy to manage water resources sustainably. [Online] Available at: <https://naturalresources.wales/media/683371/sev-licensing-strategy-final-nov-17.pdf> [Accessed 1 September 2022]

**Table 10.6 Private Water Abstractions within study area (Wind Farm development and Grid Connection (OHL))**

Reference	NGR	Source type	Distance from Proposed Development boundary (km)	Scoped in/Scoped out
<b>200039, 200038</b>	ST0440088600	Spring	0.03 SE	Scoped in (downslope and likely downgradient of Proposed Development)
<b>8134</b>	ST0260089500	Unknown	0.1 W/S	
<b>199353</b>	ST0470088800	Unknown	0.4 E	
<b>7431</b>	ST0240088900	Unknown	0.5 W	
<b>199339</b>	ST0250088300	Unknown	0.7 SW	
<b>200060</b>	ST0420090600	Mixed sources	0.8 NE	
<b>200268, 199370</b>	ST0370087500	Spring	1.0 S	
<b>199771</b>	ST0330087600	Spring	1.0 S	
<b>199361</b>	ST0440090700	Mixed sources	1.1 NE	
<b>199764, 199360, 199362</b>	ST0450090700	Mixed sources	1.1 NE	
<b>199769, 199366, 199357, 199368</b>	ST0460090600	Surface water	1.2 NE	
<b>146051</b>	ST0480090700	Unknown	1.4 NE	
<b>200162, 200163</b>	ST0400088000	Spring	0.4 S	
<b>7679</b>	ST0480087600	Spring	0.9 SE	
<b>6933</b>	ST0470087500	Unknown	1.0 SE	
<b>235877</b>	ST0340087600	Spring	1.0 S	
<b>7455</b>	ST0080088700	Unknown	1.1 W	
<b>199774</b>	ST0430087200	Unknown	1.2 S	
<b>200042, 200270</b>	ST0550087900	Unknown	1.2 SE	
<b>200169</b>	ST0020089900	Spring	1.4 W	

Reference	NGR	Source type	Distance from Proposed Development boundary (km)	Scoped in/Scoped out
200170	ST0020090000	Spring	1.4 W	
200180	ST0440091300	Spring	1.4 NE	

Notes: \*Source type as identified in data provided by RCTCBC

### Grid Connection

- 10.5.27 The South East Valleys Abstraction Licensing Strategy<sup>63</sup> which encompasses the Grid Connection Corridor, indicates that the Afon Taff and Afon Clun have water resources available at least 50% and 70% of the time respectively. However, there is no water available during low flows at Afon Taf and restricted water available during low flows at Afon Clun.
- 10.5.28 Data provided by NRW indicates that there are no licensed surface water or groundwater abstractions within the Grid Connection Corridor (OHL section) and wider study area. RTCBC indicated that there are no private abstractions within the Grid Connection Corridor (OHL section) but a number are present within the wider study area. These are shown on **Figure 10.7** and details are provided in **Table 10.6**. Information on licensed water abstractions and private water abstractions within the underground cable section of the Grid Connection Corridor and wider study area have been requested from NRW and RTCBC, respectively, and will be assessed for the final ES.

### Water Resources – Discharges

#### Wind Farm development

- 10.5.29 Data provided by NRW indicates there are no discharge consents within the Wind Farm development area. There are a total of 12 discharge consents to surface water within the wider 1.5 km study area, 11 of which are held by the same permit holder. The discharges are distributed across the watercourses as follows; 1 is associated with Afon Rhondda Fawr, 7 with Afon Rhondda, 2 with Afon Elai, 1 with Nant Muchudd and 1 with a tributary of Nant Cae'rgwerlais. No data was provided for consented discharge volumes. There are no licenced discharges to land within the wider 1.5 km study area.

#### Grid Connection

- 10.5.30 According to the data provided by NRW, there is one consented discharge which is located along the proposed Grid Connection route. This is located approximately 3.3 km south-east of the Proposed Development boundary at NGR ST 07490 87500 and is described as a discharge to a river, stream or ditch. There are a further 14 consented discharges within 1.5 km of the underground grid connection route, none of which are within the Wind Farm development 1.5 km boundary. One of these is described as a discharge to land and the rest are discharges to rivers, streams or ditches.

<sup>63</sup> NRW (2017) South East Valleys Abstraction Licensing Strategy: A licensing strategy to manage water resources sustainably. [Online] Available at: <https://naturalresources.wales/media/683371/sev-licensing-strategy-final-nov-17.pdf> [Accessed 1 September 2022]

## Water Quality

### Wind Farm development

- 10.5.31 As part of the WFD, River Basin Management Plans (RBMPs) have been prepared for all of the river basin districts in England and Wales. The RBMPs are designed to protect and improve the water quality of the water environment by advising on which actions should be taken to tackle water related issues. This includes measures to improve water quality in rivers, lakes, estuaries, coasts and in groundwater. The Water Environment study area is covered by the RBMP for the Severn River Basin District.
- 10.5.32 The Wind Farm development study area is located within the Severn River Basin District and within the catchments of three WFD surface water bodies: Nant Muchudd (source to confluence with Afon Elai) surface water body in the south, the Afon Rhondda Fach (confluence Afon Rhondda Fach to Afon Taf) surface water body in the north of and the Afon Elai (source to the confluence with the Nant Clun) surface water body on western edge of study area. The Afon Rhondda Fawr WFD surface water body achieved an overall classification of 'Good', whilst the Nant Muchudd WFD surface water body achieved an overall classification of 'Moderate' and the WFD surface water body Afon Elai achieved an overall classification of 'Poor' in the 2021 WFD classification (Cycle 3) (Table 10.7).

**Table 10.7 Summary of the WFD surface water body and its associated status definitions within the Water Environment study area**

WFD Water Body	Nant Muchudd (source to confluence with Afon Elai) Surface Water Body	Afon Rhondda Fawr (confluence with Afon Rhondda Fach to confluence with Afon Taf) Surface Water Body	Afon Elai (source to confluence with Nant Clun) Surface Water Body
<b>Type</b>	River	River	River
<b>Water body identifier</b>	GB109057027110	GB109057027230	GB109057027120
<b>Catchment</b>	South East Valleys	South East Valleys	South East Valleys
<b>Heavily Modified_Designation</b>	Natural	Natural	Natural
<b>Overall status</b>	Moderate	Good	Poor
<b>Ecological status</b>	Moderate	Good	Poor
<b>Chemical status</b>	High	High	High

Source: <https://waterwatchwales.naturalresourceswales.gov.uk/en/> (Accessed 31/08/22). Status definitions from 2021 WFD classification (Cycle 3).

- 10.5.33 The reasons given<sup>64</sup> for the Afon Elai and Nant Muchudd not achieving 'Good' WFD status is based upon impacts to fish, in particular salmon and trout at Afon Elai and trout at Nant Muchudd.
- 10.5.34 No groundwater quality data was available from NRW. Surface water quality data (1970-2022) was received from NRW for the Afon Rhondda, Afon Taff, Afon Elai, Nant Gwerlais

<sup>64</sup> Water Watch Wales Map Gallery. [Online] Available at: <https://waterwatchwales.naturalresourceswales.gov.uk/en/> [Accessed 31 August 2022]

and Nant Muchudd for stations located within the study area (**Appendix 10B**). Water quality is generally similar for all watercourses with average pH at each monitoring station ranging between 7.10 and 8.00, Biological Oxygen Demand (BOD) between 0.85 to 4.71 mg/l, ammoniacal nitrogen as N between 0.05 and 2.35 mg/l and chloride between 10 and 25 mg/l.

### Grid Connection

- 10.5.35 The Grid Connection Corridor extends over the catchments of four WFD surface water bodies. The OHL section crosses the Nant Muchudd (source to confluence with Afon Elai) Surface Water Body and the underground cable section crosses (from west to east) the Afon Rhondda Fawr (confluence with Afon Rhondda Fach to confluence with Afon Taf), Nant Clun (source to confluence with Afon Elai) and Afon Taf (confluence with Afon Rhondda to Castle Street) surface water bodies.
- 10.5.36 The Afon Rhondda Fawr WFD achieved an overall classification of 'Good' Nant Muchudd and Afon Taff WFD surface water bodies achieved an overall classification of 'Moderate' and the Nant Clun WFD surface water body achieved an overall classification of 'Poor' in the 2021 WFD classification (Cycle 3) (**Table 10.8**).

**Table 10.8 Summary of the WFD surface water bodies in the Grid Connection corridor**

WFD Water Body	Afon Rhondda Fawr (confluence with Afon Rhondda Fach to confluence with Afon Taf) Surface Water Body	Nant Muchudd (source to confluence with Afon Elai) Surface Water Body	Nant Clun (source to confluence with Afon Elai) Surface Water Body	Afon Taff (confluence with Afon Rhondda to Castle Street) Surface Water Body
<b>Type</b>	River	River	River	River
<b>Water body identifier</b>	GB109057027230	GB109057027110	GB109057027100	GB109057027270
<b>Catchment</b>	South East Valleys	South East Valleys	South East Valleys	South East Valleys
<b>Heavily Modified Designation</b>	Natural	Natural	Natural	Heavily Modified
<b>Overall status</b>	Good	Moderate	Poor	Moderate
<b>Ecological status</b>	Good	Moderate	Poor	Moderate
<b>Chemical status</b>	High	High	High	Moderate

Source: <https://waterwatchwales.naturalresourceswales.gov.uk/en/> (Accessed 31/08/22). Status definitions from 2021 WFD classification (Cycle 3).



## Flood Risk

### Terminology

- 10.5.37 In this report, the probability of a flood occurring is expressed in terms of Annual Exceedance Probability (AEP), which is the reciprocal 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.
- 10.5.38 **Table 10.9** is provided to clarify the use of the AEP terminology as well as a description of the flood band definitions as used by the NRW in the Flood Map for Planning (FMfP), and the Welsh Flood Zones set out in the Welsh Assembly Government's Technical Advice Note 15 (TAN-15) Development Advice Map (DAM) and associated guidance.

**Table 10.9 Flood Zone definitions and associated annual exceedance probability**

WAG TAN-15 DAM Flood Zone	NRW Flood Zones	Probability of flooding	AEP	Definition
<b>Flood risk from rivers and the sea</b>				
Flood Zone A	Flood Zone 1	Low Probability	<0.1% AEP of river or sea flooding	Land with less than 1 in 1,000 probability of flooding from rivers or the sea, in any given year
Flood Zone C1 (developed and served by significant flood defences) / Flood Zone C2 (no significant flood defences)	Flood Zone 2	Medium Probability	1% - 0.1% AEP of river flooding 0.5% – 0.1% AEP of sea flooding	Land with between a 1 in 100 and 1 in 1,000 of river flooding; or land having between a 1 in 200 and 1 in 1,000 probability of sea flooding
Flood Zone B	N/A	N/A	N/A	Geological indicators of flooding
N/A	Flood Zone 3	High Probability	>1% AEP of river flooding >0.5% AEP of sea flooding	Land having a 1 in 100 or greater probability of river flooding in any year; or Land having a 1 in 200 probability or greater of sea flooding in any year.
<b>Flood risk from surface water and small watercourses</b>				
N/A	N/A	Very low risk	Less than 0.1% AEP of flooding	Land with less than 1 in 1,000 probability of surface water flooding in any year.
N/A	N/A	Low risk	Between 1% and 0.1% AEP of flooding	Land with between a 1 in 100 and 1 in 1,000 probability of surface water flooding in any year.
N/A	N/A	Medium risk	Between 3.3% and 1% AEP of flooding	Land having a probability of river flooding of between 1 in 30 and 1 in 100 in any year;

WAG TAN-15 DAM Flood Zone	NRW Flood Zones	Probability of flooding	AEP	Definition
N/A	N/A	High risk	>3.3% AEP of flooding	Land having a 1 in 30 or greater probability of surface water flooding in any year.
<b>Groundwater flood risk</b>				
N/A	N/A	N/A	N/A	Flood risk bands assessed by professional judgement, in the absence of criteria set by NRW.
<b>Sewer flood risk</b>				
N/A	N/A	N/A	N/A	Flood risk bands assessed by professional judgement, in the absence of criteria set by NRW.
<b>Artificial flood risk</b>				
N/A	N/A	N/A	N/A	Flood risk assessed on the basis of flood extent shown on NRW Flood Risk from Reservoir Map.

### Fluvial and Tidal Flood Risk

#### Wind Farm development

- 10.1.3 The Wind Farm development site lies entirely within an area of very low risk of fluvial flooding (Flood Zone 1 in the FmfP, **Figure 10.3**, and Flood Zone A in the DAM, **Figure 10.4**) owing to its location on an elevated summit (Mynydd y Glyn). This indicates that the Wind Farm development area is at negligible risk of fluvial flooding.
- 10.1.4 The Wind Farm development site is not at risk of tidal flooding on account of the elevation above sea level (210 to 350 m AOD) and distance from the coast.

#### Grid Connection

- 10.1.5 The Grid Connection Corridor lies predominantly within an area of very low risk of fluvial flooding (Flood Zone 1 in the FMfP, **Figure 10.3**, and Flood Zone A in the DAM, **Figure 10.4**). However, a small section of the Grid Connection (underground cable) near the WPD connection point intersects areas of medium to higher risk at Upper Boat (Flood Zones 2 and 3 in the FMfP, **Figure 10.3**, and Flood Zones B and C1 in the DAM, **Figure 10.4**) associated with the Afon Taf. Flood defences are present along the Afon Taf but are mapped as discontinuous in the area of the WPD connection point. The associated flood model for the Afon Taf was requested from NRW and will be used in the assessment for the final ES.
- 10.1.6 The Grid Connection Corridor is not at risk of tidal flooding on account of the elevation above sea level (210 to 50 m AOD) and distance from the coast.

## Surface Water Flood Risk

- 10.5.39 Surface water flooding occurs when the intensity of rainfall is greater than the local drainage and infiltration capacity, causing water to flow overland. Where low-points or barriers to flow are present, particularly deep areas of flooding may occur. These areas are not limited to river corridors or floodplains.

### Surface water run-on

- 10.5.40 The Flood Risk Assessment Wales map – Flood risk from Surface Water and Small Watercourses (FRfSWSW) (**Figure 10.5**) gives an indication of the broad areas likely to be at risk of surface water flooding at present, i.e. areas where surface water would be expected to flow or pond. It defines areas at very low (less than 0.1% AEP), low (between 0.1% and 1% AEP), medium (between 1% and 3.3% AEP) and high (greater than 3.3% AEP) probability of surface water flooding. The mapping shows that most of the Proposed Development area is at very low risk of flooding from this source, reflective of the general topography of the area and locality across a ridge summit. However, there are several regions of mapped higher risk, discussed further in the subsections below.
- 10.5.41 The mapping shows a surface water flow pathway of low to medium flood risk starting at approximately 370 m AOD in the east of the Wind Farm development area and draining east towards Nant Gelliwion. This surface water flow pathway crosses the proposed access track between Turbines 4 and 5 (**Figure 10.5**). The closest areas of high flood risk are associated with the Afon Ebwy 0.15 km to the west of the Grid Connection corridor and the Afon Ebwy Fach 0.25 km to the east of the Wind Farm development.

### Wind Farm Development

- 10.5.42 The FRfSWSW has been used to further inform the flood risk associated with minor watercourses and tributaries for Nant Muchudd in the south and west, Nant Gelliwion in the east and Afon Rhonda Fawr in the north as these smaller watercourses are not included within the FRfR and DAM mapping. The mapping indicates narrow bands of low to high risk (>3.3% AEP) through the Wind Farm development area, coincident with these watercourses centrelines. The proposed access tracks cross surface water flow pathways associated with tributary Nant Muchudd (2 crossings) to the west and with Nant Gelliwion (3 crossings) to the east of the Wind Farm development area (**Figure 10.5**).
- 10.5.43 Some narrow regions of Low (0.1 to 1% AEP) flood risk are also mapped in depressions within the Wind Farm development area but these do not intersect proposed development elements.

### Grid Connection corridor

- 10.5.44 The FRfSWSW indicates that the Grid Connection Corridor crosses narrow bands of low to high risk (>3.3% AEP), coincident with the centrelines associated with minor watercourses. The OHL route crosses the tributaries of the Nant Muchudd (2 crossings) to the south whilst the underground cable crosses tributaries of the Nant Gelliwion (2 crossings) to the north and Nant Ty'rarlwydd and Nant Dowlais (4 crossings) to the south (**Figure 10.5**).
- 10.5.45 Some narrow regions of Low (0.1 to 1% AEP) flood risk are also mapped in depressions in the wider area but these do not intersect the Grid Connection Corridor (**Figure 10.5**).

### Groundwater Flood Risk

- 10.5.46 Groundwater flooding occurs as a result of water issuing to the surface from the underlying aquifers. This tends to occur after long periods of sustained high rainfall, with areas most at risk being situated on permeable geology and low-lying compared to the local water table.
- 10.5.47 Rhondda Cynon Taf County Borough Council Local Flood Risk Management Strategy (2013)<sup>65</sup> states there is little documented evidence of groundwater flooding within the borough area.
- 10.5.48 The Wind Farm development area and Grid Connection corridor have limited superficial cover (comprised of localised areas of peat in the centre and Glacial Till). Local BGS boreholes show that the underlying bedrock (Carboniferous South Wales Upper Coal Measures Formation) consist of a cyclical sequence of sandstone, mudstone, siltstone and coal seam layers. The Carboniferous South Wales Upper Coal Measures Formation is classified as a Secondary A aquifer.
- 10.5.49 The potential for encountering groundwater during excavations is considered to be limited (**Chapter 11: Ground Conditions**). Where groundwater may be encountered, it is likely to be perched and in small quantities. This is due to the Proposed Development area being at a topographic high and the underlying geology comprising bands of both higher and lower permeability bedrock layers. This is also consistent with the EA Areas Susceptible to Groundwater Flooding Map<sup>66</sup> which shows that the risk of groundwater flooding in the Proposed Development area is less than 25%.

### Sewer Flood Risk

- 10.5.50 Most of the Proposed Development is situated away from developed areas and it is anticipated that there are few sewer drainage networks in the Proposed Development area within which water levels could feasibly rise to an extent that would result in flooding of the Site. Any flows surcharging from minor sewer systems associated with nearby farm buildings would be expected to be minimal/intercepted by the local watercourses. A small section of the Grid Connection (underground cable) follows an unnamed road across Church Village which joins the B4595. Whilst sewer flooding could occur in this area, any water that surcharged would drain to nearby more low lying areas to the southeast.
- 10.5.51 On this basis, owing to the lack of source, the risk of sewer flooding in the area is considered to be low and is not considered further in this assessment.

### Artificial Flood Risk

#### Wind Farm development

- 10.5.52 The NRW Reservoir Flood Risk Map (**Figure 10.6**) shows that the Proposed Development is not located within an area of reservoir flood risk. In the wider area, flooding from artificial sources is predicted along the Afon Rhoda Fawr and Afon Taf associated with breach/failure of reservoirs to the north of the Proposed Development. No raised bodies of water are proposed as part of the development.

<sup>65</sup> The Rhondda Cynon Taf County Borough Council (RCTCBC) Flood Risk Management Strategy [Online] Available at: <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/RelatedDocuments/localfloodriskmanagementstrategyv1.pdf> [Accessed 15 September 2022]

<sup>66</sup> Provided as Figure 6 in Rhondda Cynon Taf County Borough Council (2013) Local Flood Risk Management Strategy [Online] Available at: <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx> [Accessed 14 September 2022]

- 10.5.53 Owing to the lack of source, the risk of artificial flooding in the Wind Farm development area is considered to be low and is not considered further in this assessment.

#### Grid Connection

- 10.5.54 The NRW Reservoir Flood Risk Map (**Figure 10.6**) shows that the Grid Connection Corridor is not located within an area of reservoir flood risk, except for a small section of underground cable near the WPD connection point at Upper Boat which is within the reservoir flood extent along the Afon Taf associated with breach/failure of reservoirs to the north of the Proposed Development. No raised bodies of water are proposed as part of the development.

#### Biodiversity sites

- 10.5.55 A number of designated sites for biodiversity conservation have been identified within the study area of the Wind Farm development and Grid Connection (OHL) in **Chapter 8: Biodiversity**. These include two statutory designated sites (Rhos Tonyrefail SSSI and Nant Gelliwion Woodland SSSI) and several non-statutory designated sites (SINCs). It is noted that there are two additional statutory designated sites outside of the Water Environment study area that are within 10 km of the Wind Farm development. These sites have no water components and therefore are scoped out of the assessment.
- 10.5.56 A description of the SINCs which have a water component, and therefore could potentially be impacted by the Proposed Development is provided in **Table 10.10**, where information is available. Additional information on the conservation sites will be collected through further consultation with stakeholders during the next stages of the EIA in order to confirm the sites which are considered to be water-dependant and therefore likely to be affected by the Proposed Development.

**Table 10.10 Summary of water-dependent nature conservation sites with potential hydrological connectivity to the Proposed Development within study area**

Site	Ecological interest	OS Grid Reference	Distance (km) from Proposed Development boundary	Hydrological/hydrogeological connectivity
<b>Statutory nature conservation sites within study area of Wind farm development and Grid connection (OHL and underground cable)</b>				
<b>Rhos Tonyrefail SSSI</b>	Marshy grassland, acid flush, species-rich neutral grassland, acid grassland, wet heath and blanket mire.	ST 02102 88240	0.2km S Adjacent to Wind Farm development (western access road)	Located along tributaries of the Nant Muchudd, which is downslope of the Proposed Wind Farm Development. Therefore, there are potential impacts to the SSSI if the watercourse is impacted by the development. <b>Scoped in to the assessment.</b>
<b>Nant Gelliwion Woodland SSSI</b>	Occupies a small tributary valley of the Rhondda which flows over Pennant Sandstone and	ST 05832 88604	1.1km SE	Located along the Nant Gelliwion, downstream of the Proposed Development. Therefore, there are potential impacts to the SSSI if the watercourse is impacted by the

Site	Ecological interest	OS Grid Reference	Distance (km) from Proposed Development boundary	Hydrological/hydrogeological connectivity
	superficial deposits of boulder clay. The mixed deciduous woodland is dominated by stands of sessile oak which occur with a scattering of beech on the free-drainage valley slopes.			development. <b>Scoped in to the assessment.</b>
<b>Non-statutory nature conservation sites within study area of Wind Farm Development and Grid Connection (OHL)*</b>				
<b>Mynydd y Glyn SINC</b>	Area of upland peat bog.	ST 03154 89224	Within the proposed Wind Farm development boundary	In proximity of proposed wind turbines 1, 3, 6 and 7. Therefore, there are potential impacts to the SINC. <b>Scoped in to the assessment.</b>
<b>Mynydd Gelliwion and Gellwion Slopes SINC</b>	Bog mosaic SINC of forestry plantation, ffridd marshy and acid grassland, woodlands, ponds and colliery spoil.	ST 05197 89798	Partly within the proposed Wind Farm development boundary	The site is downslope of the Proposed Development therefore has the potential to be impacted by changes to the hydrological regime as a result of the development. <b>Scoped in to the assessment.</b>
<b>Trebanog Slopes SINC</b>	Very large hillside mosaic site with ffridd, marshy grassland, acid grassland and heath and colliery spoil.	ST 02780 90410	Within the proposed Wind Farm development boundary	Located on northern slope of Mynydd y Glyn, towards Trebanog. The site is downslope of the Proposed Development therefore has the potential to be impacted by changes to the hydrological regime as a result of the development. <b>Scoped in to the assessment.</b>
<b>Nant Gelliwion /Waun Castellau SINC</b>	A network of wet woodland and marshy grassland habitats.	ST 04848 88562	0.010km SE	Located along a tributary of the Nant Gelliwion, downstream of the proposed Wind Farm development. Therefore, there are potential impacts to the SINC if the watercourse is impacted by the development. <b>Scoped in to the assessment.</b>
<b>Tonyrefail East SINC</b>	A wooded valley with marshy grassland and	ST 02098 87989	0.4km SW	Located along the Nant Muchudd, which is downslope of the Proposed Development. Therefore, there are potential



Site	Ecological interest	OS Grid Reference	Distance (km) from Proposed Development boundary	Hydrological/hydrogeological connectivity
	neutral grasslands.			impacts to the SINC if the watercourse is impacted by the development. <b>Scoped in to the assessment.</b>
<b>Coed Castellau SINC</b>	A fast-flowing stream and the large ancient woodland of Coed Castellau	ST 05231 87322	0.519km SE	Located along the Nant Castellau and, within 200 m downslope of the Grid Connection. Therefore, there are potential impacts to the SINC if the watercourse is impacted by the development.
<b>The Glyn SINC</b>	A wooded valley and associated marshy grassland, which lies along the eastern edge of part of the Rhos Tonyrefail SSSI.	ST 02311 88801	0.6km SW	Located along the Nant Muchudd, which is downslope of the Proposed Development. Therefore, there are potential impacts to the SINC if the watercourse is impacted by the development. <b>Scoped in to the assessment.</b>

Notes: Details of non-statutory nature conservation sites within study area of the Grid Connection (underground cable) will be obtained and assessed in the final submission of the ES.

## Future baseline

10.5.57 Water Environment 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.

## 10.6 Embedded measures

10.6.1 A range of environmental measures have been embedded into the Proposed Development as outlined in **Section 10.4. Table 10.12** outlines how these embedded measures will influence the Water Environment assessment.

**Table 10.11 Summary of the embedded environmental measures**

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
<b>Construction</b>			
<b>Aquatic environment receptors</b> Watercourses (Nant Gelliwion), WFD surface water bodies (Nant Muchudd, Afon Rhondda Fawr and Afon Elai) and their tributaries), ponds and SINC	Temporary increase in sediment-loading of surface water runoff from construction areas leading to deterioration in the surface water quality environment, deterioration in the status of WFD surface water bodies and deterioration in the conditions supporting local conservation sites	<u>ID1 - Good working practices</u> Good working practices will be implemented during construction, with adherence to the Construction Environmental Management Plan (CEMP), which will be secured through a planning consent requirement, and relevant guidance. A monitoring schedule will be implemented by the contractor to ensure that the measures taken to protect the water environment are effective.	CEMP
		<u>ID2- Water Management Plan (WMP)</u> 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 these works. 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.	CEMP
		<u>ID3 – Water discharges</u> Further investigation of the viability of infiltration as a means by which surface water runoff could be discharged to ground will be undertaken through liaison with RCTCBC and by undertaking soakaway testing exercise. In the case that the soakaway testing concludes that infiltration is not solely sufficient in managing runoff, and discharge to the watercourses is required, this will be subject to a Consent from the NRW and RCTCBC and dewatering would be suspended if a flood alert or flood warning is in place downstream (and the on-site discharges could feasibly contribute to the flood event). Any groundwater dewatered from excavations (e.g., excavations associated with turbine foundation, OHL wooden poles and underground cables linking the turbines to the substation) will be discharged to adjacent ground, away from	CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		<p>watercourses as far as possible. If infiltration is not possible, and discharge to the watercourses is required, this will be subject to a Consent from the NRW and RCTCBC and dewatering would be suspended if a flood alert or flood warning is in place downstream (and the on-site discharges could feasibly contribute to the flood event).</p> <p>Any discharge to surface water would be restricted to the greenfield runoff rate and will be treated in a suitable basin/trench before discharging.</p> <p><u>ID4 - Materials Management Plan</u> Excavated materials during construction works should be segregated and stored/ re-used on-site in accordance with a Materials Management Plan (in compliance with the CL:AIRE Definition of Waste: Code of Practice). Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate / runoff drainage to prevent migration of contaminants from the stockpile. Materials will be segregated where possible to prevent cross-contamination occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the Materials Management Plan.</p> <p><u>ID5 – Soil stockpiles</u> Stockpiles will be appropriately maintained and have the minimum lifespan possible, with materials being reinstated as construction works progress. Where these remain in situ for 3 months or longer, seeding management techniques will be used.</p>	CEMP
<b>Aquatic environment receptors</b>	Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	See measures <u>ID1 (Good working practices)</u> , <u>ID2 (WMP)</u> , <u>ID3 (Water discharges)</u> , <u>ID5 (Materials Management Plan)</u> and <u>ID5 (Soil stockpiles)</u>	CEMP
Watercourses (Nant Gelliwion), WFD surface water bodies (Nant Muchudd, Afon Rhondda Fawr and Afon Elai) and their tributaries), ponds and SINC		<p><u>ID6 - Standoff distance</u> No works will be undertaken within 20 m of any watercourse (other than for watercourse crossings and drainage mitigation).</p> <p><u>ID7 - Watercourse crossings</u></p>	CEMP
			CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		<p>If watercourse crossings are required to enable access over any watercourses, these would be appropriately sized to maintain existing flow conveyance.</p> <p><u>ID8 - Underground cables</u> The underground cables linking the turbines to the substation will be constructed in discrete sections with the reinstatement process commenced in as short a timeframe as practicable.</p>	CEMP
<b>Aquatic environment receptors</b> Watercourses (Nant Gelliwion), WFD surface water bodies (Nant Muchudd, Afon Rhondda Fawr and Afon Elai) and their tributaries), ponds, springs, SE Valleys Carboniferous Coal Measures and SINCS	Accidental release of pollution into surface water or ground by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites.	<p>See measures <u>ID1 (Good working practices)</u>, <u>ID2 (WMP)</u>, <u>ID3 (Water discharges)</u> and <u>ID4 (Materials Management Plan)</u></p>	CEMP
		<p><u>ID9 – Fuel, oil and chemicals storage (construction phase)</u> Areas of construction compounds that are used for fuel storage, plant maintenance and refuelling will be surfaced with fully impermeable materials to prevent any infiltration of contaminated runoff and contain bunding. An effective accident response protocol will be developed to ensure any spillages or potential pollution incidents are dealt with appropriately including the provision of containment for spills of contaminated liquids. Plant and machinery will be maintained to minimise the risks of oil leaks or similar. Any tanks containing oils, fuels and chemicals will be double skinned. There will be a bunded capacity of 100% of the maximum tank volume for non-hazardous fluids. For fuels or oils the bund capacity will be the larger of 110% of the largest tank volume for single tank bunds, (or, in the case of multi tank bunds, 110% of the largest tank capacity or 25% of the combined tank capacity, whichever is the largest). Fuel storage will be in accordance with Pollution Prevention Guidelines (PPGs). All stores of fuel will be located at least 20m from any watercourses and away from areas at risk of flooding.</p>	CEMP
<b>Aquatic environment receptors</b> Watercourses (Nant Gelliwion), WFD surface water bodies (Nant Muchudd, Afon Rhondda Fawr and Afon	Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water	<p>See measures <u>ID1 (Good working practices)</u>, <u>ID2 (WMP)</u>, <u>ID3 (Water discharges)</u> and <u>ID4 (Materials Management Plan)</u></p>	CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Elai) and their tributaries), ponds, springs, SE Valleys Carboniferous Coal Measures and SINCs	runoff) into surface water or groundwater leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites		
<b>Water resources receptors</b> Private and licensed water abstractions	Potential change to water quality of a water supply resource which may affect the viability of an abstraction	See measures <a href="#">ID1 (Good working practices)</a> , <a href="#">ID2 (WMP)</a> , <a href="#">ID3 (Water discharges)</a> , <a href="#">ID4 (Fuel/oil/chemicals storage)</a> and <a href="#">ID5 (Materials Management Plan)</a>	CEMP
<b>Flood risk receptors</b> People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Porth (north), Trebanog (west) and Trehafod (north).	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., temporary construction compound (TCC), access tracks, crane pads)	See measures <a href="#">ID4 (WMP)</a> and <a href="#">ID5 (Water discharges)</a> .	CEMP
<b>Flood risk receptors</b> People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area	Changes to watercourse flow conveyance as a result of new or modified temporary watercourse crossings (e.g., culvert or bridge).	See measure <a href="#">ID7 (Temporary watercourse crossings)</a>  <a href="#">ID10 - Crossing of surface water flow paths</a> Where the proposed access tracks cross mapped surface water flow paths, a pipe culvert will be provided beneath the access track to convey flows from existing drainage pathways. The design of the pipe culvert will be confirmed as	CEMP  CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
including properties at Porth (north), Trebanog (west) and Trehafod (north).		part of the detailed drainage design with the Lead Local Flood Authority (LLFA). Where the proposed underground cable crosses mapped surface water flow paths, each crossing will be individually reviewed / surveyed during detailed design (which will occur subsequent to gaining relevant consents) to confirm the crossing methodology employed. It is anticipated that open cut crossing methodology will predominantly be used. Crossings will be subject to a Land Drainage Consent from RCTCBC.	
<b>Operation</b>			
<b>Aquatic environment receptors</b> Watercourses (Nant Gelliwion), WFD surface water bodies (Nant Muchudd, Afon Rhondda Fawr and Afon Elai) and their tributaries), ponds, springs, SE Valleys Carboniferous Coal Measures and SINCs	Accidental spillage of pollutants (fuel or oil) during maintenance activities leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites.	See measure <a href="#">ID3 (Water discharges)</a>  <a href="#">ID11 – Detailed drainage design</a> Detailed drainage design for the operational wind farm development, utilising SuDS principles, including attenuation storage where necessary, to ensure sufficient capacity is available onsite to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. The detailed design will be prepared in accordance with the Drainage Strategy for the operational wind farm development, which will accompany the ES.  <a href="#">ID12 – Fuel, oil and chemicals usage (operational phase)</a> Following the construction phase there will be no requirement for fuel, oil or chemicals to be stored on site, however, small quantities of fuel/oil/chemicals may need to be brought onto site for maintenance activities. In these cases, only the minimum quantities possible should be brought on to site and must be removed from site following completion of works, The fuel/oil/chemicals must be kept in the appropriate containers and sealed when not used for refuelling. An effective accident response protocol will be developed to ensure any spillages or potential pollution incidents are dealt with appropriately including the provision of containment for spills of contaminated liquids. Plant and machinery will be maintained to minimise the risks of oil leaks or similar.	DNS planning condition  DNS planning condition  DNS planning condition



Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
<b>Water resources receptors</b> private and licensed water abstractions	Potential change to water quality of a water supply resource which may affect the viability of an abstraction	See measures <a href="#">ID3 (Water discharges)</a> , <a href="#">ID11 (Detailed Drainage Design)</a> and <a href="#">ID12 (Fuel/oil/chemicals storage (operational phase))</a>	DNS planning condition
<b>Flood risk receptors</b> People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Porth (north), Trebanog (west) and Trehafod (north)).	Changes to surface water flood risk due to changes in runoff rates resulting creation of impermeable surfaces (e.g., substation, access tracks, crane pads)	See measures <a href="#">ID3 (Water discharges)</a> and <a href="#">ID11 (Detailed Drainage Design)</a>	DNS planning condition
<b>Flood risk receptors</b> People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Porth (north), Trebanog (west) and Trehafod (north)).	Changes to watercourse flow conveyance as a result of new or modified temporary watercourse crossings (e.g., culvert or bridge).	See measures <a href="#">ID7 - Watercourse crossings</a> and <a href="#">ID10 (Crossing of surface water flow paths)</a>	DNS planning condition

## 10.7 Scope of the assessment

- 10.7.1 This section sets out the scope of the assessment for the Water Environment, including flood risk and WFD. This scope is based upon a review of the baseline information detailed in **Section 10.5** and in response to engagement to date as set out in **Section 10.3**.

### The Proposed Development

- 10.7.2 All the activities and consequent environmental changes for the Water Environment associated with the construction, operation and decommissioning of the Proposed Development, as set out in **Chapter 4: Description of the Proposed Development** have been considered.

### Spatial scope

- 10.7.3 The spatial scope of the assessment of Water Environment covers the area of the Proposed Development contained within the red line boundary, together with the Zones of Influence (Zols) that have formed the basis of the study area described in **Section 10.4**.
- 10.7.4 The Water Environment study area was defined as a 1.5 km buffer around the Proposed Development boundary. Where applicable, this was further refined where hydraulic connectivity was not present (for example areas upslope of the Proposed Development were scoped out). The spatial scope for the flood risk receptors includes people, property and infrastructure which would be at risk should flooding be influenced by the Proposed Development. Within this Water Environment chapter, only the potential effects to third party receptors are considered. The Draft Flood Consequence Assessment (FCA) (**Appendix 10A**) assesses aspects of the development itself, in addition to third party receptors, in regard to increased flood risk.

### Temporal scope

- 10.7.5 The temporal scope of the hydrology assessment is aligned with the period over which the Proposed Development will be carried out, as defined in **Chapter 3: Need, alternatives and iterative design**; inclusive of the construction, operational and decommissioning phases, as detailed below.
- 10.7.6 This will be achieved by considering the NPS EN-1 climate change emission scenarios appropriate for the Proposed Development's lifetime. The assessment has taken into account potential impacts on current and future water quality and hydromorphology using approaches consistent with the WFD.
- 10.7.7 The proposed Wind Farm development will be designed with an operational life of 30 years. At the end of this period the Applicant has three options; to decommission the wind farm and dismantle and remove the turbines; to apply for an extension to the operating period using existing equipment; or apply to install new equipment on the Site. For the purposes of this assessment, it is assumed that the wind farm will be decommissioned.

### Potential receptors

- 10.1.7 Three types of Water Environment receptors have been identified with respect to the hydrology assessment:
- aquatic environment receptors;

- water resources receptors; and
- flood risk receptors (people, property, and infrastructure at risk of flooding).

10.7.8 The principal Water Environment receptors that have been identified as being potentially subject to effects are summarised in **Table 10.12**. The location of these receptors is shown in **Figure 10.7**.

**Table 10.12 Water Environment receptors subject to potential effects**

Receptor		Reason for consideration
<b>Aquatic environment receptors – watercourses</b>		
Nant Gelliwion (tributary of Afon Rhondda Fawr)	WC1	Ordinary Watercourse which issues east of the Wind Farm development area and flows to the east. Discharges into Afon Rhondda Fawr. Not designated as WFD surface water body. Potential for impacts on water quality, hydromorphology and flow conveyance of this watercourse.
Afon Rhondda Fawr and tributaries	WC2	Main River and WFD surface water body with overall ‘Good’ status, flowing north of the Proposed Development area. The tributaries of Afon Rhondda Fawr are Ordinary Watercourses and not designated as WFD surface water bodies. Potential for impacts on water quality, WFD status, hydromorphology and flow conveyance of these watercourses.
Nant Muchudd and tributaries	WC3	Main River and WFD surface water body with overall ‘Moderate’ status which flows southwest of the Wind Farm development area and joins Afon Elai to the south. The tributaries of Nant Muchudd are Ordinary Watercourses and not designated as WFD surface water bodies. Potential for impacts on water quality, WFD status, hydromorphology and flow conveyance of these watercourses.
Afon Elai and tributaries	WC4	Main River and WFD surface water body with overall ‘Poor’ status, which flows west of the Proposed Development area. The tributaries of Afon Elai are Ordinary Watercourses and not designated as WFD surface water bodies. Potential for impacts on water quality, WFD status, hydromorphology and flow conveyance of these watercourses.
Afon Taf and tributaries	WC5	Main River and WFD surface water body with overall ‘Moderate’ status, which flows east of the Proposed Development area. The tributaries of Afon Taf are Ordinary Watercourses and not designated as WFD surface water bodies. Potential for impacts on water quality, WFD status, hydromorphology and flow conveyance of these watercourses.
Nant Myddlyn and Nant Ty’rarfwydd (tributaries of Afon Clun)	WC6	Nant Myddlyn is a Main River whilst Nant Ty’rarfwydd is an Ordinary Watercourse. Both watercourses are not designated as WFD surface water bodies and flow south into Afon Clun (Main River and WFD surface water body). Potential for impacts on water quality, hydromorphology and flow conveyance of these watercourses.
Nant Dowlais (tributary of Afon Clun)	WC7	Main River and not designated as WFD surface water body. This watercourse flows south into Afon Clun (Main River and WFD surface water body). Potential for impacts on water quality, hydromorphology and flow conveyance of this watercourse.

Receptor		Reason for consideration
Nant Castellau (tributary Nant Muchudd)	WC8	Ordinary Watercourse which flows to the south of the Proposed Development area. Not designated as WFD surface water body. Discharges into Nant Muchudd (Main River and WFD surface water body). Potential for impacts on water quality, hydromorphology and flow conveyance of this watercourse.
Unnamed watercourse (tributary Nant Muchudd)	WC9	Ordinary Watercourse which flows to the south of the Proposed Development area. Not designated as WFD surface water body. Discharges into Nant Muchudd (Main River and WFD surface water body). Potential for impacts on water quality, hydromorphology and flow conveyance of this watercourse.
<b>Aquatic environment receptors - Aquifers</b>		
SE Valleys Carboniferous Coal Measures WFD Groundwater body	AQ1	WFD groundwater body. Potential for impacts on WFD status as a result of changes to water quality.
<b>Aquatic environment receptors – Ponds</b>		
Pond	P1	Within Wind Farm development area
Pond	P2	Within Wind Farm development area
Pond	P3	Within Wind Farm development area
Pond	P4	Within Wind Farm development area
Various ponds	-	Between 500 m of Wind Farm development boundary and study area boundary
<b>Aquatic environment receptors – Springs</b>		Eight springs within the Proposed Development area. Potential for impacts on water quality of the springs.
<b>Aquatic environment receptors – Statutory nature conservation sites</b>		
Nant Gelliwion Woodland SSSI	SC1	Nationally designated site approximately 1.1 km south-east of the Proposed Development area which supports water dependent habitats and species.
Rhos Tonurefail SSSI	SC2	Nationally designated site adjacent to Wind Farm development area (access road) which supports water dependent habitats and species.
<b>Aquatic environment receptors – Non-statutory nature conservation sites*</b>		
Mynydd y Glyn SINC	C1	Locally designated sites within the study area which support water dependent habitats and species.
Mynydd Gelliwion and Gellwion Slopes SINC	C2	
Trebanog Slopes SINC	C3	
Nant Gelliwion /Waun Castellau SINC	C4	

Receptor		Reason for consideration
Coed Castellau SINC	C5	
Tonyrefail East SINC	C6	
The Glyn SINC	C7	
<b>Water resource receptors**</b>		
Potential increase in pressures on local water resources due to changes to water quality and quantity.		
Private water supply, spring, ref 200039, 200038	WR1	Located approximately 30 m from south-eastern boundary of the Wind Farm development (downslope of and likely downgradient)..
Private water supply, unknown source, ref 8134	WR2	Located approximately 0.1 km from western boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, unknown source, ref 199353	WR3	Located approximately 0.4 km from south-eastern boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, unknown source, ref 7431	WR4	Located approximately 0.5 km from western boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, unknown source, ref 199339	WR5	Located approximately 0.7 km* from south-western boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, mixed source, ref 200060	WR6	Located approximately 0.8 km from north-eastern boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, spring, ref 200268, 199370	WR7	Located approximately 1 km from southern boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, spring, ref 199771	WR8	Located approximately 1 km from southern boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, mixed source, ref 199361	WR9	Located approximately 1.1 km from north-east boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, mixed source, ref 199764, 199360, 199362	WR10	Located approximately 1.1 km from north-east boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, surface water, ref 199769, 199366, 199357, 199368	WR11	Located approximately 1.2 km from north-east boundary of the Wind Farm development (downslope of and likely downgradient).
Private water supply, unknown source, ref 146051	WR12	Located approximately 1.4 km from north-east boundary of the Wind Farm development (downslope of and likely downgradient).

### Flood Risk receptors

(Potential for increased flood risk due to changes in surface water runoff rates and volumes).

Receptor		Reason for consideration
Residential properties, industry/business properties located in and around Porth	FR1	Humans/properties/infrastructure downslope of the Proposed Development to the north.
Residential properties, industry/business properties located in and around Trebanog	FR2	Humans/properties/infrastructure downslope of the Proposed Development to the north-west.
Residential properties, industry/business properties located in and around Trehafod	FR3	Humans/properties/infrastructure downslope of the Proposed Development to the north-east.
Residential and farm buildings at Langton Court Farm	FR4	Located >300 m south-east of Wind Farm Development.
Residential and farm buildings at Tyla-winder Farm	FR5	Located approximately 350 m east of the Proposed Development area.
Residential buildings at Bwlch-gwyn	FR6	Located approximately 400 m south of the Proposed Development area..
Residential buildings at Glyn	FR7	Located approximately 450 m south-west of the Proposed Development area.
Residential buildings at Rhiw-garn-fach	FR8	Located approximately 50 m from the western boundary of the Proposed Development area.
Residential buildings at Rhiw-garn-fawr	FR9	Located approximately 50 m from the boundary of the proposed access track to the Wind Farm Development.
Residential and farm buildings at Llan	FR10	Located approximately 500 m south-west and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Pen-y-garn	FR11	Located approximately 700 m south-west and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Crofft-yr-haidd	FR12	Located approximately 900 m south-west and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Penbwch Uchaf	FR13	Located between 25-200 m south and downslope of the proposed underground Grid Connection route.
Residential buildings at Pen-y-coedcae	FR14	Proposed underground section of Grid Connection route runs through the middle of this village.
Residential and farm buildings at Penbwch Isaf	FR15	Located approximately 900 m south and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Tirmabellis	FR16	Located approximately 1.3 km south and downslope of the proposed underground Grid Connection route.



Receptor		Reason for consideration
Residential and farm buildings at Ty'llwyd	FR17	Located approximately 450 m south and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Ty'rarlwydd	FR18	Located approximately 500 m south and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Berthlwyd	FR19	Located approximately 450 m east and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Maendy	FR20	Located approximately 180 m east and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Rhyd-y-llech	FR21	Located approximately 400 m south-west and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Heol-y-cawl	FR22	Located approximately 750 m east and downslope of the proposed underground Grid Connection route.
Residential and farm buildings at Tyr-Person	FR23	Located approximately 200 m south-west and downslope of the proposed underground Grid Connection route.
Residential properties, industry/business properties located in and around Church Village	FR24	Proposed underground section of Grid Connection route runs through the middle of this village.
Industry/business properties located in Treforest Industrial Estate	FR25	Proposed underground section of Grid Connection route runs through this industrial area, where it meets the Grid Connection point at Upper Boat.

Notes: \* Data shown is for private abstractions within the study area of the Wind Farm development and Grid Connection (OHL). Details of non-statutory nature conservation sites within study area of the Grid Connection (underground cable) will be obtained and assessed in the final submission of the ES.

\*\* Data shown is for private water abstractions within the Wind Farm development and Grid Connection Corridor (OHL section) and associated study area. NRW indicated that there are no licensed water abstractions within the Wind Farm development and Grid Connection Corridor (OHL section) and associated study area. Information on licensed water abstractions and private water abstractions within the underground cable section of the Grid Connection Corridor and associated study area have been requested from NRW and RCTCBC, respectively, and will be assessed in the ES.

## Aquatic environment receptors

- 10.7.9 The aquatic environment receptors represent a range of potential habitats, species, interactions and pathways that may be affected as a result of the Proposed Development, during the construction, operation and decommission phases of its lifespan. This includes watercourses (Nant Muchudd, Afon Rhondda Fawr, Afon Elai, Afon Taf and their tributaries, Nant Gelliwion, Nant Myddlyn, Nant Ty'rarfwydd, Nant Dowlais and Nant Castellau), WFD surface water bodies Afon Rhondda Fawr, Nant Muchudd, Afon Elai, Afon Taf, WFD groundwater body SE Valleys Carboniferous Coal Measures, underlying aquifer (Coal Measures), statutory and non-statutory nature conservation sites, ponds and springs. The location of these receptors is shown in **Figure 10.7**.
- 10.7.10 The Proposed Development is located across the Afon Rhondda Fawr, Nant Muchudd, Afon Elai, Afon Taf catchments, which are reportable WFD surface water bodies. The Proposed Development does not directly interact with these WFD water bodies; as such any impacts would occur via their tributaries (Ordinary Watercourses) draining from the Proposed Development Area.
- 10.7.11 Potential effects on the WFD water bodies have been considered in the WFD assessment, **Appendix 10D**, in a manner which reflects the WFD approach. The

assessment has assumed that in the future all watercourses will achieve WFD Good Ecological Status and have been assessed as such. Specific consideration has also been given to both the statutory (Nant Gelliwion Woodland SSSI and Rhos Tonyrefail SSSI) and non-statutory designated (various SINC) sites which are located within the Proposed Development area and wider study area. The sites scoped in for further assessment all support water-dependent habitats, as identified within the baseline analysis, which have potential connectivity with the Proposed Development activities.

- 10.7.12 Potential effects on specific species and aquatic and riparian biodiversity are assessed within **Chapter 8: Biodiversity**, which should be read in conjunction with this assessment.

### Water resource receptors

- 10.7.13 The water resources identified within the study area are dependent on surface water and groundwater bodies and springs. Any impact as a result of the Proposed Development to the water bodies or springs would have subsequent impacts on the water resources. On this basis full consideration has been given of the rights of local water users (primarily abstractors) within this assessment. Potential derogation of these rights as a result of the Proposed Development could occur through reduction in water quantity or deterioration in water quality.
- 10.7.14 According to the baseline analysis there are no licenced abstractions from within the study area for the Wind Farm development area, but there are private abstractions from various springs, surface water and unknown sources located within the study area which have some degree of hydrological conductivity to the Proposed Development. The location of the water resource receptors is shown in **Figure 10.7**.

### Flood risk receptors

- 10.7.15 Flood risk receptors are defined within this assessment as people, property and infrastructure that could be at risk of flooding. The FCA (**Appendix 10A**) informs the baseline flood risk across the study area. Where a flood risk to an identified receptor exists within the baseline environment it is important that this assessment recognises the potential change in risk arising from the Proposed Development.
- 10.7.16 Review of the available OS mapping and aerial imagery in the FCA (**Appendix 10A**) has identified various potential flood risk receptors in the vicinity of the Proposed Development. This includes residential properties and farm buildings.

### Likely significant effects

- 10.7.17 The effects on Water Environment receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 10.13**.

**Table 10.13 Water Environment receptors scoped in for further assessment**

Receptor	Likely significant effects
<b>Construction Phase</b>	
Aquatic environment receptors	Temporary increase sediment-loading of surface water runoff from construction areas leading to deterioration in the water quality environment of the aquatic environment receptors

Receptor	Likely significant effects
	<p>Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.</p> <p>Accidental release of pollution into the water environment by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration.</p> <p>Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water runoff) into surface water or groundwater leading to deterioration in the water quality of the water environment receptors</p> <p>Potential change in groundwater levels due to dewatering resulting in decrease in groundwater baseflow to aquatic environment receptors</p>
Water resource receptors	<p>Potential change to water quality of a water supply resource which may affect the viability of an abstraction</p> <p>Potential change to yield of a water supply resource which may affect the viability of an abstraction</p>
Flood risk receptors (third party receptors)	<p>Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCC, access tracks, crane pads)</p> <p>Changes to watercourse flow conveyance as a result of new or modified temporary watercourse</p>
<b>Operational Phase</b>	
Aquatic environment receptors	<p>Accidental spillage of pollutants (fuel or oil) during maintenance activities leading to deterioration in the water quality of the aquatic environment receptors.</p>
Water resource receptors	<p>Potential change to water quality of a water supply resource which may affect the viability of an abstraction</p>
Flood risk receptors (third party receptors)	<p>Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCC, access tracks, crane pads)</p> <p>Changes to watercourse flow conveyance as a result of new or modified temporary watercourse</p>

10.7.18 The receptors/effects detailed in **Table 10.14** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

**Table 10.14 Summary of effects scoped out of the Water Environment assessment**

Receptors/potential effects	Justification
<b>Flood risk receptors</b> Flooding from tidal, groundwater and sewer sources	As discussed in <b>Section 10.5</b> (Flood Risk), these flood sources pose a low risk to the Proposed Development and therefore are scoped out of the assessment during the construction and operational phases. It is

Receptors/potential effects	Justification
(construction, operational phase and decommission phases)	envisaged that those activities and potential effects that are scoped out of the construction phase can also be scoped out for the future decommissioning phase.
<b>Aquatic environment receptors</b> Water quantity and hydromorphology effects arising from the presence of OHL infrastructure (operational phase)	All OHL wooden poles would be located a minimum distance away from any watercourses. The impact arising from the presence of the OHL wooden poles on water flows and levels, and watercourse morphology is therefore scoped out.
<b>Aquatic environment receptors</b> Effects associated with routine inspection and maintenance activities of the OHL infrastructure (operational phase)	Routine inspection and maintenance activities of the OHL infrastructure will result in minimal disturbance of surface soils or watercourses. Best practice measures in line with NetRegs PPGs and GPPs would be incorporated into operational procedures to ensure that the risk of accidental release of pollutants into the water environment is minimised. There would be no impact from these activities on third party flood risk receptors and they are scoped out of the assessment.
<b>Flood risk receptors</b> Changes to surface water flood risk due to changes in runoff rates resulting from permanent infrastructure (underground cables) (operational phase)	During the operational phase, the underground cables would be entirely below ground and would not affect surface runoff rates. Therefore, there would be no impact from the underground cables on third party flood risk receptors and it is scoped out of the assessment.

## 10.8 Assessment methodology

- 10.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 2: Approach to preparing the Environmental Statement**, and specifically in **Sections 2.7 to 2.10**. However, whilst this has informed the approach that has been used in this Water Environment assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this Water Environment assessment.
- 10.8.2 The significance of an effect resulting from the Proposed Development is primarily determined by the value of a given water feature and the magnitude of the effect. In terms of the hydrology, the key determinants of magnitude relate to surface water quantity (level and flow), and water quality. Depending on the effects on surface water flows, there may also be indirect effects on downstream morphology and sediment dynamics, river water quality and flood risk. The method and criteria used to determine value, magnitude, and significance of effect are described in the sections below.

### Determination of significance

- 10.8.3 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are “*likely to be significantly affected by the development*”.

- 10.8.4 The EIA Regulations do not define significance and it will be necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.
- 10.8.5 **Table 10.15** details the basis for assessing receptor sensitivity. The value of water features is normally related to the importance of the surface water or groundwater feature that might be at risk from effects. The criteria used by Wood in the assessment of water feature value are semi-quantitative, so professional judgement by the assessor has been required.

**Table 10.15 Establishing the sensitivity of water receptors**

Sensitivity	Criteria	Receptor type*	Examples
<b>High</b>	Features with a high yield, quality or rarity with little potential for substitution.	Aquatic environment	<p>Conditions supporting a site with an international conservation designation (Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site), where the designation is based specifically on aquatic features.</p> <p>WFD surface water body (or part thereof) with overall High status, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body.</p> <p>WFD surface water body (or part thereof) with High status for morphology.</p>
	Water use supporting human health and economic activity at a regional scale.	Water use	Regionally important public surface water or groundwater supply (and associated catchment/GWMU) or permitted discharge.
	Features with a high vulnerability to flooding.	Flood risk	Land use type defined as ‘Emergency Services’ in the TAN15 development categories (e.g., hospitals, ambulance/police stations that are required to operate during flooding and buildings used to provide emergency shelter in time of flood) and essential infrastructure equivalent (i.e. critical national infrastructure, such as essential transport and utility infrastructure).
<b>Medium</b>	Features with a medium yield, quality or rarity, with a limited potential for substitution.	Aquatic environment	<p>Conditions supporting a site with a national conservation designation (e.g., SSSI, National Nature Reserve (NNR)), where the designation is based specifically on aquatic features.</p> <p>WFD surface water body (or part thereof) with overall ‘Good’ status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body.</p>

Sensitivity	Criteria	Receptor type*	Examples
			WFD groundwater body (or part thereof) with overall 'Good' status.
	Medium quality watercourse morphology	Watercourse morphology	A watercourse in natural equilibrium and exhibiting a natural range of fluvial processes and morphological features, with little or no modification or anthropogenic influence.
	Water use supporting human health and economic activity at a local scale.	Water use	Local public surface water and groundwater supply (and associated catchment/GWMU) or permitted discharge.  Licensed non-public surface water and groundwater supply abstraction (and associated groundwater catchment) which is relatively large relative to available resource, or where raw water quality is a critical issue, e.g., industrial process water, or permitted discharge.
	Features with a medium vulnerability to flooding.	Flood risk	Land use type defined as 'Highly vulnerable development' in the TAN15 development categories (e.g., educational institutions, most types of residential development and vulnerable industrial development)
<b>Low</b>	Features with a low yield, quality or rarity, with some potential for substitution.	Aquatic environment	Conditions supporting a site with a local conservation designation (e.g., SINC, Local Nature Reserve (LNR), County Wildlife Site (CWS)), where the designation is based specifically on aquatic features, or an undesignated but highly/moderately water-dependent ecosystem, including a Local Wildlife Site (LWS) and a GWDTE.  WFD surface water body (or part thereof) with overall Moderate or lower status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body.  Groundwater body (or part thereof) with overall Poor status.
	Low quality watercourse morphology	Watercourse morphology	A watercourse showing signs of modification and recovery to a natural equilibrium, and currently exhibiting a limited range of fluvial processes and morphological features affected by modification or anthropogenic influence.
	Water use supporting human health and economic activity at household/individual business scale.	Water use	Licensed non-public surface water and groundwater supply abstraction (and associated catchment/GWMU), which is relatively small relative to available resource, or where raw water quality is not critical, e.g., cooling water, spray irrigation, mineral washing or permitted discharge.  Unlicensed potable surface water and groundwater abstraction (and associated catchment) e.g., private



Sensitivity	Criteria	Receptor type*	Examples
			domestic water supply, well, spring or permitted discharge.
	Features with a low vulnerability to flooding.	Flood risk	Land use type defined as 'Less vulnerable development' in the TAN15 development categories excluding water compatible development equivalent (e.g., general industrial, employment, commercial and retail development, transport and utilities infrastructure, mineral extraction sites (except sand and gravel)).
<b>Very Low</b>	Commonplace features with very low yield or quality with good potential for substitution.	Aquatic environment	<p>Conditions supporting an undesignated and low water-dependent ecosystem, including an LWS, GWDTE and pond.</p> <p>Non-reportable WFD surface water body (or part thereof), or non-WFD surface water body, not associated with any downstream WFD surface water body.</p> <p>Non-reportable WFD groundwater body (or part thereof), or non-WFD groundwater body.</p>
	Very low-quality watercourse morphology	Watercourse morphology	A highly modified watercourse changed by channel modification or other anthropogenic pressures, currently exhibiting no active flow processes or morphological diversity.
	Water use does not support human health, and of only limited economic benefit.	Water use	Unlicensed non-potable surface water and groundwater abstraction (and associated catchment) e.g., livestock supply.
	Features that are resilient to flooding.	Flood risk	Land use type defined as 'Other' paragraph 5.3 in the TAN15 development categories which are 'water compatible' development equivalent (e.g., amenity open space, nature conservation and biodiversity, sand and gravel workings, docks, marinas, flood control infrastructure, water transmission infrastructure) and undeveloped land.

\*Receptor types map onto receptor lists as follows:

- Aquatic environment –watercourses, springs and ponds and conditions supporting designated conservation sites
- Water use – springs, abstractions, WFD surface water bodies, aquifers/WFD groundwater bodies
- Flood risk – humans, properties and infrastructure.

The watercourse morphology receptor type is only relevant when 'in-channel' works are proposed.

10.8.6 **Table 10.16** details the basis for assessing magnitude of change. The magnitude of change on water receptors is independent of the value of the receptor, and its assessment is semi-quantitative, based professional judgement.

**Table 10.16 Establishing the magnitude of change**

Magnitude	Criteria	Receptor type*	Example**, ***
<b>High</b>	Results in major change to feature, of sufficient magnitude to affect its use/integrity.	Aquatic environment	Deterioration in river flow regime, morphology, or water quality, leading to sustained, permanent or long-term breach of relevant Conservation Objectives (COs) or non-temporary downgrading (deterioration) of status of WFD surface water body (including downgrading of individual WFD elements) or dependent receptors, or resulting in the inability of the surface water body to attain Good status in line with the measures identified in the RBMP. Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of status of WFD groundwater body or dependent receptors, or the inability of the groundwater body to attain Good status in line with the measures identified in the RBMP.
		Watercourse morphology	Loss or extensive damage to geomorphological habitat and processes due to extensive modification and/or fine sediment input. Replacement of a large extent of the natural bed and/or banks with artificial material. Extensive change to channel planform.
		Water use	Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract.
		Flood risk	Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.
<b>Medium</b>	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances.	Watercourse morphology	Loss or extensive damage to geomorphological habitat and processes due to extensive modification and/or fine sediment input. Replacement of a large extent of the natural bed and/or banks with artificial material. Extensive change to channel planform.
		Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of status of surface water body status (including potential temporary downgrading of individual WFD elements) or dependent receptors, although not affecting the ability of the surface water body to achieve future WFD objectives. Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of status of WFD groundwater body or dependent receptors, although not affecting the ability of the groundwater body to achieve future WFD objectives.
		Watercourse morphology	Partial loss or damage to geomorphological habitat and processes due to modifications and/or fine sediment input. Replacement of the natural bed and/or banks with artificial material (total length is more than 3% of water body length).

Magnitude	Criteria	Receptor type*	Example**, ***
		Water use	Moderate reduction in water availability and/or quality, which may compromise the ability of the water user to abstract on a temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used.
		Flood risk	Change in flood risk resulting in potential for moderate damage to the property or infrastructure.
<b>Low</b>	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances.	Aquatic environment	<p>Slight change in river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term or permanent change to status of WFD surface water body (of overall status or element status) or dependent receptors.</p> <p>Slight deterioration in groundwater levels, flows or water quality, but with no short-term or permanent downgrading of status of WFD groundwater body or dependent receptors.</p>
		Watercourse morphology	Slight change or deviation from baseline conditions, or partial loss or damage or improvement/ gain to in channel habitat and geomorphological processes due to modifications and/or fine sediment input.
		Water use	Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract.
		Flood risk	Change in flood risk resulting in potential for minor damage to property or infrastructure.
<b>Very Low</b>	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity	Aquatic environment	<p>No or very slight change in river flow regime or surface water quality, and no consequences in terms of COs or status of WFD surface water body or dependent receptors.</p> <p>No or very slight change in groundwater levels or groundwater quality, and no consequences in terms of status of WFD groundwater body or dependent receptors.</p>
		Watercourse morphology	Very slight change from surface water baseline conditions, approximating to a 'no change' situation.
		Water use	No, or very slight change in water availability or quality and no change in ability of the water user to exercise licenced rights or continue with small private abstraction.
		Flood risk	Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.

\*The watercourse morphology receptor type is only relevant when 'in-channel' works are proposed.

\*\*For the purposes of this assessment of change, relevant WFD elements for surface water body classification include:

- all biological quality elements e.g., fish, macrophytes, invertebrates;
- all physico-chemical quality elements e.g., dissolved oxygen, phosphate;
- hydromorphological supporting elements;
- the mitigation measures assessment.

## Significance evaluation methodology

10.8.7 The significance of water-related effects is derived by considering both the value 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 10.17**, with ‘Major’ and ‘Moderate’ effects taken to be ‘Significant’. Significance can be ‘Beneficial’, ‘Adverse’ or ‘Neutral’.

**Table 10.17 Significance evaluation matrix relating to the water environment**

		Magnitude of change			
		High	Medium	Low	Very Low
Value/importance/value	High	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Note: ‘Significant’ effects are those identified as ‘Major’. ‘Moderate’ effects would normally be deemed to be ‘significant’. However, there may be some exceptions, depending on the application of professional judgment.

10.8.8 In this assessment, only the potential and residual significance of change with respect to the water environment (groundwater levels, flows and quality, and river flows, quality and morphology) and flood risk are considered. It is important to recognise that a ‘*Significant*’ change in the water environment does not necessarily result in a ‘*Significant*’ change to ecological features. Indeed, because of the different benchmarks and magnitude criteria used by the two assessments, it is possible that a ‘*Not Significant*’ change in the water environment can still sit alongside a ‘*Significant*’ change in an associated ecological water feature, and vice-versa.

## 10.9 Preliminary assessment of Water Environment effects

10.1.8 This section provides an assessment of the Water Environment related effects and will be reviewed in light of statutory consultation feedback, stakeholder engagement and evolution of the detailed design of the Proposed Development.

### Assessment of effects on aquatic environment receptors

10.9.1 This section summarises the aquatic environment receptors taken forward in this assessment, which are listed in **Table 10.18**. The sensitivity of each receptor has been determined in accordance with the criteria set out in **Table 10.15**.

10.9.2 The assessment of impacts on the individual WFD elements is provided in **Appendix 10D** (WFD Assessment) which concludes that the significance of effects is **Not Significant**. The assessment has assumed that in the future all watercourses will achieve WFD Good Ecological Status and have been assessed as such.

**Table 10.18 Aquatic environment receptors considered under this assessment**

Receptor ID	Receptor	Sensitivity	Rationale
<b>Watercourses</b>			
Nant Gelliwion (tributary of Afon Rhondda Fawr)	WC1	Low	Not designated as a WFD surface water body. Discharges into the Afon Rhondda Fawr (Main River and WFD surface water body). Ordinary Watercourse.
Afon Rhondda Fawr	WC2	Medium	Main River and WFD surface water body with overall 'Good' status.
Nant Muchudd	WC3	Medium	Main River and WFD surface water body with overall 'Moderate' status.
Afon Elai	WC4	Medium	Main River and WFD surface water body with overall 'Poor' status.
Afon Taf	WC5	Medium	Main River and WFD surface water body with overall 'Moderate' status.
Nant Myddlyn / Nant Ty'rarfwydd (tributaries of Afon Clun)	WC6	Medium	Nant Myddlyn is a Main River whilst Nant Ty'rarfwydd is an Ordinary Watercourse. Part of both watercourses are designated as WFD surface water bodies with overall 'Poor' status. Flows south into Afon Clun (Main River and WFD surface water body).
Nant Dowlais (tributary of Afon Clun)	WC7	Medium	Main River. Designated as WFD surface water body with overall 'Poor' status.
Nant Castellau (tributary Nant Muchudd)	WC8	Low	Ordinary Watercourse. Not designated as WFD surface water body. Discharges into Nant Muchudd (Main River and WFD surface water body).
Unnamed (tributary Nant Muchudd)	WC9	Low	Ordinary Watercourse. Not designated as WFD surface water body. Discharges into Nant Muchudd (Main River and WFD surface water body).
<b>Aquifers</b>			
<b>AQ1</b>	SE Valleys Carboniferous Coal Measures	Low	Designated WFD groundwater body with 'Poor' Overall WFD status.
<b>Conditions supporting statutory nature conservation sites</b>			
<b>SC1</b>	Nant Gelliwion Woodland SSSI	Medium	Nationally designated site approximately 1.1 km south-east of the Proposed Development area which supports water dependent habitats and species.
<b>SC2</b>	Rhos Tonurefail SSSI	Medium	Nationally designated site adjacent to Wind Farm development area (access road) which supports water dependent habitats and species.

Receptor ID	Receptor	Sensitivity	Rationale
<b>Conditions supporting non-statutory nature conservation sites</b>			
Mynydd y Glyn SINC	C1	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features. Water dependent Section 7 priority habitat.
Mynydd Gelliwion and Gelliwion Slopes SINC	C2	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Trebanog Slopes SINC	C3	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Nant Gelliwion /Waun Castellau SINC	C4	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Coed Castellau	C5	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Tonyrefail East SINC	C6	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
The Glyn SINC	C7	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
<b>Ponds</b>			
Various locations	Ponds	Very low	Not designated for biodiversity conservation.
<b>Springs</b>			
Various locations	Springs	Very low to Low	Some springs are used as water abstractions. In the absence of information on water use, it is assumed both non-potable use (Very Low sensitivity) and potable use (Low sensitivity)

## Wind Farm development and Grid Connection - Construction phase

*Temporary increase sediment-loading of surface water runoff from construction areas leading to deterioration in the surface water quality environment, deterioration in the status of WFD surface water bodies and deterioration in the conditions supporting local conservation sites*

- 10.9.3 Construction works associated with the Proposed Development have the potential to generate sediment-laden runoff. Activities that could potentially produce sediment-laden runoff include:
- runoff from the TCC, internal access tracks and working areas;



- excavation works associated with the construction of the substation, wind turbine foundations, crane pads and Grid Connection (underground cable and OHL wooden poles); and
  - temporary use and management of soil stockpiles.
- 10.9.4 The proposed embedded environmental measures to limit sediment-laden runoff are set out in **Table 10.11**. These measures would be secured through a planning condition, likely via the CEMP and include implementing good working practices and adherence to the CEMP; in addition to specific measures relating to the draft Water Management Plan (WMP) (**Appendix B of Draft CEMP**), implementation of a water quality monitoring programme, and suitable management of soil stockpiles and excavated materials. The WMP will utilise SuDS principles to reduce the discharge to greenfield runoff rates and prevent pollution of the water environment.
- 10.9.5 Construction of the access tracks and Grid Connection includes a small number of crossings of mapped surface water flow paths below. It is anticipated that the consenting powers of RCTCBC will be enforced to ensure that the future detailed designs of these crossings will limit sediment-laden runoff.
- access roads: two crossings of a tributary Nant Muchudd to the west and three crossings of the Nant Gelliwion to the east of the Wind Farm development area (both Ordinary Watercourses found to be dry or not flowing during the site visit on 24 August 2022, where access was possible);
  - the OHL route: two crossings of tributaries of the Nant Muchudd to the south (Ordinary Watercourses); and
  - underground cable: two crossings of tributaries of the Nant Gelliwion to the north and four crossings of the Nant Ty'rarlwydd and Nant Dowlais to the south (Ordinary Watercourses).
- 10.9.6 The magnitude of potential effects of sediment-laden runoff on the aquatic environment receptors is determined to be Very Low for the watercourses with larger dilution capacity (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf) and Low for the watercourses with lower dilution capacity (Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), local biodiversity sites, ponds and springs. Consideration of the magnitude of change to the aquatic environment receptors, in conjunction with their determined sensitivity (Very Low to Medium), finds that, with the specified embedded environmental measures in place in **Table 10.11**, the significance of effects to the aquatic environment receptors in this preliminary assessment is **Not Significant**.

***Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance***

- 10.9.7 Any potential increases in sediment-laden runoff could also result in increased silt deposition within watercourses network affecting the hydromorphology of the watercourses. Those measures described above and detailed in **Table 10.11** to limit sediment-laden runoff will also prevent any resultant sediment deposition and changes to watercourse hydromorphology, such that the magnitude of change on the hydromorphology and flow conveyance of the watercourses is Very Low for the watercourses with larger dilution capacity (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf) and Low for the watercourses with lower dilution capacity (Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd).

- 10.9.8 Consideration of the sensitivity of the watercourses (Low to Medium) in combination with the potential magnitude of change to the receptors (Very Low to Low), finds that, with the specified embedded environmental measures in place in **Table 10.11**, the significance of effects to the aquatic environment receptors in this preliminary assessment is **Not Significant**.

Accidental release of pollution by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites.

- 10.9.9 Construction works have the potential to further affect water quality conditions and therefore aquatic environment receptors (and water resource receptors) within associated water features via:
- accidental spillage of fuel, oil or other chemicals used during construction works;
  - mobilisation/leaching of contaminants, where present, from soils during excavation works associated with the construction of the two substations, wind turbine foundations, crane pads and Grid Connection (underground cable and OHL wooden poles); and
  - concrete leaching.
- 10.9.10 The proposed embedded measures to prevent surface and groundwater water pollution are set out in **Table 10.11**.
- 10.9.11 The magnitude of change from all identified potential effects of mobilisation of contaminants from any potentially contaminated soil, accidental spillages of oils/fuel and concrete leaching is determined to be Very Low for the watercourses with larger dilution capacity (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf) and Low for the watercourses with lower dilution capacity (Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), groundwater, local biodiversity sites, ponds and springs. The sensitivity of the aquatic environment receptors (Very Low to Medium) in combination with the potential magnitude of change acting upon them (Very Low to Low) and with the specified embedded environmental measures in place in **Table 10.11**, is found to be, in this preliminary assessment, **Not Significant**.

Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water runoff) into surface water or groundwater leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites

- 10.9.12 Discharge of water generated from construction activities into surface water or groundwater has the potential to affect water quality conditions and therefore aquatic environment receptors (and water resource receptors) within associated water features via:
- potentially polluted groundwater and water ingress pumped from excavations associated with the construction of the substation, wind turbine foundations and Grid Connection (underground cable and OHL wooden poles);
  - potentially polluted surface water runoff (e.g., suspended solids); and
  - concrete leaching.

- 10.9.13 Those measures described above and detailed in **Table 10.11** to prevent surface water and groundwater pollution from accidental release of pollution will also prevent pollution of water generated in the construction activities which will be treated prior to discharge into surface water or groundwater.
- 10.9.14 The magnitude of change from the identified potential effects resulting from deterioration of water quality is determined to be Very Low for the watercourses with larger dilution capacity (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf) and Low for the watercourses with lower dilution capacity (Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), groundwater, local biodiversity sites, ponds and springs. . The sensitivity of the aquatic environment receptors (Very Low to Medium) in combination with the potential magnitude of change acting upon them and with the specified embedded environmental measures in place in **Table 10.11** is found to be, in this preliminary assessment, **Not Significant**.

*Potential change in groundwater levels due to dewatering resulting in decrease in groundwater baseflow to aquatic environment receptors*

- 10.9.15 Dewatering of excavations has the potential to lead to a decline in local groundwater levels and subsequent decline in groundwater baseflow to watercourses and springs, deterioration in WFD water bodies status and conditions supporting biodiversity sites within the study area.
- 10.9.16 Excavations associated with the construction phase are of limited duration, footprint and depth including the turbine foundations (20m diameter x 4m depth) and underground cables (0.3-0.6m width x 0.9 to 1.0m depth). In addition, the potential for encountering groundwater during excavations into the Coal Measures is considered to be limited, and where encountered, it is likely to be of low sensitivity, perched and in small quantities (coal-bearing mudstones/siltstones with minor sandstones and ironstones). BGS borehole ST08NW111 (NGR is ST 01324 89203) about 700 m south of the Wind Farm Development shows a standing water level at 2.2m below ground level. This suggests that the impact arising from dewatering activities on local groundwater levels and associated receptors in this preliminary assessment is Not Significant. However, further information is required to assess in more detail the potential impact of dewatering activities on the peat/bog pockets identified to the west of the summit of Mynydd y Glyn with depths ranging from 2.4m bgl to 4.10m bgl. Potential impacts include drying out and subsequent oxidation of the peat.
- 10.9.17 The magnitude of change from the identified potential effects resulting from dewatering activities is determined to be Low taking into account the duration, depth and footprint of the excavations and limited potential for encountering groundwater during excavations. The sensitivity of the aquatic environment receptors (Very Low to Medium) in combination with the potential magnitude of change acting upon them is found to be, in this preliminary assessment, **Not Significant**. However, the effects of dewatering on peatland will be assessed in more detail in the Final ES once delineation of the identified peat/bog features within the Wind Farm development area is completed at the end of 2022 (peats survey details provided in **Chapter 11: Ground Conditions**).

## Wind Farm development - Operational phase

*Accidental spillage of pollutants (fuel or oil) during maintenance activities leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites*

- 10.9.18 Following the construction phase, small quantities of fuel/oil/chemicals would need to be brought onto Site for the maintenance activities of the Wind Farm development. The embedded measures for the operation phase of the development listed in **Table 10.11**, include measures to control the potential impacts of accidental fuel, oil or chemical release as a result of maintenance activities onsite.
- 10.9.19 The magnitude of change from the identified potential effects resulting from deterioration of water quality is determined to be Very Low for the watercourses with larger dilution capacity (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf) and Low for the watercourses with lower dilution capacity (Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), groundwater, local biodiversity sites, ponds and springs. The sensitivity of the aquatic environment receptors (Very Low to Medium) in combination with the potential magnitude of change acting upon them and with the specified embedded environmental measures in place in **Table 10.11**, in is found to be this preliminary assessment **Not Significant**.

## Assessment of effects on water resource receptors

- 10.9.20 This section summarises the water resource receptors taken forward in this assessment, which are listed in **Table 10.19**. The sensitivity of each receptor has been determined in accordance with the criteria set out in **Table 10.15**. The receptors are shown on **Figure 10.7**.

**Table 10.19 Water resource receptors considered under this assessment**

Receptor ID	Receptor*	Sensitivity	Rationale
WR1	Abstraction from spring	Very Low to Low	Private water supplies, which are considered to be small relative to available resource. In the absence of information on water use, it is assumed both non-potable use (Very Low sensitivity) and potable use (Low sensitivity).
WR2	Abstraction from unknown source		
WR3	Abstraction from unknown source		
WR4	Abstraction from unknown source		
WR5	Abstraction from unknown source		
WR6	Abstraction from mixed source		
WR7	Abstraction from spring		
WR8	Abstraction from spring		
WR9	Abstraction from mixed source		
WR10	Abstraction from mixed source		
WR11	Abstraction from surface water		

Receptor ID	Receptor*	Sensitivity	Rationale
WR12	Abstraction from unknown source		

Notes: \* Data provided is for private water abstractions within the Wind Farm development and Grid Connection Corridor (OHL section) and associated study area. NRW indicated that there are no licensed water abstractions within the Wind Farm development and Grid Connection Corridor (OHL section) and associated study area. Information on licensed water abstractions and private water abstractions within the underground cable section of the Grid Connection Corridor and associated study area have been requested from NRW and RCTCBC, respectively, and will be assessed in the ES.

## Wind Farm development and Grid Connection - Construction Phase

### *Potential change to water quality of a water supply resource which may affect the viability of an abstraction*

- 10.9.21 Those activities with the potential to affect the water resources receptors (private water supply abstractions) via potential changes to the water quality of watercourses and aquifer (potential for increases in sediment laden runoff or pollution by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching for example), together with the embedded measures associated with these, are presented in the Preliminary Assessment of effects on aquatic environment receptors section above.
- 10.9.22 The magnitude of change from all the identified potential effects on the water resource receptors (private water abstractions), is considered to be Very Low. Taking into account the receptor sensitivity (Very Low to Low) in combination with the potential magnitude of change acting upon them, finds that in this preliminary assessment, the significance of effects on the water resource receptors from the construction of the Proposed Development is **Not Significant**.

### *Potential change to yield of a water supply resource which may affect the viability of an abstraction*

- 10.9.23 Dewatering of excavations has the potential to lead to a decline in local groundwater levels and subsequent decline in groundwater baseflow to watercourses and springs and decline in the yield (or even derogation) of the private water abstractions within the study area.
- 10.9.24 There are no private water abstractions within 400m and 100m of excavations associated with the construction of the Wind Farm development and Grid Connection (OHL), respectively (**Figure 10.7**). As discussed in the Assessment of effects on aquatic environment receptors above, excavations associated with the construction phase are of limited duration, footprint and depth. In addition, the potential for encountering groundwater during excavations is considered to be limited, and where encountered, it is likely to be of low sensitivity, perched and in small quantities given the underlying geology (Coal Measures Formation). This suggests that the magnitude of change from the potential effects of dewatering activities on local groundwater levels and private abstractions is Low in this preliminary assessment. However, further assessment will be undertaken in the ES and appropriate embedded measures will be proposed if appropriate (e.g. groundwater monitoring plan).
- 10.9.25 The magnitude of change from the identified potential effects resulting from dewatering activities on the water resource receptors (private water abstractions), is determined to be Low taking into account the duration, depth and footprint of the excavations and limited potential for encountering groundwater during excavations. The sensitivity of the water resource receptors (Very Low to Low) in combination with the potential magnitude of change acting upon them and with the specified embedded environmental measures in place in **Table 10.11**, is found to be, in this preliminary assessment, **Not Significant**.

## Wind Farm development - Operational phase

### *Potential change to water quality of a water supply resource which may affect the viability of an abstraction*

- 10.9.26 The maintenance activities with the potential to affect the water resources receptors via potential changes to the water quality of watercourses upstream of the receptor (potential for change in water quality via accidental spillage/release of pollutants), together with the embedded measures associated with these, are presented in the Assessment of effects on aquatic environment receptors section above.
- 10.9.27 The magnitude of change from all the identified potential effects on the water resource receptors, is considered to be Very Low. Taking into account the receptors sensitivity (Very Low to Low) in combination with the potential magnitude of change acting upon them (Very Low and Low), finds that the significance of effects on the water resource receptors from the operational with the specified embedded environmental measures in place in **Table 10.11** is **Not Significant**.

## Assessment of effects on flood risk receptors

- 10.9.28 The following summarises the flood risk receptor groups taken forward in this assessment, which are listed in **Table 10.20**. The sensitivity of these receptors has been identified in accordance with the criteria outlined in **Table 10.15**. The receptors are shown on **Figure 10.7**. Surface water flooding was identified as the key flood risk mechanisms at the Proposed Development in **Section 10.5** and is discussed further below.

**Table 10.20 Flood risk receptors considered under this assessment**

Receptor ID	Receptor	Sensitivity	Rationale
FR1	Residential properties, industry/business properties located in and around Porth	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR2	Residential properties, industry/business properties located in and around Trebanog	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR3	Residential properties, industry/business properties located in and around Trehafod	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR4	Residential and farm buildings at Langton Court Farm	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR5	Residential and farm buildings at Tylawinder Farm	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR6	Residential buildings at Bwlch-gwyn	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.



Receptor ID	Receptor	Sensitivity	Rationale
FR7	Residential buildings at Glyn	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR8	Residential buildings at Rhiw-garn-fach	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR9	Residential buildings at Rhiw-garn-fawr	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR10	Residential and farm buildings at Llan	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR11	Residential and farm buildings at Pen-y-garn	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR12	Residential and farm buildings at Crofft-yr-haidd	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR13	Residential and farm buildings at Penbwch Uchaf	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR14	Residential buildings at Pen-y-coedcae	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR15	Residential and farm buildings at Penbwch Isaf	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR16	Residential and farm buildings at Tirmabellis	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR17	Residential and farm buildings at Ty'llwyd	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR18	Residential and farm buildings at Ty'rarlwydd	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR19	Residential and farm buildings at Berthlwyd	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR20	Residential and farm buildings at Maendy	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.

Receptor ID	Receptor	Sensitivity	Rationale
FR21	Residential and farm buildings at Rhyd-y-llech	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR22	Residential and farm buildings at Heol-y-cawl	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR23	Residential and farm buildings at Tyr-Person	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR24	Residential properties, industry/business properties located in and around Church Village	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR25	Industry/business properties located in Treforest Industrial Estate	Low	'Less vulnerable development' (general industry/business properties) under the TAN15 guidance.

## Wind Farm development - Construction and operational phases

### *Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCCs, access tracks, crane pads)*

- 10.1.9 During the construction and operational phases of the Proposed Development, ground disturbance and new areas of hardstanding / compacted ground (TCCs in the construction phase and substation, access tracks and wind turbines/crane pads in the operational phase), although localised and of limited extent, have the potential to increase the overall extent of low permeability surfaces. Without effective surface water management measures, this could lead to a potential increase in runoff rates and a subsequent increase in risk of flooding to the flood risk receptors.
- 10.1.10 As outlined in the Draft FCA (**Appendix 10A**), a WMP for the construction phase (Draft WMP is provided in Appendix B of the Draft CEMP) and Detailed Drainage Design for the operational phase, will be prepared to manage surface runoff utilising SuDS principles including attenuation storage where necessary. Surface water runoff will be discharged to ground and/or to watercourses. Further investigation of the viability of infiltration as a means by which surface water runoff could be discharged to ground will be undertaken post- ES, through liaison with RCTCBC and by undertaking a soakaway testing exercise. In the case that the soakaway testing concludes that infiltration is not solely sufficient in managing runoff, and discharge to the watercourses is required, this will be subject to a Consent from the NRW or RCTCBC.
- 10.1.11 It is concluded that the Proposed Development during the construction and operational phases, with the specified embedded environmental measures in place in **Table 10.11** will not result in increases in surface water runoff, as such the magnitude of change is considered to be Very Low. The sensitivity of the flood risk receptors (Medium for residential properties, and Low for industry/business properties), in combination with the magnitude of change acting upon the receptors and with the specified embedded environmental measures in place in **Table 10.11**, concludes that the significance of effects on the flood risk receptors is **Not Significant**.

## Wind Farm development and Grid Connection - Construction phase

### *Changes to surface water flow conveyance arising from the presence of new or modified permanent watercourse crossings*

- 10.9.29 If not appropriately designed, any temporary and permanent (access) crossings of watercourses have the potential to adversely affect flow conveyance within the affected watercourses and therefore to influence flood depths. If watercourse crossings are required to enable access over any watercourses, these need to be appropriately sized to maintain existing flow conveyance.
- 10.9.30 Construction of the proposed access tracks includes a small number of crossings of mapped surface water flow paths: two crossings of a tributary Nant Muchudd to the west and three crossings of the Nant Gelliwion to the east of the Wind Farm development area (both Ordinary Watercourses found to be dry or not flowing during the Site visit on 24 August 2022, where access was possible). Where the proposed access tracks cross mapped surface water flow paths, a pipe culvert will be provided beneath the access track to convey flows from existing drainage pathways. The design of the pipe culvert will be confirmed as part of the detailed drainage design with the RCTCBC. Crossings will be subject to a Land Drainage Consent from RCTCBC.
- 10.9.31 Where the proposed underground cable crosses mapped surface water flow paths, each crossing will be individually reviewed / surveyed during detailed design (which will occur subsequent to gaining planning consent) to confirm the crossing methodology employed. It is anticipated that open cut crossing methodology will predominantly be used.
- 10.1.12 The magnitude of change from the potential effects associated with the crossing of mapped surface water flow paths is determined to be Very Low. The sensitivity of the flood risk receptors (Medium for residential properties, and Low for industry /business properties), in combination with the magnitude of change acting upon the receptors and with the specified embedded environmental measures in place in **Table 10.11**, concludes that the significance of effects on the flood risk receptors in this preliminary assessment is **Not Significant**.

## Wind Farm development and Grid Connection - Decommissioning Phase

- 10.9.32 Future decommissioning phase effects are considered to be similar to construction phase effects, although with a lesser duration of less than one year and against a future baseline which accounts for the anticipated impacts of climate change on the water environment. The drainage assessment provided in the FCA (**Appendix 10A**) includes a climate change allowance of 40% for the operational phase (precautionary upper end estimate up to 2080s) which suggests that similar sized SuDS features as used during the operational phase are required to control runoff to greenfield discharge rates in the decommissioning phase.
- 10.9.33 Decommissioning of the Proposed Development would not result in increases in the rate of surface runoff and therefore the potential magnitude of the effects are Very Low. Consideration of the sensitivity of the flood risk receptor groups (Medium for residential properties and Low for Industry/business properties), in combination with the potential magnitude of change acting upon the receptors and with the specified embedded environmental measures in place in **Table 10.11**, concludes that the significance of effects on the flood risk receptors is **Not Significant**.

## 10.10 Preliminary assessment of cumulative (inter-project) effects

- 10.10.1 A preliminary 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 methodology followed in identifying and assessing potential cumulative effects is set out in **Section 2.8 of Chapter 2: Approach to Environmental Impact Assessment**.
- 10.10.2 For Water Environment, the study area outlined in **Section 10.4**, has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed.
- 10.10.3 A tiered approach to the CEA has been set out in **Chapter 2: Approach to Environmental Impact Assessment, Section 2.8** and is summarised as follows:
- Tier 1: developments under construction, permitted applications, and submitted applications;
  - Tier 2: Other DNS developments where a Scoping Report has been submitted to PEDW; and
  - Tier 3: Other DNS developments where a Scoping Report has not yet been submitted to PEDW, or where developments are identified in Development Plans or other plans as appropriate.
- 10.1.13 Only those developments in the short list in **Chapter 2** that fall within the Water Environment study area have significant potential to result in cumulative effects with the Proposed Development. All developments falling outside the study area are excluded from the CEA on the basis that either:
- there is no pathway for cumulative hydrological effects; or
  - the embedded measures that will be included in the other developments are suitable to fully avoid, manage and if appropriate mitigate potential water environment effects associated with that development.
- 10.1.14 On the basis of the above, there is one specific development contained within the short list that falls within the Water Environment study area (**Table 10.21**). A simple qualitative assessment (as justified in **Table 10.21**) of the potential for significant cumulative effects to arise is carried out in **Table 10.22**. This indicates that there is no potential for the development contained within the short list to result in significant cumulative effects with the Proposed Development.

**Table 10.21 Development to be considered as part of the Water Environment CEA**

Development Name	Development type	Project	Status	Tier	Level of detail of CEA to be adopted
<b>Maes Mawr Solar Farm</b>	PV solar electricity generating station of 30mW	Rhondda Cynon Taff County Borough Council 22/0329/36	Scoping Direction received, EIA required	2	The wind farm development site is located within the Afon Taf catchment, which is also overlapped by the proposed underground Grid Connection route. The solar farm is planned to be connected to the same substation as the Proposed Wind Farm development at Upper Boat. A

Development Name	Development type	Project	Status	Tier	Level of detail of CEA to be adopted
					simple qualitative assessment of cumulative hydrological effects has been carried out (in Table 10.22 below).

**Table 10.22 CEA for Water Environment**

Project	Discussion
<b>Maes Mawr Solar Farm</b>	<p>Information on the solar farm development is available in the EIA Scoping Report<sup>67</sup>, produced in March 2022. Both the solar farm development site and the Proposed Development area are located within the Afon Taf catchment, with both sites proposed to be connected to the connection point at Upper Boat. The solar farm development site is located approximately 500m to the southeast of the Proposed Development, between Church Village and Treforest Industrial Estate. The solar farm includes a substation and a cable route of less than 2 km and covers approximately 40 hectares. The Afon Taf catchment covers a total area of 6319 ha, which in comparison to the solar farm development site is significantly larger.</p> <p>On the basis that the development sites will have a suite of effective embedded measures of high level confidence (agreed via planning), it is expected that the potential effects to hydrology receptors, as a result of the Maes Mawr Solar Farm and associated infrastructure, will be not significant. In it is determined that any cumulative effects would be negligible and therefore not significant.</p>

## 10.11 Preliminary significance conclusions

- 10.11.1 A summary of the results of the preliminary Water Environment assessment is provided in **Table 10.23**.

<sup>67</sup> Rhondda Cynon Taf County Borough Council. 2022. Maes Mawr Solar Farm planning application documents. [Online] Available here: [https://planningonline.rctcbc.gov.uk/online-applications/applicationDetails.do?activeTab=externalDocuments&keyVal=\\_RHOND\\_DCAPR\\_59346](https://planningonline.rctcbc.gov.uk/online-applications/applicationDetails.do?activeTab=externalDocuments&keyVal=_RHOND_DCAPR_59346) (Accessed 1 October 2022)

**Table 10.23 Preliminary summary of significance of effects on Water Environment receptors**

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor <sup>1</sup>	Magnitude of change <sup>2</sup>	Significance <sup>3</sup>	Summary rationale
<b>Wind Farm development and Grid Connection - Construction (and Decommissioning) phase</b>				
<u><b>Aquatic environment receptors</b></u> <b>Watercourses (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf, Nant Gelliwion, Nant Myddlyn / Nant Ty'rarwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), local biodiversity sites, ponds and springs.</b> <u><b>Potential Effect</b></u> <b>Temporary increase sediment-loading of surface water runoff from construction areas leading to deterioration in the surface water quality environment, deterioration in the status of WFD surface water bodies and deterioration in the conditions supporting local conservation sites</b>	Very Low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible to Minor (Not Significant)	Adoption of suitable embedded measures to limit sediment-laden runoff including standard good working practices, maintaining the stand-off distances from watercourses, appropriate management of soil stockpiles, development and implementation of a DMP utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of these works.
<u><b>Aquatic environment receptors</b></u> <b>Watercourses (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf, Nant Gelliwion, Nant Myddlyn / Nant Ty'rarwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd).</b> <u><b>Potential Effect</b></u> <b>Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.</b>	Low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible to Minor (Not Significant)	Effective implementation of the embedded measures designed to avoid the release of silt-laden runoff.



Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor <sup>1</sup>	Magnitude of change <sup>2</sup>	Significance <sup>3</sup>	Summary rationale
<p><b><u>Aquatic environment receptors</u></b>  <b>Watercourses (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf, Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), , groundwater, local biodiversity sites, ponds and springs</b>  <b>Potential Effect</b>  <b>Accidental release of pollution into surface water or ground by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD waterbodies and deterioration in the conditions supporting local conservation sites.</b></p>	Very low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible to Minor (Not Significant)	Implementation of the embedded measures designed to prevent pollution of surface water and groundwater. These include appropriate pollution prevention measures in line with recommended guidance, pollution incident response planning, water quality monitoring programme, implementation of the WMP for the construction phase, fuel and oil storage design, and development and implementation of a Materials Management Plan to manage potentially contaminated excavated material. If concrete batching is to happen on site, appropriate controls and water treatment facilities are to be agreed with NRW prior to construction. The use of sulphate resistant concrete is recommended.
<p><b><u>Aquatic environment receptors</u></b>  <b>Watercourses (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf, Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), , groundwater, local biodiversity sites, ponds and springs</b>  <b>Potential Effect</b>  <b>Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water runoff) into surface water or groundwater leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD</b></p>	Very low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible to Minor (Not Significant)	Implementation of the embedded measures designed to prevent pollution of surface water and groundwater. These include appropriate pollution prevention measures in line with recommended guidance, pollution incident response planning, water quality monitoring programme, implementation of the WMP for the construction phase, fuel and oil storage design, and development and implementation of a Materials Management Plan to manage potentially contaminated excavated material. If concrete batching is to happen on site, appropriate controls and water treatment facilities are to be agreed with NRW prior to construction.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor <sup>1</sup>	Magnitude of change <sup>2</sup>	Significance <sup>3</sup>	Summary rationale
<b>waterbodies and deterioration in the conditions supporting local conservation sites</b>				
<p><b><u>Aquatic environment receptors</u></b>  <b>Watercourses (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf, Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), groundwater, local biodiversity sites, ponds and springs</b>  <b><u>Potential Effect</u></b>  <b>Potential change in groundwater levels and groundwater baseflow to aquatic environment receptors</b></p>	Very low (least sensitive) to Medium (most sensitive)	Low	Negligible to Minor (Not Significant)	The magnitude of change from the identified potential effects resulting from dewatering activities is determined to be Low taking into account the duration, depth and footprint of the excavations and limited potential for encountering groundwater during excavations. However, the effects of dewatering on peatland will be assessed in more detail in the ES once delineation of the identified peat/bog features within the Wind Farm development area is completed at the end of 2022 (peats survey details provided in <b>Chapter 11: Ground Conditions</b> )
<p><b><u>Water resource receptors</u></b>  <b>Private water abstractions<sup>4</sup></b>  <b><u>Potential Effect</u></b>  <b>Potential change to water quality of a water supply resource which may affect the viability of an abstraction</b></p>	Very low (least sensitive) to Low (most sensitive)	Very Low	Negligible (Not Significant)	Implementation of embedded measures designed to prevent pollution of surface water and groundwater and to limit sediment-laden runoff (set out above for the aquatic environment receptors).

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor <sup>1</sup>	Magnitude of change <sup>2</sup>	Significance <sup>3</sup>	Summary rationale
<p><b><u>Water resource receptors</u></b>  <b>Private water abstractions<sup>4</sup></b>  <b><u>Potential Effect</u></b>  <b>Potential change to yield of a water supply resource which may affect the viability of an abstraction</b></p>	Very low (least sensitive) to Low (most sensitive)	Low	Negligible (Not Significant)	Further assessment will be undertaken in the ES and appropriate embedded measures will be proposed if appropriate (e.g. groundwater monitoring plan).
<p><b><u>Flood risk receptors (third party receptors)</u></b>  <b>People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area.).</b>  <b><u>Potential effect</u></b>  <b>Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCCs).</b></p>	Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	Limited land take and change in impermeable area. Implementation via WMP of embedded measures designed to provide runoff control/storage using SuDS to ensure no increase in runoff.
<p><b><u>Flood risk receptors (third party receptors)</u></b>  <b>People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area.</b>  <b><u>Potential effect</u></b>  <b>Changes to surface water flow conveyance arising from the presence of new or modified permanent watercourse crossings. This has the potential to increase the risk of flooding to flood risk receptors</b></p>	Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	If watercourse crossings are required appropriate design will be agreed with NRW to maintain existing flow conveyance. In addition, access crossing of a mapped surface water flow path in the central part of the Wind Farm development will include engineering of the access track with a pipe culvert to convey flows from existing drainage pathway.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor <sup>1</sup>	Magnitude of change <sup>2</sup>	Significance <sup>3</sup>	Summary rationale
<b>Wind Farm development - Operational phase</b>				
<p><b><u>Aquatic environment receptors</u></b>  <b>Watercourses (Afon Rhonnda Fawr, Nant Muchudd, Afon Elai, Afon Taf, Nant Gelliwion, Nant Myddlyn / Nant Ty'rarfwydd, Nant Dowlais, Nant Castellau and unnamed tributary Nant Muchudd), , groundwater, local biodiversity sites, ponds and springs</b>  <b><u>Potential Effect</u></b>  <b>Accidental spillage of pollutants (fuel or oil) during maintenance activities leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD waterbodies and deterioration in the conditions supporting local conservation sites.</b></p>	Very Low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible to Minor (Not Significant)	Implementation of embedded measures to control the potential impacts of accidental fuel, oil or chemical release as a result of maintenance activities onsite. These include appropriate maintenance of vehicles, equipment and wind turbines, development and implementation of a WMP and an accidental spill response protocol and implementation of standard best practice when using equipment or refuelling.
<p><b><u>Water resource receptors</u></b>  <b>Private water abstractions<sup>4</sup></b>  <b><u>Potential Effect</u></b>  <b>Potential change to water quality of a water supply resource which may affect the viability of an abstraction</b></p>	Very Low (least sensitive) to Low (most sensitive)	Very Low and Low	Negligible to Minor (Not Significant)	Implementation of embedded measures designed to prevent pollution of surface water and groundwater (set out above for aquatic environment receptors).

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor <sup>1</sup>	Magnitude of change <sup>2</sup>	Significance <sup>3</sup>	Summary rationale
<p><b><u>Flood risk receptors (third party receptors)</u></b>  <b>People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area.</b>  <b><u>Potential effect</u></b>  <b>Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., access tracks, crane pads, turbines, substation)</b></p>	Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	Limited land take and change in impermeable area. Implementation via a DMP of embedded measures designed to provide runoff control/storage using SuDS to ensure no increase in runoff.
<p><b><u>Flood risk receptors (third party receptors)</u></b>  <b>People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area.</b>  <b><u>Potential effect</u></b>  <b>Changes to surface water flow conveyance arising from the presence of new or modified permanent watercourse crossings. This has the potential to increase the risk of flooding to flood risk receptors</b></p>	Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	Where the proposed access tracks cross mapped surface water flow paths, a pipe culvert will be provided beneath the access track to convey flows from existing drainage pathways. The design of the pipe culvert will be confirmed as part of the detailed drainage design with the RCTCBC. Crossings will be subject to a Land Drainage Consent from RCTCBC. 10.9.35 Where the proposed underground cable crosses mapped surface water flow paths, each crossing will be individually reviewed / surveyed during detailed design (which will occur subsequent to gaining planning consent) to confirm the crossing methodology employed. It is anticipated that open cut crossing methodology will predominantly be used.

- 1) The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 10.8** and is defined as Very Low, Low, Medium and High.
- 2) The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 10.8** and is defined as Very Low, Low < Medium and High.
- 3) The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 10.8**.

- 4) The Draft ES water abstractions baseline is based on information provided by NRW and RCTCBC for the Wind Farm development and Grid Connection Corridor (OHL section) and associated study area. In the ES, this will be complemented by information on licensed water abstractions and private water abstractions within the underground cable section of the Grid Connection Corridor and associated study area which have been requested from NRW and RCTCBC, respectively.



## 10.12 Further work to be undertaken

- 10.12.1 The information provided in this Draft ES is preliminary, the final assessment of likely significant effects will be reported in the final submission of the ES. This section describes the further work to be undertaken to support the Water Environment assessment presented in the ES.

### Baseline

- 10.12.2 The Draft ES water abstractions baseline is based on information provided by NRW and RCTCBC for the Wind Farm development and Grid Connection Corridor (OHL section) and associated study area. In the ES, this will be complemented by information on licensed water abstractions and private water abstractions within the underground cable section of the Grid Connection Corridor and associated study area which have been requested from NRW and RCTCBC, respectively.

### Assessment

- 10.12.3 The effects of dewatering activities during the construction phase of the Proposed Development on peatland will be assessed in more detail in the ES once delineation of the identified peat/bog features within the Wind Farm development area is completed at the end of 2022 (peats survey details provided in **Chapter 11: Ground Conditions**).
- 10.12.4 Further assessment will be undertaken in the ES on the magnitude of change from the potential effects of dewatering activities on local groundwater levels and private abstractions.

### Environmental measures

- 10.12.5 The proposed outline surface water drainage strategy for the Proposed Development included in the Draft FCA (**Appendix 10A**) will be agreed in consultation with RCTCBC and confirmed in the final submission of the ES.