Pennant Walters Ltd

Environmental Statement

Appendix 10A Flood Consequence Assessment

This report was prepared by WSP UK Limited

August 2024

Report for

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Doc ref: 807095-WOOD-RP-OW-00001_P03

\\corp.pbwan.net\GLB-E&I\UK\GBBRS400-BSL\Shared\Projects\807095 Mynydd Llanhilleth Wind Farm\Deliver Stage\D Design_Technical\Reports\Environmental Statement\Resubmission 2024\Chapter 10\Appendices\AppA- FCA

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Document revisions

No.	Details	Date
1	Draft Report	November 2022
2	Final Report	June 2023
3	Final Report (supporting ES resubmission)	August 2024

Executive summary

This Flood Consequent Assessment (FCA) accompanies the Environmental Statement (ES) for the proposed Mynydd Llanhilleth Wind Farm and grid connection (the 'Proposed Development') located near Abertillery and Pontypool. It has been prepared in line with Welsh planning policy (principally the Welsh Assembly Government's (WAG) TAN15) and associated guidance to a) assess the consequences of flooding from all sources both during the construction and operational phases of development; and b) to appraise the potential effects of the scheme on the baseline level of existing flood risk to third parties to identify any significant consequences. The Proposed Development comprises the Wind Farm Development (inclusive of the wind turbines, internal access tracks, substation, underground cables and Temporary Construction Compound (TCC)) and the grid connection (which comprises an underground cable route). Once constructed, the significant permanent above ground infrastructure would comprise the seven turbines and the substation. All temporary construction works associated with the Proposed Development would be removed with the ground being reinstated to a similar condition and elevation as at present.

The hydrological baseline has been determined with information from desktop sources and a walkover survey. The Proposed Development intersects the headwaters of several ordinary watercourses which drain to the Afon Ebwy Fach, Afon Ebbw and Afon Lwyd, whilst the access track via Farm Road crosses the Cwmsychan Brook and Blaengaefog Brook. All potential sources of flooding have been considered under this assessment, which has identified that surface water runoff originating from the Proposed Development and fluvial flood risk to the access track pose the greatest potential flood risk.

The Proposed Development lies predominantly within an area of very low risk of fluvial flooding. However, the proposed access route via the existing Farm Road intersects small areas of fluvial Flood Zone C2, and as a result is subject to the Justification Test. The Justification Test is passed given that the access track has been assessed to be the most feasible route to the wind farm development.

Suitable flood risk management measures have been identified to address the potential risks identified; these include a Water Management Plan for the construction phase, stand-off distances from watercourses, stockpile management and a Detailed Drainage Design for the operational phase. Risks during decommissioning are considered to be very similar to those for construction, albeit disturbance will be more limited as some below-ground infrastructure will be left in-situ. Appropriate permissions and supporting appraisals will be obtained at the time of decommissioning to comply with the then current legislation and guidance. No residual risks were identified following this FCA, as such no additional mitigation measures are required.

For this FCA, an outline approach to drainage has been identified, including indicative discharge locations (discharge to ground and if required supplemented by discharge to surface water), discharge rates (greenfield Q_{BAR}) and Sustainable Drainage Systems (SuDS) attenuation volumes (up to and including the 1% AEP plus 20% and 40% climate change events for the construction and operational phases respectively). Investigation of the viability of infiltration as a means by which surface water runoff could be discharged will be undertaken post-consent, through liaison with Blaenau Gwent County Borough Council (BGCBC) and Torfaen Borough County Council (TBCC) as the Lead Local Flood Authorities (LLFAs) and Caerphilly County Borough Council (CCBC) as the SuDS Approval Body (SAB) and by undertaking soakaway testing. 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 Natural Resources Wales (NRW) and/or the SAB and the LLFAs.

Implementation of the identified flood risk management measures is considered to be appropriate mitigation to ensure the Proposed Development will be safe for its lifetime, with consideration of the vulnerability of its users, without increasing flood risk elsewhere and, where possible, will reduce flood risk overall.

The FCA concludes that the Proposed Development, together with the proposed flood risk management measures above, will not be subject to an unacceptable level of risk, nor would there be potential increased flood risk elsewhere. As such the Proposed Development is acceptable on flood risk grounds and meets the aims of TAN-15.

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1. Introduction

1.1 Purpose of this Report

1.1.1 This Flood Consequence Assessment (FCA) accompanies the Environmental Statement (ES) for the proposed Mynydd Llanhilleth Wind Farm and grid connection (the 'Proposed Development') located near Abertillery. This FCA has been prepared in accordance with Technical Advice Note 15: Development and Flood Risk (TAN15)[1].

1.2 Context

1.2.1 In accordance with the TAN15, a FCA is required as the Proposed Development area exceeds 1 ha. The Proposed Development is primarily within an area of very low flood risk from rivers in the Natural Resources Wales (NRW) Flood Map for Planning (Rivers)[2], with the exception of the access road via Farm Road which intersects Flood Zone 3.

1.2.2 This FCA demonstrates how flood risk to the Proposed Development and any increased flood risk to third parties due to that development, would be managed over the lifetime of the development, taking climate change into account.

1.3 Sources of Data and Information

1.3.1 **Table 1.1** summarises sources of data, site plans and maps that have been used to inform this assessment. Data requests have also been undertaken with Blaenau Gwent County Borough Council (BGCBC) and Torfaen County Borough Council (TCBC), as the Lead Local Flood Authorities (LLFAs), and NRW. Copies of relevant correspondence are provided in **Annex A** and **Annex B** respectively.

1.3.2 A meeting was held with Caerphilly County Borough Council (CCBC), as the SuDS Approval Body (SAB), on 02 December 2022 to discuss the proposed drainage strategy. A meeting was also held with CCBC on 06 June 2023 to provide generic advice with regards to Ordinary Watercourse consents. A further meeting was held with TCBC (as the LLFA) on 18 July 2023 to confirm the proposed approach for the watercourse crossings. Minutes of these meetings are provided in **Annex D.** These meetings were held to discuss proposals for the now withdrawn application (DNS Ref. 3273368) which proposed up to 8 turbines. This revised application reduces the number of turbines to up to 7 – all other aspects of the application remain the same. Therefore, the advice provided in these meetings remain relevant to this current application.

[1] The current version of TAN15 dates from 2004. Consultation on an updated version of TAN15 has recently been completed (April 2023) and the responses are being reviewed. https://www.gov.wales/technical-advice-note-tan-15-development-flooding-and-coastal-erosion - accessed August 2024

[2] Natural Resources Wales Flood Risk Map Viewer (available online Geocortex Viewer for HTML5 (https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/I ; accessed August 2024)

Table 1.1 Sources of desktop information used in this assessment

Data	Source	Purpose
Natural Resources Wales Flood Map for Planning	https://flood-map-for-planning.naturalresources.wales/ (accessed June 2023)	For assessment of fluvial flood risk
Natural Resources Wales Risk of Flooding from Surface Water	https://lle.gov.wales/catalogue/item/RiskOfFloodingFromSurfaceWater/?lang=en (accessed June 2023)	For assessment of surface water flood risk
Natural Resources Wales Flood Risk from Reservoirs	https://flood-map-for-planning.naturalresources.wales/ (Accessed June 2023)	For assessment of reservoir flood risk
BGS Geoindex Onshore – Aquifer Designation	http://mapapps2.bgs.ac.uk/geoindex/home.html (accessed June 2023)	To characterise the underlying aquifers and hydrogeology
British Geological Survey (BGS) Geology of Britain Viewer for geological information	http://www.bgs.ac.uk/data/mapViewers/home.html (accessed June 2023)	To characterise the underlying geology
Cranfield University – LandIS soilscapes viewer for soil classification	http://www.landis.org.uk/soilscapes/ (accessed June 2023)	To characterise the underlying soils
Ordnance Survey (OS) Mapping and Terrain data	Ordnance Survey	To characterise the local region and identify springs, ponds and lakes
Blaenau Gwent County Borough Council (2013) – Local Flood Risk Management Strategy	http://democracy.blaenau-gwent.gov.uk/Data/Ordinary%20Meeting%20of%20the%20Council/201307111400/Agenda/att220.pdf (accessed June 2023)	To characterise the local flood risk and management measures
Torfaen County Borough Council (2013) – Local Flood Risk Management Strategy	https://www.torfaen.gov.uk/en/Related-Documents/Roads-Highways-and-Pavements/Drainage/TorfaenLoc	To characterise the local flood risk and management measures

Data	Source	Purpose
	alFloodRiskManagementStrategy.pdf (accessed June 2023)	

Terminology

1.3.3 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.

1.3.4 **Table 1.2** 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, 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 1.2 Flood Zone definitions and associated annual exceedance probability

WAG TAN-15 DAM Flood Zone*	NRW Flood Bands	AEP	Definition
Development Advice Map (DAM)			
Flood Zone A	Very Low Risk	<0.1% AEP of river or sea flooding	Land with less than 0.1% AEP (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)	Low Risk	Between 1% and 0.1% AEP of river flooding Between 0.5% and 0.1% AEP of sea flooding	Land with between a 1 in 100 and 1 in 1,000 probability of river flooding in any year; or land having between a 1 in 200 and 1 in 1,000 probability of sea flooding in any year.
Flood Zone B	N/A	N/A	Based upon British Geological Survey drift data
N/A	Medium Risk	Between 3.3% and 1% AEP risk of river flooding / between 3.3% and 0.5% AEP risk of sea flooding	Land having a probability of river flooding of between 1 in 30 and 1 in 100 in any year; or land having a probability of sea flooding of between 1 in 30 and 1 in 200 in any year.

WAG TAN-15 DAM Flood Zone*	NRW Flood Bands	AEP	Definition
N/A	High Risk	>3.3% AEP of flooding	Land having a 1 in 30 or greater probability of river or sea flooding in any year.
Flood Map for Planning (rivers)			
Flood Zone 1	N/A	<0.1% AEP of flooding	Land with less than 0.1% AEP (1 in 1,000) probability of flooding from rivers or the sea, in any given year
Flood Zone 2	N/A	Between 0.1% and 1% AEP of flooding	Land with 0.1% to 1% (1 in 1000 to 1 in 100) probability of flooding from rivers in a given year, including the effects of climate change.
Flood Zone 3	N/A	>1% AEP of flooding	Land with more than 1% (1 in 100) probability of flooding from rivers in a given year, including the effects of climate change.
Flood Map for Planning (surface water and small watercourses)			
Flood Zone 1	N/A	<0.1% AEP of flooding	Land with less than 0.1% AEP (1 in 1,000) probability of flooding from surface water or small watercourses, in any given year
Flood Zone 2	N/A	Between 0.1% and 1% AEP of flooding	Land with 0.1% to 1% (1 in 1000 to 1 in 100) probability of flooding from surface water or small watercourses in a given year, including the effects of climate change.
Flood Zone 3	N/A	>1% AEP of flooding	Land with more than 1% (1 in 100) probability of flooding from surface water or small watercourses in a given year, including the effects of climate change.
Groundwater flood risk			
N/A	N/A	N/A	Flood risk bands assessed by professional judgement, in the absence of criteria set by NRW.

WAG TAN-15 DAM Flood Zone*	NRW Flood Bands	AEP	Definition
			High risk: flooding has occurred/mapped or reported significant risk, significant consequences. Medium risk: flooding has occurred/mapped but no significant consequences. Low risk: flooding has not occurred, no significant mapped/reported risk.
Sewer flood risk			
N/A	N/A	N/A	Flood risk bands assessed by professional judgement, in the absence of criteria set by NRW. High risk: flooding has occurred/mapped or reported significant risk, significant consequences. Medium risk: flooding has occurred/mapped but no significant consequences. Low risk: flooding has not occurred, no significant mapped/reported risk.
Artificial flood risk			
N/A	N/A	N/A	Flood risk assessed on the basis of flood extent shown on NRW Flood Risk from Reservoir Map.

Notes: * Welsh Assembly Government's (WAG) Technical Advice Note 15 (TAN-15) Development Advice Map (DAM)

1.4 Structure of this Report

1.4.1 The report is structured as follows:

- **Section 2** - Site Description, Development Proposals and Planning Context;
- **Section 3** - Flood Risk Appraisal;
- **Section 4** – Outline Drainage Strategy;
- **Section 5** - Flood Risk Mitigation; and
- **Section 6** - Conclusions.

1.4.2 Figures are presented within each section while supporting documents are presented at the end of the report in the form of appendices. These are as follows:

- **Annex A** contains details of the correspondence and data provided by BGCBC and TCBC;
- **Annex B** contains details of the correspondence and data provided by NRW; and
- **Annex C** contains the calculations of surface water runoff attenuation volumes.

2. Site Description, Development Proposal and Planning Context

2.1 Introduction

2.1.1 This section provides an overview of the Proposed Development area location and characteristics (**Section 2.2**), a description of the Proposed Development (**Section 2.3**) and establishes the planning policy context for the FCA (**Section 2.4**).

2.2 Site Description

The Site

2.2.1 The Proposed Development site lies across both the BGCBC and TCBC administrative areas, approximately 3km southeast of Abertillery and 4.5km northwest of Pontypool. The Proposed Development is accessed by a track running from Talywain to the northeast.

2.2.2 The current baseline is described separately for the Wind Farm Development (wind turbines and crane pads, access tracks, temporary construction compound (TCC) and substation), and the grid connection (underground cable) which are collectively referred to as the Proposed Development. A walkover survey of the Wind Farm Development area was carried out by a Wood hydrologist on 3rd August 2022. Photographs of the walkover are provided in **Appendix 10C** of ES **Chapter 10: Water Environment**.

Land use and topography

Wind farm development

2.2.3 The Proposed Development covers an area of approximately 268ha. The area is largely undeveloped, although has been subject to coal mining dating back to the mid-19th century as shown on historical mapping[3]. Small areas of land have been built upon more recently including farms and access tracks, but the area is largely dominated by grassland and coniferous woodland. A disused former quarry (known as 'The Canyon') is situated immediately south of the Proposed Development. The closest residential developments are Abertillery to the north-west, Llanhilleth to the west, Pontypool and Pontnewynydd to the east and Hafodrynys to the south. The A467 is located to the west of the Proposed Development, whist the A472 and A4043 are situated to the south and east of the Proposed Development, respectively.

2.2.4 The topography of the Proposed Development is shown in, as defined from the OS (Ordnance Survey) Terrain 5 data. The Proposed Development is located on a broad summit (Mynydd Llanhilleth) which runs roughly in a north-south direction and leads to Coety Mountain to the north at an elevation of 578m AOD, approximately 5km from the

[3] National Library of Scotland (2022). Old maps online. Available at: https://www.oldmapsonline.org/en/Wales (accessed June 2023)

Proposed Development. The Proposed Development itself sits roughly across the summit of the ridge, with elevations varying between 250m AOD in the south-west to 470m AOD in the north of the Proposed Development. The majority of the Proposed Development sits at elevations between 350m AOD and 450m AOD across the ridge summit, as such the low-lying area associated with the Nant Dbu valley is excluded from the Proposed Development.

Grid connection corridor

2.2.5 The grid connection corridor is located on the northern valley face of the Nant Ddu, and extends east of the Proposed Development north of Ty-Bwmpyn Road. The grid connection runs from an elevation of approximately 400m AOD to 270m AOD.

Hydrology and Drainage

Wind Farm development

2.2.6 The Wind Farm development area sits on a watershed between the Afon Ebwy Fach/Afon Ebwy catchment to the west and the Afon Lwyd catchment to the east, both of which are classified as Main Rivers by NRW. The hydrological setting is shown in **Figure 10A.3**.

2.2.7 The Afon Ebwy Fach is situated approximately 800m west of the Proposed Development and flows south joining the Afon Ebwy at Aberbeeg. At its nearest point, the Afon Ebwy passes within 1km of the south-west limit of the Proposed Development and continues flowing south. The Afon Lwyd is situated 2km east of the Proposed Development and flows south through Pontypool.

2.2.8 The Wind Farm development area is intersected by the headwaters of several tributaries of the Afon Ebwy and Afon Lwyd which are classified as ordinary watercourses. The headwaters of the Nant Cwmmllwydrew, Nant Cyffin and Nant y Cnyw intersect the west and south-west boundary of the Proposed Development and drain south into the Afon Ebwy. The headwaters of the Nant Ffwydd-oer, Nant Caws and Nant Dbu intersect the south-east limits of the Proposed Development and drain east into the Afon Lwyd catchment. At the time of the site visit in August 2022, the Nant Ddu and Nant Ffrwd-oer were largely dry at their closest points to the Proposed Development.

2.2.9 Within the wider area of interest, the Nant y Groes to the north-west drains west into the Afon Ebwy Fach, and the Cwmsychan Brook and Blaengaefog Brook to the north-east drain east into the Afon Lwyd. An unnamed tributary joins the Cwymsychan Brook at Abersychan. The Trosnant Brook intersects the southern part of the area of interest, flowing east into the Afon Lwyd. The Cwmsychan Brook and Blaengaefog Brook were inspected on the Site visit in August 2022 at Farm Road, and flow was evident (approximately 2 l/s). The Cwmsychan Brook road culvert was approximated to be a 2m diameter circular pipe.

2.2.10 NRW was contacted to obtain river flow data in the vicinity of the Proposed Development. The closest permanent flow gauging station is on the Afon Ebwy at Aberbeeg (Station ID: 56019: NGR SO2097501467) approximately 0.8 km south (downstream) of the Proposed Development. The data indicates a mean daily flow rate of 2.68m^3/s (1984 to 2012).

2.2.11 The OS map shows several springs within the wider area of interest with two springs issuing within the Wind Farm development area. These are both located in the south, in a region of former quarrying known as ‘The Canyon’. The springs are located at an

approximate elevation of 358mAOD. The western-most spring drains south-west to the Nant y Cnyw, whilst the eastern-most spring drains south-east to the Nant Ffrwd-oer.

2.2.12 There are numerous ponds/lakes of varying sizes within the wider area of interest (described in more detail in **Chapter 10: Water Environment** of the ES), and four within the southern portion of the Wind Farm development area at elevations approximately between 330mAOD and 405mAOD. The ponds and spring were not explicitly inspected on the Site visit, though some standing water was evident on Mynydd Llanhilleth common.

Grid connection

2.2.13 The Grid connection corridor runs across the northern face of the Nant Ddu valley, close to the watershed ridge between the Nant Ddu to the south and unnamed tributary of the Cwmsychan Brook to the north. As such, there is no interaction with any permanent watercourses along its route.

Geology, Hydrogeology and Soils

Wind Farm development

2.2.14 The BGS online geology mapping indicates that there are limited superficial deposits across the Wind Farm development area, primarily following the valley floors. The Afon Ebwy Fach, Afon Ebwy and Afon Lwyd flow over Quaternary deposits of alluvium (clay, silt, sand and gravel), head (clay, silt, sand and gravel) and till. The northern portion of the Site is underlain by till deposits that sit across the ridge at the headwaters of the Nant Dbu. In addition, a band of alluvium follows the Nant Dbu valley floor eastward towards the confluence with the Afon Lwyd.

2.2.15 The Wind Farm development area is underlain by the Carboniferous South Wales Upper Coal Measures Formation. 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 comprises the Grovesend Formation and Hughes Member (mostly sandstone with smaller areas of sandstone, mudstone, and siltstone), which underlay the majority of the Wind Farm development area. Across the wider area of interest, the Rhondda and Brithdir Members (Pennant Sandstones with thin mudstone/siltstone and seat-earth interbeds and mainly thin coals) underlay the Afon Ebwy Fach, Afon Ebwy and Afon Lwyd valleys.

2.2.16 The South Wales Upper Coal Measures and the alluvium deposits underlying the Wind Farm development area are classified by NRW 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 aquifers formerly classified as minor aquifers. The till and head deposits are classified as Secondary Undifferentiated aquifers. These are assigned in: "*cases where it has not been possible to attribute either category Secondary A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type"*.

2.2.17 The LANDIS mapping indicates that the soils within the Wind Farm development area comprise of restored soils from quarry and opencast spoil (in the centre and south areas),

very acid loamy upland soil with a wet peaty surface (along the ridge line extending north to Coity Mountain) and freely draining acid loamy soils over rock (in the outer edges of the Wind Farm development area typically at lower elevations). The wider area of interest to the west and east is predominantly underlain by freely draining acid loamy soils over rock.

2.2.18 A Phase 1 peat depth survey was undertaken by Wood on 16 September 2021[4] and is discussed in detail **Chapter 11: Ground Conditions** of the ES. The survey indicated that the Wind Farm development area is generally not underlain by peat (peat depths of up to 0.40m with a calculated mean depth <0.1m). Only two locations recorded potential peat of 0.4m and therefore peat can be considered as very localised across the wind farm development area. However, this should be confirmed with an intrusive ground investigation.

Grid connection

2.2.19 The underlying geology across the grid connection corridor is similar to that across the wider Wind Farm development area, underlain predominantly by the South Wales Upper Coal Measures Formation comprising of the Grovesend Formation and Hughes Member (mostly sandstone with smaller areas of sandstone, mudstone, and siltstone). The eastern portion of the corridor is underlain by narrow bands of Deri Formation (mudstone, siltstone and sandstone) and South Wales Middle Coal Measures Formation (mudstone, siltstone and sandstone).

2.2.20 There are no superficial deposits underlaying the grid connection corridor.

2.3 Development Proposals

2.3.1 The development proposals incorporate the construction and operation of a wind farm with up to seven turbines and associated infrastructure. The key elements of the Proposed Development are shown in **Figure 10A.1** and listed below. A more detailed description is provided in **Chapter 4: Description of Proposed Development** of the ES.

- Seven wind turbines, each three-bladed with a maximum height to blade tip of 180m;
- Access works – approximately 9.8km of site access tracks, including 5.8km of existing track. Of which, 2.2km of the existing tracks will require upgrades with an approximate width of 5m;
- Crane pads at each turbine location, sized to suit the turbine manufacturers requirements (typically 2500m^2);
- Turbine foundations, typically comprising of a reinforced concrete slab with dimensions of approximately 20m x 4m depth;
- Underground power cables linking the turbines and the on-site substation, with a typical trench width of 450mm and depth of 750mm;
- TCC (maximum area of 2500m^2), laydown, and storage areas;
- On-site substation with an approximate area of 14m x 10m; and

[4] Wood (2021). Mynydd Llanhilleth Wind Farm – Peat Depth Survey Report. Document ref.

- Grid connection infrastructure, including the control building and underground cables (1.5km to 2km in length and trench width of 0.60m to 1.5m and depth of up to 1.5m) linking the Proposed Development to the distribution network, together with construction enabling works). The evaluation of potential effects from the grid connection presented in this FCA is based on baseline surveys, desk-based assessments and a worst-case scenario of a 66kV underground cable.

2.3.2 The Wind Farm development will be designed with an operational life of 30 years. At the end of this period the developer has two options; to decommission the wind farm and dismantle and remove the turbines; or to apply for an extension to the operating period using existing equipment or by installing new equipment on the Site. For the purposes of this assessment, it is assumed that the wind farm would be decommissioned.

2.4 Planning Context

Introduction

2.4.1 The purpose of this section is to identify the key policy documents that define the scope of this assessment. The section is structured in a hierarchical order, from national policy down to local guidance.

National Policies

Technical Advice Note 15 (TAN15)

2.4.2 Technical Advice Note 15: Development and Flood Risk (TAN15 – July 2004)[5] 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 11, 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 completed (April 2023) and the responses are being reviewed by the Welsh Government. 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 Flood Map for Planning (FMfP) 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 this assessment.

2.4.3 The updated FMfP mapping and Flood Risk Assessment Wales Map have been used as a further reference point for the assessment of flood risk to the Proposed Development, given that this is understood to be a more contemporary dataset utilising the latest and improved datasets.

[5] Welsh Government. 2004. *Technical Advice Note 15: Development and Flood Risk*. Planning Policy Wales. (Online) Available from: https://gov.wales/sites/default/files/publications/2018-09/tan15-development-flood-risk.pdf (Accessed June 2023).

The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales, Welsh Government

2.4.4 The National Strategy for FCERM in Wales[6], 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. NRW are responsible for managing the flood risks from the main rivers and sea across Wales; whilst Local Authorities LLFAs are responsible for managing risks associated with surface water, groundwater, and ordinary watercourses.

Sustainable Drainage (SuDS) Statutory Guidance, Welsh Government

2.4.5 The SuDS Statutory Guidance[7] 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 would remain effective for the lifetime of the development.

Local plans and policies

2.4.6 Local plans and policies and relevant guidance to this FCA are summarised in **Table 2.1**

Table 2.1 Local Plans, policies and guidance

Policy/ Plan / Guidance	Key Provisions
Flood Risk Management Strategy, Blaenau Gwent County Borough Council (BGCBC) (2013)[8]	The Blaenau Gwent County Borough Council (BGCBC) Flood Risk Management Strategy (FRMS) sets out the responsibilities of the LLFA to address 'local' flood risks from ordinary watercourses, surface water and groundwater. The strategy is used by BGCBC to co-ordinate flood risk management across the region. The FRMS has been used to inform Section 3 of this report.
Flood Risk Management Plan, Blaenau Gwent County Borough	The BGCBC Flood Risk Management Plan (FRMP) identifies that the primary source of flood risk within the Abertillery and Blaina community areas, which are relevant to this FCA, is associated with ordinary watercourses and intakes to existing surface water culverts. The FRMP sets out how risk management authorities will work to manage flood risk.

[6] Welsh Government. 2010. The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales. (Online) Available from: https://gov.wales/sites/default/files/publications/2021-03/the-national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf (Accessed August 2024)

[7] Welsh Government. 2019. *Sustainable Drainage (SuDS) Statutory Guidance*. (Online) Available from: https://gov.wales/sites/default/files/publications/2019-06/statutory-guidance.pdf (Accessed August 2024).

[8] Blaenau-Gwent County Borough Council. 2013. Local Flood Risk Management Strategy. (Online) Available at: https://www.blaenau-gwent.gov.uk/en/resident/emergencies-crime-prevention/flooding/flood-risk-management-strategy-plan/ (Accessed August 2024).

Policy/ Plan / Guidance	Key Provisions
Council (BGCBC) (2015)[9]	
Local Flood Risk Management Strategy, Torfaen County Borough Council (TCBC) (2013) [10]	The TCBC FRMS sets out the responsibilities of the LLFA to address 'local' flood risks from ordinary watercourses, surface water and groundwater. The strategy is used by TCBC to co-ordinate flood risk management across the region. The FRMS has been used to inform Section 3 of this report.
Flood Risk Management Plan, Torfaen County Borough Council (TCBC) (2015) [11]	The TCBC FRMP identifies the key sources of flood risk within the borough as being fluvial flooding associated with the Afon Llwyd and surface water flooding in urban areas. The FRMP sets out how risk management authorities will work to manage flood risk.
Sustainable Drainage Approval Body (SAB), Caerphilly County Borough Council (CCBC) (2021)[12]	CCBC undertake the SAB technical approvals on behalf of BGCBC and TCBC. At present, CCBC have not produced any technical guidance on sustainable drainage design or standards. However, the application guidance does make reference to the key national documents listed above
Severn Preliminary Flood Risk Assessment (PFRA), Natural Resources Wales (NRW) and the Environment Agency (EA) (2018)[13]	The Severn PFRA was undertaken in December 2018. The document is used to inform management of the River Severn catchment in regard to flood risk and FRMPs developed by Local Authorities within the catchment. The catchment area is inclusive of the Blaenau Gwent County Borough.

2.5 The Justification Test

2.5.1 TAN15 directs that preference to siting projects within Zone A must be given, then to Zone B where flooding from fluvial or tidal sources will be less of an issue. Projects should be

[9] Blaenau-Gwent County Borough Council. 2015. Flood Risk Management Plan. (Online) Available at: https://www.blaenau-gwent.gov.uk/fileadmin/documents/Resident/Planning/Floods_FRMP_complete.pdf (Accessed August 2024).

[10] Torfaen County Borough Council. 2013. Local Flood Risk Management Strategy. (Online) Available at: https://www.torfaen.gov.uk/en/Related-Documents/Roads-Highways-and-Pavements/Drainage/TorfaenLocalFloodRiskManagementStrategy.pdf (Accessed August 2024)

[11] Torfaen County Borough Council. 2015. Flood Risk Management Plan. (Online) Available at: https://www.torfaen.gov.uk/en/Related-Documents/Roads-Highways-and-Pavements/Drainage/Torfaen-Flood-Risk-Management-Plan.pdf (Accessed August 2024)

[12] Caerphilly CBC. 2021. Sustainable Drainage Approval Body (SAB). (Online) Available at: https://www.caerphilly.gov.uk/sab (Accessed August 2024).

[13] Natural Resource Wales. 2018. Severn Preliminary Flood Risk Assessment. (Online) Available at: https://cdn.naturalresources.wales/media/687716/pfra-severn.pdf (Accessed August 2024).

directed away from Zone C, although where this is not possible the project will be subject to the tests set out in Sections 6 and 7 of TAN15.

2.5.2 The DAM (**Figure 10A.5**) shows that the vast majority of the Proposed Development is within Flood Zone A (see section 1.3 for DAM Zone definitions) and is therefore deemed to be compatible development as summarised in Section 9 of TAN15 (Summary of Policy Requirements). The FCA and mitigation measures will need to demonstrate that there is no increase in flood risk elsewhere and consideration of the surface water requirements. However, the access track via British Road intersects small areas of Flood Zone C2 adjacent to Talywain. The associated vulnerability classification for this element of the development and associated construction works for access improvements is 'Less Vulnerable', which is compatible with the Flood Zone but subject to the Justification Test.

2.5.3 The vulnerability of the Proposed Development elements and Flood Zone compatibility is presented below.

Table 2.2 Application of the TAN15 policy requirements

Development type	Flood risk vulnerability classification	Flood Zones[1]	Flood risk vulnerability and flood zone 'compatibility'
Construction Phase			
Temporary construction compound (including offices and welfare facilities)	Less Vulnerable	A	✓ (No Justification Test required)
Construction and working areas	Less Vulnerable	A	✓ (No Justification Test required)
Operational Phase			
Wind turbines	Highly Vulnerable	A	✓ (No Justification Test required)
Substation	Highly Vulnerable	A	✓ (No Justification Test required)
Grid connection	Highly Vulnerable	A	✓ (No Justification Test required)
Internal access tracks	Less Vulnerable Less Vulnerable	A C2	✓ (No Justification Test required) ✓ (Subject to Justification Test)

Notes:

✓ Development is appropriate

X Development should not be permitted

[1] Definition of flood zones is provided in **Table 1.1**

2.5.4 A review of possible access routes to the Proposed Development was undertaken during the design evolution process, as summarised in **Chapter 3: Need, Alternatives and Iterative Design** of the ES. The proposed access route via British Road and the B4246 was chosen given that this was the only existing access route which allowed sufficient access up to the Proposed Development. Alternative access existing tracks were of insufficient size to facilitate the necessary access requirements, and therefore the only alternative would have been to build a new road which would be at significantly greater cost and likely result in more substantial impacts to the wider environment.

2.5.5 In addition, the risk of flooding to the access track and construction activities associated with the junction improvement works can be managed with appropriate mitigation measures, as outlined in **Section 5**. Therefore, the Justification Test is considered to be passed.

3. Flood Risk Appraisal

3.1 Introduction

3.1.1 The assessment will use the source-pathway-receptor approach, whereby all three of those elements must exist for these to be a risk to be assessed. The presence of a source is initially screened in **Section 3.2** below. Where a potential source is identified, the risk itself will be assessed with respect to the likelihood and consequence of flooding in the subsequent sub-sections. Where necessary, appropriate flood risk management measures will be set out in **Sections 4** and **5** to address the identified risks.

3.2 Screening of all Potential Sources of Flood Risk

3.2.1 **Table 3.1** provides an initial screening of all potential flood risk across the Proposed Development. Those that are screened in as posing a potential flood risk are then considered in the following sub-sections.

Table 3.1 Screening of all Potential Flood Risk Sources

Source of Flooding	Potential Connection to Proposed Development	Screened In?
Fluvial	The DAM (**Figure 10A.5**) and FMfP (**Figure 10A.4**) show that the Proposed Development lies predominantly within an area of very low risk of fluvial flooding (Flood Zone A in the DAM and Flood Zone 1 in the FMfP). However, the proposed access route intersects small areas of high risk at Golynos (Flood Zone C2 without significant flood defence infrastructure in the DAM and Flood Zone 3 in the FMfP) associated with the Cwmsychan Brook and Nant Ffrwd. Fluvial flooding is assessed in further detail in **Section 3.4.**	Yes
Tidal	The Proposed Development is located over 20km from the sea and is at an elevation exceeding 250m AOD. Therefore, there is considered to be no risk of tidal flooding to the Proposed Development and this is not considered further in this assessment.	No
Surface water	The Flood Risk Assessment Wales map – Flood risk from surface water and small watercourses (**Figure 10A.6**) shows that the majority of the Proposed Development is at very low risk of flooding (<0.1% AEP) from this source. However, there are several areas of mapped high risk (3.33% AEP). Surface water runoff originating from the Proposed Development area also needs further consideration.	Yes

Source of Flooding	Potential Connection to Proposed Development	Screened In?
	Surface water flooding is assessed in further detail in **Section 3.5.**	
Groundwater	The Proposed Development is underlain by South Wales Upper Coal Measures which consists of a cyclical sequence of sandstone, mudstone, siltstone and coal seam layers (Secondary A aquifer). Groundwater flooding is assessed in further detail in **Section 3.7.**	Yes
Sewer	The Proposed Development is primarily situated away from developed areas (due to its elevation). However, a DCWW watermain intersects the central portion of the Proposed Development across Mynyndd Llanhilleth Common. The risk of sewer flooding is therefore considered further in **Section 3.7**.	Yes
Artificial	The NRW Reservoir Flood Risk Map (**Figure 10A.7**) 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 Ebwy, Afon Ebwy Fach and a tributary near Abertillery associated with breach/failure of reservoirs to the north of the Proposed Development. No raised bodies of water are proposed as part of the Proposed Development. Owing to the lack of source, the risk of artificial flooding in the area is considered to be low and is not considered further in this assessment.	No

3.3 Historical Flooding

3.3.1 Historical flood extent mapping received from NRW indicates that there are no recorded flood incidents within the Proposed Development (including the grid connection corridor).

3.3.2 Correspondence with both BGCBC and TCBC confirm that neither council hold any records of historical flooding across the Proposed Development, though it is also noted that any flooding is unlikely to be reported given the rural setting and land use.

3.4 Fluvial Flooding

Wind Farm Development

3.4.1 The majority of the Wind Farm development area is situated within a region of very low risk of fluvial flooding (corresponding to Flood Zone A in the DAM (**Figure 10A.5**) and Flood Zone 1 in the FMfP (**Figure 10A.4**)), owing to its location on an elevated summit (Mynydd Llanhilleth). However, the proposed access route intersects small areas of high fluvial flood risk at Golynos (Flood Zone C2 without significant flood defence infrastructure

in the DAM and Flood Zone 3 in the FMfP) associated with the Cwmsychan Brook and Nant Ffrwd.

3.4.2 The DAM suggests that in extreme flood events, floodwater on the Nant Ffrwd backs up behind the Emlyn Road and railway embankments at Talywain, and flows southwest across Albert Road and Farm Road, which will be used as the primary access to the Wind Farm Development. This combines with floodwater flows from the Cwmsychan Brook and Blaengaefog Brook, as shown in **Figure 10A.5**. The extent of flooding is generally greater than the FMfP mapping, likely owing to the coarser topography resolution.

3.4.3 The FMfP (surface water and small watercourses) has been used to further inform the flood risk associated with the Cwmsychan Brook and Blaengaefog Brook, given that the Blaengaefog Brook is not included within the FMfP (rivers) and DAM. The mapping indicates a narrow band of Flood Zone 3 through the proposed access road, coincident with the Cwmsychan Brook centreline (**Figure 10A.6**), though it is acknowledged that the road crossing appears to have been represented using a 2D 'cut' approach without explicit representation of the culvert (estimated to be a 2m diameter circular culvert, inspected on the site visit). Therefore, the flood risk mapping across the road at this crossing point is erroneous.

3.4.4 The FMfP (surface water and small rivers) shown in **Figure 10A.6** indicates that flows from the Blaegaefog Brook join the Cwmsychan Brook upstream of the access track. This is inconsistent with the OS mapping and observations from the Site walkover, which identified the Blaengaefog channel running approximately 100m northeast of the Cwmsychan Brook. However, it is possible that floodwater flows bypass the Blaegaefog channel during periods of heavy rainfall and join the Cwmsychan Brook, though owing to lack of access this could not be validated in the field.

3.4.5 The associated flood model for the Cwmsychan Brook, Blaengaefog Brook and Nant Ffrwd was requested from NRW. However, NRW have advised that these flood extents have been derived based on a national scale model, which is not suitable for detailed site-specific assessments. As a result, the 0.1% AEP flood extent has been used as a proxy to assess the potential impacts of climate change.

Grid connection

3.4.6 The grid connection corridor runs across the northern valley face of the Nant Dbu across a ridge at elevations of approximately 270m AOD to 400m AOD. This is entirely within a region of very low risk of fluvial flooding (corresponding to Flood Zone A in the DAM (**Figure 10A.5**) and Flood Zone 1 in the FMfP (**Figure 10A.4**), and hence the risk of fluvial flooding is considered to be negligible.

3.5 Surface Water Flooding

Surface water run-on

3.5.1 The FMfP – surface water and small watercourses (**Figure 10A.6a**) 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. The mapping shows that most of the Proposed Development is at very low risk of flooding from this source (Flood Zone 1; <0.1% AEP probability of flooding in a given year), reflective of the general topography of

the Proposed Development and locality across a ridge summit. However, there are several regions of mapped higher risk, discussed further in the subsections below.

Wind Farm development

3.5.2 The vast majority of the Wind Farm development area, including all turbines (and associated infrastructure), substation and TCC are at very low risk (Flood Zone 1; <0.1% AEP) of flooding from surface water and small watercourses.

3.5.3 Flood Zones 2 and 3 are coincident with minor flowpaths and depressions within the Wind Farm development area, including the headwaters of the Nant Caws, Nant Ffrwd-oer, Nant y Cnyw, and Nant Dbu.

3.5.4 In addition, a band of elevated risk (Flood Zones 2 and 3) is shown in the central-eastern portion of the Proposed Development across Mynydd Llanhilleth Common, consistent with a shallow valley observed on the Site walkover (**Figure 10A.6b**). The mapping indicates that surface water is anticipated to accumulate and flow in a northwest direction towards the headwaters of the Nant Dbu.

3.5.5 The proposed access tracks intersect various mapped surface water flowpaths (Ordinary Watercourses) within Flood Zones 2 and 3. Indicative crossing points identified based on review of the FMfP and satellite imagery are outlined in **Table 3.2** and shown on **Figure 10A.6**.

Table 3.2 Indicative crossings of Ordinary Watercourses

ID	NGR	FMfP – Flood Zone	Comments
Access track crossings			
1	SO 25641 04029	Flood Zone 1	Existing access (Farm Road) crossing of Blaengaefog Brook. Crossing location is indicative and it is assumed that an existing culvert is in place but could not be identified on the Site visit due to the dense vegetation. Although mapped as Flood Zone 1, the FMfP as shown in **Figure 10A.6** is likely to underestimate the flood risk due to the narrow channel.
2	SO 25422 04030	Flood Zone 3	Existing access (Farm Road) crossing of Cwmsychan Brook. Existing culvert in place may be subject to modifications due to track widening required.
3	SO 23690 02900	Flood Zone 2	New access track crossing of minor ditch evident on satellite imagery.
4	SO 23969 02865	Flood Zone 2	New access track crossing of flowpath draining south into the Nant Ddu. There is an existing farm track crossing in this location, which will likely be subject to upgrades as part of the Proposed Development.

ID	NGR	FMfP – Flood Zone	Comments
5	SO 23943 01899	Flood Zone 3	New access track crossing of flowpath across Mynydd Llanhilleth Common.
6	SO 23783 02236	Flood Zone 3	Existing access track crossing of flowpath across Mynydd Llanhilleth Common. Existing culvert in place.
7 & 8	SO 23897 01588 SO 23808 01521	Flood Zone 3	New access track crossings (in close proximity to each other) of minor flowpath (tributary of the Nant Ffrwd-oer). There is an existing unsurfaced track along this route though it is not known whether any existing culvert exists.
Grid connection crossings (underground cable)			
GC1	SO 23582 02812	Flood Zone 3	Grid connection crosses surface water flowpath (headwaters of the Nant Ddu).
GC2	SO 23698 02825	Flood Zone 2	Grid connection crosses minor ditch evident on satellite imagery, for which the FMfP identifies as Flood Zone 2 (as shown in **Figure 10A.6**).
GC3	51.71940295, -3.10214983	Flood Zone 1	Grid connection crosses surface water flowpath draining south to the Nant Ddu, for which the FMfP (as shown in **Figure 10A.6**) identifies as Flood Zone 1.

3.5.6 The proposed crossing points have the potential to impact on flow conveyance and increase local flood risk. Potential mitigation to assist in conveying flows (consistent with the existing flow pathway) is discussed in **Section 5.**

3.5.7 Existing access tracks and crossing points may be subject to modifications associated with access track improvements or following detailed survey (post consent), should an upgrade be deemed necessary as a result of structural considerations. Mitigation to ensure that any track updates and widening would have no impact to the existing flow conveyance is discussed in **Section 5**.

Grid connection

3.5.8 The FMfP (**Figure 10A.6a**) shows that the grid connection corridor is mapped almost entirely at very low risk of surface water flooding (Flood Zone 1; less than 0.1% AEP), owing to its location running broadly across a ridge and minimal upstream catchment.

3.5.9 However, the grid connection corridor crosses Ordinary Watercourses (mapped surface water flowpaths and ditches) as outlined in **Table 3.2** shown on **Figure 10A.6**. Specific mitigation measures required are set out in **Section 5.**

Surface water runoff

3.5.10 The temporary and permanent changes in ground cover associated with the Proposed Development have the potential to increase the overall extent of lower permeability surfaces. In the absence of effective surface water management measures, this could lead to a temporary increase in peak runoff rates and a consequent increase in flood risk to third party receptors downstream. To address this, surface water management measures will be implemented, as discussed in **Sections 4** and **5**.

3.5.11 For the construction phase, such changes in ground cover would be associated with the wind turbine crane pads, TCC and internal access tracks. For the operational phase such changes would be associated with the crane pads (parking space), substation and internal access tracks (the grid connection wooden poles would have a negligible footprint and the TCC would be restored to its land previous use).

3.5.12 The flood risk receptors associated with the potential effects of increased runoff from the Proposed Development are identified below and shown in **Figure 10A.8**. These have been considered based on review of existing surface water flood risk, proximity to the Proposed Development, and review of topography to determine whether detrimental impacts arising from the development could impact the receptor.

- Residential properties, industry/business properties located in and around Pontnewynydd (FR1);
- Residential properties, industry/business properties located in and around Six Bells, Abertillery (FR2);
- Residential properties, industry/business properties located in and around Llanhilleth (FR3);
- Residential properties, industry/business properties located in and around Cwm Ffrwd-oer (FR4); and
- Residential and farm buildings at Plasycoed Farm (FR5).

3.6 Groundwater flooding

Wind Farm development

3.6.1 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.

3.6.2 Both the BGCBC[9] and TCBC[10] Local Flood Risk Management Strategies state that there are no reports of historical groundwater flooding within the borough area.

3.6.3 The Wind Farm development area has some sparse superficial deposits of Till though the central area, and is underlain by a bedrock of mudstones, siltstone and sandstone. Local BGS boreholes show that the underlying bedrock (Hughes Member) consists of a cyclical sequence of sandstone, mudstone, siltstone and coal seam layers. The Hughes Member is classified as a Secondary A aquifer.

3.6.4 Although groundwater emergence may be possible, any flows are expected to be limited/small as the Wind Farm development area is on a topographic high and the

underlying geology comprises bands of both higher and lower permeability bedrock layers. The elevated topography is likely to channel surface water to the valley floors relatively quickly, limiting the amount of percolation and increasing the amount of surface runoff. This is consistent with the EA Areas Susceptible to Groundwater Flooding (AStGWF) Map presented in the BGCBC FRMS which shows that the risk of groundwater flooding in the western portion of the Site (within the BGCBC administrative area) is less than 25%. Regions of elevated risk in the surrounding area are coincident with the low-lying river valleys.

Grid connection corridor

3.6.5 Owing to the similar underlying geology to the wider Wind Farm development area and elevated position, there is similarly considered to be low risk of groundwater flooding to the grid connection corridor.

3.7 Sewer Flooding

Wind Farm development

3.7.1 The Wind Farm development area is primarily situated away from developed areas (due to its elevation), and it is anticipated that few sewer networks underlay the Proposed Development for which water levels could feasibly rise to an extent which would generate flooding.

3.7.2 A small section of the Farm Road access track intersects the edge of Abersychan town. Whilst sewer flooding could occur in this area, any water that surcharged would be anticipated to drain into the Blaengaefog Brook. Similarly, any flows surcharging from minor sewer systems associated with nearby farm buildings would be expected to be minimal/intercepted by the local watercourses.

3.7.3 DCWW have indicated on the EIA Scoping Direction (**Table 10.4** of **Chapter 10: Water Environment** of the ES) that a watermain crosses the Proposed Development area. The indicative water main (based on georeferenced images provided by DCWW) is shown in **Figure 10A.9**. The watermain intersects Mynydd Llanhilleth Common running in a northwest-southeast direction and running south into the Nant Ffrwd-oer valley. Based on topography levels, it is envisaged that potential flooding originating from breach or surcharge of the watermain in the northern area would drain north, eventually discharging to the Nant Ddu. Similarly, any flooding originating from the watermain in the southern portion of the Wind Farm development area is anticipated to drain to the Nant Ffrwd-oer.

3.7.4 The watermain is anticipated to be intersected by the access tracks associated with the development at two locations, one of which is an existing road across Mynydd Llanhilleth and the second of which is associated with a new access track. These crossing points are shown in **Figure 10A.9**. Specific mitigation measures are outlined in **Section 5** to mitigate the risk of interference with the watermain. The risk of sewer flooding is consequently assessed to be low.

Grid connection corridor

3.7.5 The grid connection corridor runs across an elevated ridge which is entirely undeveloped. There is no interaction with the DCWW watermain or any other DCWW assets as identified above, and consequently it is anticipated that few (if any) sewers underlay the corridor.

4. Outline Drainage Strategy

4.1 Introduction

4.1.1 This section sets out the outline strategy for managing runoff from the Proposed Development in a sustainable manner, in accordance with the requirements to manage surface water flood risk on-site, not increase flood risk elsewhere, and where possible, reduce flood risk overall. Surface water quality matters are addressed in **Chapter 10: Water Environment** of the ES.

4.2 Overview of Drainage Strategy Scope

4.2.1 The need for sustainable surface water management for the Proposed Development is set out in TAN15[5], Sustainable Drainage (SuDS) Statutory Guidance[7] and the Defra Non-Statutory Technical Standards for Sustainable Drainage Systems[14]. Best practice guidance is provided in the CIRIA SuDS manual[15]. At the local level, guidance is provided by BGCBC and TCBC as the LLFAs, who have prepared the following documents: Flood Risk Management Strategy[10] and Flood Risk Management Plan[11].

4.2.2 The creation of the hardstanding surfaces associated with the buildings and vehicle movement areas within the Wind Farm development has the potential to increase surface water runoff rates, volumes and pathways. The creation of temporary and new permanent infrastructure associated with the grid connection must also be considered. Appropriate management of surface water will therefore be necessary to ensure risks to on-site and off-site (down-gradient) third party receptors are appropriately addressed.

4.2.3 A water management system will be designed for the Proposed Development to address surface water runoff (surface water originating from within the Proposed Development); surface water run-on (surface water originating from outside of the Proposed Development, if any); and any groundwater ingress (which it is anticipated would be dealt with alongside surface water).

4.3 SuDS - Legislation and Guidance

Technical Advice Note 15 (TAN15)

4.3.1 Technical Advice Note 15: Development and Flood Risk (TAN15 – July 2004) provides 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. It encourages the use of SuDS to manage surface water.

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[14] Defra. 2015. *Sustainable Drainage Systems Non-statutory technical standards for sustainable drainage systems*. (Online) Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf (Accessed June 2023).

[15] CIRIA. 2015. CIRIA SuDS Manual. (Online) Available from: https://www.ciria.org/ItemDetail?iProductCode=C753F&Category=FREEPUBS (Accessed June 2023).

Floods and Water Management Act, 2010

4.3.2 Under the Floods and Water Management Act 2010, BGCBC and TCBC are designated as the LLFAs and therefore are a statutory consultee on major planning applications in relation to surface water drainage.

Sustainable Drainage (SuDS) Statutory Guidance, Welsh Government

4.3.3 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 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.

CIRIA SuDS Manual (C753)

4.3.4 The CIRIA SuDS (C753) is the most up-to-date industry standard containing revised principles and technical advice for the planning, design, construction, management and maintenance of effective SuDS. This document replaces the original CIRIA SuDS Manual (C697). As the LLFAs, BGCBC and TCBC expect all new or existing developments be designed to align with the revised (C753) manual.

DEFRA Non-statutory technical standards for sustainable drainage systems, 2015

4.3.5 The Non-statutory technical standards for sustainable drainage systems is a national guidance document that provides a set of standards to be applied when designing SuDS systems for any development. Standards include controls on peak flow and volume of run-off and flood risk internal to the development and downstream. Standards S2, S4, S7, S8 and S9 state:

- S2 – for greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100-year rainfall event should never exceed the peak greenfield runoff rate for the same event;
- S4 - where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100-year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event;
- S7 – the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the Proposed Development for a 1 in 30-year rainfall event;
- S8 - the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100-year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development; and

- S9 - The design of the Proposed Development must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1-in-100-year rainfall event are managed in exceedance routes that minimise the risks to people and property.

LLFA and SAB Advice

4.3.6 In accordance with consultation advice received from TCBC (LLFA), any impermeable area over 100m^2 will requires SuDS technical approval. The Proposed Development is upland grassland with surface water runoff discharging into two sensitive receptors, the Nant Ddu and Nant Ffrwd-oer. Any discharge therefore should be limited to 5 l/s per ha. This provides opportunities for SuDS and natural flood management.

4.3.7 The proposed approach for the outline drainage strategy was discussed and agreed with CCBC on a pre-application consultation meeting held on 2nd December 2022. Further meetings were held on 6th June 2023 with CCBC and on 18 July 2023 with TCBC to discuss the watercourse crossings associated with the proposed watercourse crossing methodologies. Details of these meetings are provided in **Annex D**.

Compatibility of SuDS with Site conditions

4.3.8 The Proposed Development is almost entirely greenfield, with some surfaced access tracks and isolated farm buildings distributed across the Proposed Development. Existing greenfield rates of surface water runoff should be maintained in future via the provision of appropriate SuDS.

4.4 The proposed SuDS solution

4.4.1 All potential SuDS options have been considered. At this stage it is anticipated infiltration may need to be combined with a positive discharge into a watercourse. Investigation of the viability of infiltration as a means by which surface water runoff could be discharged will be undertaken post- consent, through liaison with BGCBC, TCBC and CCBC and by undertaking soakaway testing. Should soakaway testing results indicate that infiltration is not favourable, then attenuation will be included to limit discharge rates entering the existing watercourses to the greenfield runoff rate.

4.4.2 Initial estimations of existing greenfield runoff rates and surface water runoff attenuation volumes required have been calculated using Micro Drainage Source Control (2018.1.1) and the UKSuDS tools[16] with results provided in **Annex C**. The existing greenfield runoff rates per hectare (ha) are summarised in **Table 4.1.**

[16] HR Wallingford 2022. UKSuDS tools for sustainable drainage systems (online). Available at: https://www.uksuds.com/ (Accessed June 2023)

Table 4.1 Existing Greenfield Runoff Rates

Parameter	Value
Area	1 ha
Soil Type	3
SPR (Standardised Percentage Runoff)	0.37
SAAR (Standard Annual Average Rainfall)	1438 mm
Greenfield Runoff Rates	**Value**
Q_{BAR}	6.67 l/s/ha
1 in 1 year	5.87 l/s/ha
1 in 30 year	11.87 l/s/ha
1 in 100 year	14.54 l/s/ha

4.4.3 Initial drainage calculations supporting this outline strategy have considered the 1% AEP (1 in 100-year) event as the design standard, including allowances for climate change covering the lifetime of the Proposed Development (20% for the construction phase (precautionary upper estimate up to the 2050s) and 40% for the operation phase (precautionary upper estimate up to the 2080s))[17].

4.4.4 However, based on feedback received from CCBC, the design standard for the construction phase drainage systems should be reduced, commensurate with the construction programme duration (approximately two years) and to prevent an over-engineered design. It was recommended that this should be in the order of the 10% AEP (1 in 10-year) to 5% AEP (1 in 20-year) event. This will be considered further at the detailed design stage to reduce the final design of the construction drainage systems.

4.4.5 The proposed attenuation features will use soft-engineering approaches to flow control rather than use any proprietary systems. It is proposed to discharge at the estimated Q_{BAR} rate of 6.7 l/s per ha. The indicative proposed SuDS solutions for each design element are described in **Table 4.2.**

4.4.6 Wherever possible, drainage systems implemented for the temporary construction phase will be retained and re-used to support the operational drainage system to reduce the

[17] Welsh Government 2021. Flood Consequences Assessments: Climate change allowances (Online) Available from: https://gov.wales/sites/default/files/publications/2021-09/climate-change-allowances-and-flood-consequence-assessments_0.pdf (Accessed June 2023)

impact to existing site conditions. Further consideration to this will be undertaken at the detailed design phase.

Table 4.2 Indicative proposed SuDS Solution

Proposed Development element	Indicative SuDS
Construction phase	
TCC	Permeable sub-base (uncompacted Type 3 stone) to be used, with a minimum depth of 200mm, across the entire compound. If infiltration rates are favourable, then surface water will infiltrate at source. If an outlet is required, then a perforated pipe will collect water within the stone and direct it towards the nearest open channel, alongside the access track. Initial calculations using Micro Drainage 2018.1.1 to support this outline drainage strategy demonstrate that when using a minimum infiltration rate of $1x10^{-5}$ m/s (conservative estimate from CIRIA typical infiltration rates (*The SuDS Manual C753 DEFRA 2015– Table 25.1)*, this system can accommodate the 1% AEP (1 in 100-year) plus 20% climate change without flooding. The results can be found in **Annex C.** As discussed above, a reduced design standard will be considered at the detailed design stage to prevent an over-engineered design, in accordance with feedback from CCBC. Runoff from the roof is proposed to be captured using a rainwater harvesting system for all on-site non potable water usage. Further details will be developed at detailed design stage.
Crane pads	The crane pads will be exposed during the construction period, considered to be up to 6 months in duration. Attenuation is proposed in the form of a ditch downslope of the pad.
Operational phase	
Access tracks	Open channels will be installed on the downslope of the tracks to manage runoff from the tracks and where the land falls towards the tracks, a cut-off ditch will be provided. It is expected that gradients will vary across the Proposed Development Site, therefore it will be necessary to use check dams within the open channels to attenuate flows and promote infiltration. Cross drains would be provided beneath the access tracks surface to convey overland runoff before being discharged into a nearby watercourse. Calculations using Micro Drainage 2018.1.1 demonstrate that a typical ditch section with a 500-600mm base width, 600mm deep, at a typical gradient of 1:75 will accommodate the runoff from the access tracks for the 1 in 100 year plus 40% climate change without flooding; when using a minimum infiltration rate of $1x10^{-5}$ m/s (conservative estimate from CIRIA typical infiltration rates (*The SuDS Manual C753 DEFRA 2015– Table 25.1)* for the sides and base. The results can be found in **Annex C**.

Proposed Development element	Indicative SuDS
	Where the existing ground becomes more level, the ditch sections can be locally widened and longitudinal gradient slackened to create additional online attenuation. Flow control will be managed with the use of the check dams at suitable intervals along the length of the ditch
Substation	It is anticipated that runoff from the roof will be collected into an underground water storage tank, which would then be recycled as greywater for re-use in the substation building. If infiltration rates are favourable, then any overflow will be directed towards a nearby infiltrate trench or soakaway. If rates do not allow sufficient infiltration to take place, then interception storage will be considered preferentially (in accordance with feedback from CCBC), followed by consideration of a connection to the nearest open channel alongside the access tracks. The track inside of the compound will be a permeable sub-base (300mm min. uncompacted Type 3 stone) and the remaining areas will be topsoiled. If infiltration rates are favourable, then surface water will infiltrate at source. If an outlet is required, then a perforated pipe will collect water within the stone and direct it towards the nearest open channel, alongside the access track. Transformers will be individually bunded with sump and pump, and clean water will be discharged locally into a stone trench.
Wind turbines and crane pads	As the turbine pads and crane pads are buried after construction, the runoff from these areas will be similar to the existing situation and therefore a drainage system is not required. Based on consultation with CCBC, this would be considered acceptable provided that the pads are perforated to allow percolation of water in heavy rainfall.
Crane pads	The only exposed hardstanding of the crane pad will be associated with a parking space (assumed to be 10m x 3m). The rest of the pad will be covered in topsoil. Attenuation for runoff from the parking space will be provided in the form of a ditch downslope of the hardstanding area.

Pollution control

4.4.7 The proposed SuDS components have been determined in accordance with The CIRIA SuDS Manual C753 to provide the required pollution control of surface runoff prior to infiltration. This indicative SuDS design provides pollution mitigation indices exceeding the minimum required for Low pollution hazard level sites (Table 4.3). The indicative proposals for SuDS components will be confirmed at the detailed design stage and in consultation with the SAB.

Table 4.3 Indicative SuDS components for the Proposed Development

	Description	Pollution hazard level	Pollution mitigation indices		
			TSS	Metals	Hydrocarbons
Land use pollution hazard index* for TCCs, Access Tracks and On-site Substation	***Non-residential car parking with infrequent changes i.e. < 300 traffic movements/day***	***Low***	***0.5 (minimum)***	***0.4 (minimum)***	***0.4 (minimum)***
SuDS component – TCCs and On-site Substation	Permeable paving**	-	0.7	0.6	0.7
Sufficient mitigation?		-	Sufficient	Sufficient	Sufficient
SuDS component – Access Tracks	Swale	-	0.5	0.6	0.6
Sufficient mitigation?		-	Sufficient	Sufficient	Sufficient

Notes: * As defined in Table 26.2 of The CIRIA SuDS Manual C753

** Constructed permeable pavement where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth (or equivalent).

4.5 SuDS maintenance

4.5.1 Arrangements will be made for the adoption and future maintenance of the SuDS and drainage assets on the Site. An appropriate adopting body will be tasked with this. The exact body will need to be confirmed at the final detailed design stage to comply with then current guidance. Maintenance will be carried out in accordance with the methods and frequency specified in CIRIA's C753 SuDS Manual.

5. Flood Risk Mitigation

5.1.1 Based on the assessment undertaken in **Section 3**, the majority of the Proposed Development is at low risk of flooding from all sources. The principal flood risk at the Proposed Development is associated with localised sections of the access tracks and grid connection which cross Ordinary Watercourses or mapped surface water flowpaths. The assessment also indicates the potential for increased flood risk to off-site receptors due to change in permeability as a result of the Proposed Development.

5.1.2 This section outlines key flood risk management measures to ensure the Proposed Development is safe from flooding, and flood risk is not increased to off-site receptors.

Construction and operational phases

5.1.3 The initial flood risk management measures for the construction and operational phases of the Proposed Development are set out in **Table 5.1,** and repeated from Table 10.17 of the main Chapter. Those that relate to specific elements or phases are identified in the wording of the measures, or are identifiable by the matter being discussed (e.g. temporary measures will apply to the construction phase only).

Table 5.1 Proposed flood risk management measures for the Proposed Development

Measure reference*	Development element	Flood risk management measure	Reason
1	Working areas, internal access tracks, TCC (construction phase)	**Water Management Plan (WMP)** Implementation of an appropriate Water Management Plan (WMP) for the construction phase of the Wind Farm Development and grid connection, 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. 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. This would be secured through a planning consent requirement, likely via the CEMP.	To ensure no increase in flood risk downstream of the Proposed Development.
2	Wind Farm Development (operational phase)	**Detailed drainage design** 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	To ensure no increase in flood risk downstream of the Proposed Development.

Measure reference*	Development element	Flood risk management measure	Reason
		watercourses is limited to greenfield rates. This would be secured through a planning consent requirement.	
3	Working areas, internal access tracks, TCC (construction phase) Wind Farm Development (operational phase)	**Discharges of surface water runoff** Further investigation of the viability of infiltration as a means by which surface water runoff could be discharged to ground will be undertaken post-consent, through liaison with BGCBC, TCBC and CCBC 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 nearest drain is required, this will be subject to a Consent from NRW or BGCBC/TCBC/CCBC. Any discharge to surface water would be restricted to the greenfield runoff rate.	To ensure no increase in flood risk downstream of the Proposed Development.
4	Working areas (construction phase)	**Discharge of pumped water from excavations** Any groundwater and rainfall dewatered from the excavations (e.g. excavations associated with turbine foundation and underground cables) will be discharged to adjacent ground, away from 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 CCBC. 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).	To manage groundwater flood risk and to ensure that any negative impacts on flooding downstream is limited as far as possible. To ensure that any change in flood risk due to water discharges is limited as far as possible.
5	Working areas (construction phase)	**Standoff distance** No works will be undertaken within 3m of any watercourse (other than for watercourse crossings and drainage mitigation). Any works within 8m of non-tidal Main River will be subject to a Flood Risk Activity Permit (FRAP) from NRW. Any works within 8m of an Ordinary Watercourse will be subject to a Land Drainage Consent (LDC) from the relevant LLFAs.	This measure will minimise any potential impacts to flow conveyance in the watercourse, particularly during high flow or flood events.
6	Internal access tracks and grid connection (construction phase)	**Crossing of surface water flow paths/Ordinary Watercourses** Access tracks crossing mapped surface water flow paths or Ordinary Watercourses will require appropriately sized culverts to maintain existing flow conveyance. The design of any new culverts will be confirmed as part of the detailed drainage design and be subject to Ordinary Watercourse consent by the relevant LLFA (TCBC). Based on consultation with	To convey flows from the mapped surface water flow path beneath the crossing, preventing flooding of the access track.

Measure reference*	Development element	Flood risk management measure	Reason
		TCBC to date, the minimum culvert size will be 600mm diameter and HDPE material is preferred, provided that the structures are pinned down and bedded in appropriately. Crossing points of any pre-existing structures (expected at three locations) will be surveyed prior to construction works (post consent) to establish the structural integrity of the crossings. Suitable mitigation measures will be identified and proposed, where necessary and applicable, to ensure no detrimental impact to the structure. Should it be deemed necessary for the culvert to be upgraded, any new culverts required will be sized at the detailed design stage in consultation and subject to consent from the relevant LLFAs. Where the proposed grid connection (underground cable) crosses mapped surface water flow paths or Ordinary Watercourses, each crossing will be individually reviewed / surveyed during detailed design (post consent) to confirm the crossing methodology employed. It is anticipated that open cut crossing methodology will predominantly be used subject to consent by the relevant LLFA (TCBC). In accordance with advice provided by CCBC, a minimum cover level of 600mm will be considered beneath the bed of the watercourse/channel.	
7	Working areas - temporary access crossings	**Temporary watercourse crossings** If temporary watercourse crossings are required to enable access over any watercourses, these would be appropriately sized to maintain existing flow conveyance.	Maintain existing conveyance capacity of watercourses
8	Electrical connection (construction phase)	**Underground cables** The underground cables linking the turbines to the substation and the substation to the electrical connection point will be constructed in discrete sections with the reinstatement process commenced in as short a timeframe as practicable.	Minimise changes in watercourse flow conveyance
9	Working areas (construction phase)	**Topsoil stockpiles** 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	To prevent sedimentation of watercourses and waterbodies (and thus reduction in

Measure reference*	Development element	Flood risk management measure	Reason
		management techniques will be used. Stockpiles will be stored exclusively within areas of very low flood risk (Flood Zone A in the DAM or Flood Zone 1 in the FMfP).	watercourse flow capacities). To prevent loss of topsoil in a major flood event, thereby reducing the availability of material for reinstatement.
10	Access tracks and working areas (operational phase)	**Temporary components** Once construction is complete, any temporary components (such as working areas) will be removed, and the ground reinstated to preconstruction conditions. Any excavations will be backfilled using soil stockpile materials, slightly above natural ground level to allow for settlement.	To ensure that rainfall infiltration and runoff generation characteristics are returned to preconstruction conditions.
11	Access track (construction phase)	**DCWW water main** All works during the construction phase will follow the measures stated in *DCWW's Planning Guidance Note - Conditions for development near water mains.* A suitable asset protection design for the locations where the proposed access track crosses DCWW's watermain will be developed and agreed with DCWW at detailed design stage (post-consent). Site meetings will be held with a DCWW inspector both prior to the construction works commencing (to mark the location and line of the watermain at the proposed crossing locations) and during the access track construction over the watermain.	To prevent damage to and allow maintenance of the DCWW watermain
12	Access routes and working areas (construction phase)	**Emergency Flood Response Plan** An Emergency Flood Response Plan will be prepared and implemented for the construction phase, including safe access and egress routes where required. The Preparation of an Emergency Flood Response Plan is secured via the CEMP.	For the safety of site operatives who may be working within the floodplain, or may need to cross it to access/egress the part of the Proposed Development boundary they are working in.

Decommissioning phase

5.1.4 Relevant flood mitigation measures will be developed once the required works and activities associated with the decommissioning of the Proposed Development are confirmed. It is likely that they will include similar measures as listed above for the construction and operational phases. Specification of such measures must take account of the changes in the flood hazard baseline relating to climate change, change of land-use and regulatory requirements prevailing at the time.

6. Conclusions

6.1.1 This FCA accompanies the ES for the Proposed Development and has been prepared in accordance with the TAN15. The findings of this FCA are summarised below:

- Flood risk to the Proposed Development has been assessed from all potential sources, and the key flood risk to the development is from surface water and fluvial sources. The Proposed Development is considered to be at low risk of flooding from groundwater, sewer, and artificial sources;
- The Proposed Development lies almost entirely within an area of very low risk of fluvial flooding. The proposed access track via Farm Road and the B4246 crosses small areas of Flood Zone C2 associated with the Nant Ffrwd and Cwmsychan Brook. In accordance with TAN15 guidance, a Justification Test is required for this element of the development. The proposed use of an existing access track is considered to be the best available option, and therefore the Justification Test is considered to be passed;
- Most of the Proposed Development is at very low risk of flooding from surface water flooding, owing to its location on a summit with minimal upstream catchment. There are small areas of high surface water flood risk associated with existing ponds and depressions, and the headwaters of several watercourses that intersect the Proposed Development. This indicates that, for the most part, it will be surface water runoff originating from the Proposed Development which will be the primary surface water flood risk consideration;
- Runoff from the Proposed Development will be managed to ensure no increase in flood risk downstream of the Proposed Development. A WMP for the construction phase and Detailed Drainage Design will be secured through the CEMP and a planning condition, respectively;
- An outline approach to surface water drainage has been identified and agreed with CCBC, including indicative discharge locations (discharge to ground and if required supplemented by discharge to watercourses), discharge rates (greenfield Q_{BAR}) and SuDS attenuation volumes (up to and including the 1% AEP plus 20% and 40% climate change events for the construction and operational phases respectively);
- Investigation of the viability of infiltration as a means by which surface water runoff could be discharged will be undertaken post-consent, through liaison with BGCBC, TCBC and CCBC and by undertaking soakaway testing. In the case that the soakaway testing concludes that infiltration is not solely sufficient in managing runoff, and discharge to surface water is required, this will be subject to a Consent from the NRW or BGCBC/TCBC/CCBC; and

6.1.2 The FCA concludes that the Proposed Development, together with the proposed flood risk management measures above, would not be subject to an unacceptable level of risk, nor would there be potential increased flood risk elsewhere. As such the development is acceptable on flood risk grounds and meets the aims of TAN15.

Annex A
Correspondence and data provided by BGCBC and TCBC

Park, Jack

From: [redacted]
Sent: 27 June 2022 09:03
To: Park, Jack
Subject: RE: Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning Jack

Thank you for your patience on this one while I liaised with my colleagues in drainage. I have the information below for you:

- Records of local historical flooding;

The area indicated is mostly open mountainside. Any flooding on this land is unlikely to be reported. We therefore have no information relating to flooding in this area.

- Any local surface water flood risk issues;

This information can be found on the NRW flood risk maps at: https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/Index.html?configBase=https://maps.cyfoethnaturiolcymru.gov.uk/Geocortex/Essentials/REST/sites/Flood_Risk/viewers/Flood_Risk/virtualdirectory/Resources/Config/Default&layerTheme=0

- Specific supplementary guidance on drainage policy including greenfield runoff and SuDS requirements. Could you please specify the requirements of an outline drainage strategy, allowable discharge rates and climate change allowances expected;

Any application with a construction area of over 100m^2 will require the approval of the SuDS Approval Body (SAB). Information relating to this approval can be found at this link https://gov.wales/sites/default/files/publications/2019-06/statutory-guidance.pdf, and FAQ at https://gov.wales/sites/default/files/publications/2019-06/frequently-asked-questions.pdf

- Private (unlicensed) surface water and groundwater abstractions within 4km of the site (NGR, source, holder, purpose). (I have contacted Natural Resources Wales with regards to licensed water abstraction) - excel format.

I do not hold any information on water abstractions. I am not sure where these records will be held.

Please let me know if you have any further questions.

Kindest

[redacted]
Uwch-Swyddog Cefnogi Busnes/Senior Business Support Officer
Tîm Cefnogaeth Amgylchedd ac Adfywiad/Environment & Regen Support Team
Gwasanaeth Cefnogi Busnes/Business Support Service

[redacted]

[redacted]
Y Swyddfeydd Cyffredinol, Heol Gwaith Dur, Glyn Ebwy, NP23 6DN / The General Offices, Steelworks Road, Ebbw Vale, NP23 6DN

From: Park, Jack <jack.park@woodplc.com>
Sent: 08 June 2022 10:01
To: BGCBC - Planning <Planning.bgcbc@blaenau-gwent.gov.uk>; BGCBC - Info <Info@blaenau-gwent.gov.uk>
Cc: Braid, Ana <ana.braid@woodplc.com>
Subject: Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm

Good morning,

As part of Environmental Impact Assessment and Flood Risk work which Wood Group UK Ltd is undertaking for the planning application for Mynydd Llanhilleth Wind Farm (NGR: SO 23476 02087), I would like to make the information requests below. The planning application boundary is situated on the border of the Blaenau Gwent and Torfaen Borough Councils and is shown on the attached PDF plan. The wider study area (1.5km buffer) shapefile is also included for reference. Please note that this map shows the current proposed layout and is subject to change following further surveys and consultation.

- Records of local historical flooding;
- Any local surface water flood risk issues;
- Specific supplementary guidance on drainage policy including greenfield runoff and SuDS requirements. Could you please specify the requirements of an outline drainage strategy, allowable discharge rates and climate change allowances expected;
- Private (unlicensed) surface water and groundwater abstractions within 4km of the site (NGR, source, holder, purpose). (I have contacted Natural Resources Wales with regards to licensed water abstraction) - excel format.

Please do not hesitate to contact me (or Ana Braid in my absence (cc'd)) if you have any specific queries about this request.

Many thanks,
Jack

Jack Park
Consultant
[redacted]
www.woodplc.com

Park, Jack

From: [redacted]
Sent: 20 June 2022 14:09
To: Park, Jack
Cc: [redacted]
Subject: RE: Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: External email. Please do not click on links/attachments unless you know the content is genuine and safe.

Dear Jack,

Our Drainage Officer, [redacted] has advised:

1. *I have no records of historical flooding related to the red line area*
2. *There are no surface water flooding issues that I am aware of within or adjacent to the red line area*
3. *SuDS requirements are any impermeable area over 100sqm will require SuDS technical approval. Any temporary or permanent access road over any watercourse will require Ordinary Watercourse Consent off TCBC,* [redacted] *The red line area is upland grassland with any surface water run-off discharging into two sensitive receptors, the Nant Ddu and Nant Ffrwd oer, which are culverted within the urban area of Pontnewynydd to the east. Therefore any discharge should be limited to 5 l/s/ha, but could provide opportunities for natural flood risk management.*

With re ard to private groundwater extraction I am waiting for a response from our Public Health Team [redacted] nd will forward that on as soon as I receive it.

Best Regards

[redacted]
Head of Planning and Development / Pennaeth Rheoli Datblygu
Torfaen County Borough Council/ Cyngor Bwrdeistref Sirol Torfaen
Tŷ Blaen Torfaen / Tŷ Blaen Torfaen,
Panteg Way / Ffordd Panteg
New Inn
Pont ool / Pont- - wl NP4 0LS
[redacted]

From: TCBC - PlanningApplications <PlanningApplications@torfaen.gov.uk>
Sent: 08 June 2022 10:45
[redacted]
Subject: FW: Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm

[redacted]

What do we do with this request? We have a current DNS pre-app on this which I'm going to allocate t [redacted] oday as they paid the fee yesterday. Should we reply to this as part of the pre-app?

[redacted]
Team Lea er App ications Arweinydd Tîm (Ceisiadau)
Development Management/Rheoli Datblygu
NEIGHBOURHOODS, PLANNING & PUBLIC PROTECTION / CYMDOGAETHAU, CYNLLUNIO A DIOGELU'R CYHOEDD
Torfaen County Borough Council / Cyngor Bwrdeistref Sirol Torfaen
Tŷ Blaen Torfaen, Panteg Way, New Inn, Pontypool, Torfaen, NP4 0LS /Tŷ Blaen Torfaen, Ffordd Panteg, Y Dafarn Newydd, Pont-y-pŵl, Torfaen, NP4 0LS

[redacted]

From: TCBC - Planning <planning@torfaen.gov.uk>
Sent: 08 June 2022 10:32
To: TCBC - PlanningApplications <PlanningApplications@torfaen.gov.uk>
Subject: FW: Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm

How do you want this one logged in IDOX?

Thanks

[redacted]

BUSINESS SUPPORT OFFICER / SWYDDOG CYMORTH BUSNES
RESOURCES DIRECTORATE/CYFARWYDDIAETH ADNODDAU
TORFAEN COUNTY BOROUGH COUNCIL / CYNGOR BWRDEISTREF SIROL TORFAEN

[redacted]

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From: Park, Jack <jack.park@woodplc.com>
Sent: 08 June 2022 10:01
To: TCBC - Planning <planning@torfaen.gov.uk>
Cc: Braid, Ana <ana.braid@woodplc.com>
Subject: Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm

Good morning,

As part of Environmental Impact Assessment and Flood Risk work which Wood Group UK Ltd is undertaking for the planning application for Mynydd Llanhilleth Wind Farm (NGR: SO 23476 02087), I would like to make the information requests below. The planning application boundary is situated on the border of the Blaenau Gwent and Torfaen Borough Councils and is shown on the attached PDF plan. The wider study area (1.5km buffer) shapefile is also included

for reference. Please note that this map shows the current proposed layout and is subject to change following further surveys and consultation.

- Records of local historical flooding;
- Any local surface water flood risk issues;
- Specific supplementary guidance on drainage policy including greenfield runoff and SuDS requirements. Could you please specify the requirements of an outline drainage strategy, allowable discharge rates and climate change allowances expected;
- Private (unlicensed) surface water and groundwater abstractions within 4km of the site (NGR, source, holder, purpose). (I have contacted Natural Resources Wales with regards to licensed water abstraction) - excel format.

Please do not hesitate to contact me (or Ana Braid in my absence (cc'd)) if you have any specific queries about this request.

Many thanks,
Jack

Jack Park
Consultant
[redacted]
www.woodplc.com

'********** DISCLAIMER: The information contained in this e-mail is a) the property of Torfaen County Borough Council; and b) confidential. It is intended only for the addressee. If you are not the addressee you must not disclose, copy or distribute this or take any action in reliance upon it. If you receive this e-mail in error, please notify us immediately by telephone on ++44 (0) 1495 766366, and re-direct the e-mail and any attachments to us. WARNING: Please ensure that you have adequate virus protection in place before you open or detach any documents attached to this e-mail. The Council welcomes correspondence in Welsh and English. Correspondence received in Welsh will be answered in Welsh and will not lead to any delay. Personal data processed by the council is done so in accordance with our requirements under Data Protection Law (UK GDPR and Data Protection Act 2018). For more information on how we do this please see our Privacy Notice ********** YMWADIAD: Mae'r wybodaeth sy'n gynwysedig yn yr e-bost yma a) yn eiddo i Gyngor Bwrdeistref Sirol Torfaen; a b) yn gyfrinachol. Fe'i bwriedir ar gyfer y derbynnydd yn unig. Os nad chi yw'r sawl y cyfeiriwyd hi ato, ni ddylech ddadlennu, copïo na dosbarthu'r wybodaeth neu ei defnyddio i weithredu. Os derbyniwch yr e-bost yma fel camgymeriad, gadewch i ni wybod ar unwaith drwy ffonio ++44 (0) 1495 766366, a danfonwch yr e-bost yn ol gydag unrhyw atodiadau. RHYBUDD: Gwnewch yn siwr bod gennych ddiogelwch feirws digonol cyn agor neu ddatgysylltu unrhyw ddogfen sydd yn atodiad i'r e-bost hwn. Mae'r Cyngor yn croesawu gohebiaeth yn Gymraeg a Saesneg. Cewch ateb Cymraeg i bob gohebiaeth yn Gymraeg ac ni fydd yn arwain i unrhyw oedi. Mae data personol sy'n cael ei brosesu gan y cyngor yn cael ei wneud yn unol â'r gofynion sydd arnom ni o dan y Gyfraith Diogelu Data (RhDDC y DU a Deddf Diogelu Data 2018). Am fwy o wybodaeth ar sut yr ydym yn gwneud hyn gwelwch ein Hysbysiad Preifatrwydd

Park, Jack

From: [redacted]
Sent: 21 June 2022 16:21
To: Park, Jack
Cc: [redacted]
Subject: FW: Proposed Wind farm at Mynydd Llanhilleth
Attachments: Mynydd Llanhilleth location plan.pdf

CAUTION: External email. Please do not click on links/attachments unless you know the content is genuine and safe.

Please see below regarding private groundwater abstraction.

[redacted]
Head of Planning and Development / Pennaeth Rheoli Datblygu
Torfaen County Borough Council/ Cyngor Bwrdeistref Sirol Torfaen
Tŷ Blaen Torfaen / Tŷ Blaen Torfaen,
Panteg Way / Ffordd Panteg
New Inn
Pont ool / Pont- - wl NP4 0LS
[redacted]

From: [redacted]
Sent: 21 June 2022 14:08
To: [redacted]
Subject: RE: Proposed Wind farm at Mynydd Llanhilleth

The following is a list of private water supplies currently registered with Torfaen County Borough Council in accordance with The Private Water Supplies (Wales) Regulations 2017. I have applied a search criteria of 4km from the boundary of the study area as highlighted in 'Figure 1 Site Boundary Plan'.

They appear in no particular order:

TY'R BEILI FARM, CASTLEWOOD, TALYWAIN, PONTYPOOL, TORFAEN. NP44 7UF
Grid_Reference_ : 325080, 204497
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

BRACKEN COTTAGE, PANTGLAS, TALYWAIN, PONTYPOOL, TORFAEN, NP4 7TX
Grid_Reference_ : 325711, 203653
Description_of_source : Spring
Water_being_supplied_for : Single, Domestic use only

SWN-Y-DWR, PANTGLAS, TALYWAIN, PONTYPOOL, TORFAEN, NP4 7TX
Grid_Reference_ : 325865, 203275
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

HOLE IN THE WALL, PANTGLAS, TALYWAIN, PONTYPOOL, TORFAEN, NP4 7TX

Grid_Reference_ : 325867, 203251
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

PISTYLL GWYN FARM, PENTWYN, POTNTYPOOL, TORFAEN. NP4 7TA
Grid_Reference_ : 325796, 202318
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

HOLLYBUSH COTTAGE, GYPSY LANE, PENTREPIOD, PONTNEWYNYDD, PONTYPOOL. NP4 6TR
Grid_Reference_ : 326171, 201989
Description_of_source : Well
Water_being_supplied_for : Domestic use only

Nant Ddu Farm, Gypsy Lane, Pentrepoid, Pontypool, NP4 6TR
Grid_Reference_ : 325721, 201889
Description_of_source : Spring
Water_being_supplied_for : Domestic Use Only

LITTLE TALOCHER FARM, GYPSY LANE, PENTREPIOD, PONTNEWYNYDD, PONTYPOOL. NP4 6TR
Grid_Reference_ : 325751, 201869
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

TALOCHER FARM, GYPSY LANE, PENTREPIOD, PONTNEWYNYDD, PONTYPOOL. NP4 6TR
Grid_Reference_ : 325751, 201869
Description_of_source : Spring and stream
Water_being_supplied_for : Domestic use only – shared supply

TALOCHER BUNGALOW, GYPSY LANE, PONTNEWYNYDD, PONTYPOOL, TORFAEN. NP4 6TR
Grid_Reference_ : 325758, 201861
Description_of_source : Stream and spring
Water_being_supplied_for : Domestic use only – shared supply

CRISPIN BUNGALOW, CRUMLIN ROAD, PONTYPOOL, TORFAEN, NP4 6US
Grid_Reference_ : 326198, 200113
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

HIGH PATH BUNGALOW, CRUMLIN ROAD, PONTYPOOL, TORFAEN. NP4 6US
Grid_Reference_ : 326204, 200138
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

TY CELYN, CRUMLIN ROAD, PONTYPOOL, TORFAEN. NP4 6US
Grid_Reference_ : 326229, 200137
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

PLAN HOUSE, COCH Y NORTH ROAD, PANTYGASSEG, PONTYPOOL, TORFAEN. NP4 6BP
Grid_Reference_ : 326699, 200533
Description_of_source : spring

Water_being_supplied_for : Domestic use only

PENTRANCH COTTAGE, COCH-Y-NORTH ROAD, TRANCH, PONTYPOOL, NP4 6BP
Grid_Reference_ : 326760, 201182
Description_of_source : well
Water_being_supplied_for : Domestic use only

PENTRANCH FARM, COCH-Y-NORTH ROAD, TRANCH, PONTYPOOL, NP4 6BP
Grid_Reference_ : 326829, 201149
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

BLAENDARE HOUSE, UPPER RACE, PONTYPOOL, NP4 5XF
Grid_Reference_ : 327110, 199413
Description_of_source : Spring
Water_being_supplied_for : Domestic use only

TYR-EWEN FARM, PONTBREN ROAD, HAFODRYNYS, CRUMLIN, TORFAEN. NP11 5BTG
Grid_Reference_ : 323277, 200019
Description_of_source : Spring
Water_being_supplied_for : Domestic Use Only Shared Supply

BLAEN-LLWYNAU BARN, CEFN-Y-CRIB, HAFODRYNYS, PONTYPOOL, NP11 5BG
Grid_Reference_ : 323333, 199930
Description_of_source : Spring
Water_being_supplied_for : Domestic Use Only Shared Supply

BLAEN-LLWYNAU FARM, CEFN-Y-CRIB, HAFODRYNYS, PONTYPOOL, NP11 5BG
Grid_Reference_ : 323333, 199930
Description_of_source : Spring
Water_being_supplied_for : Domestic Use Only Shared Supply

TY'R HEN FORWYN, CEFN-Y-CRIB, HAFODRYNYS, TORFAEN. Np11 5bn
Grid_Reference_ : 323497, 199832
Description_of_source : Spring
Water_being_supplied_for : Domestic Use Only

Notes:
There may be other private water supplies, especially single domestic supplies, within the search area that Torfaen Council is not aware of and so additional site investigations and enquiries are strongly recommended. The applicant is also advised to make enquiries with owner/occupiers of the premises listed above in due course to ascertain the exact location and type of private water supply source as this may have changed over time.

Please note that some of the land shown on the attached plan is within Blaenau Gwent County Borough Council's area so I would recommend that enquiries are lodged with them separately.

Do not hesitate to contact me if you have any further queries regarding private water supplies in Torfaen.

Regards

[redacted]
Senior Environmental Health Officer/Uwch Swyddog Iechyd yr Amgylchedd

Commercial Services/Gwasanaethau Masnachol
Public Protection Service/Gwasanaeth Diogelu'r Cyhoedd
Torfaen County Borough Council/Cyngor Bwrdeistref Sirol Torfaen
[redacted]
Address/Cyfeiriad: Neighbourhoods, Planning & Public Protection, Torfaen County Borough Council, Tŷ Blaen Torfaen, Panteg Way, New Inn, Pontypool, Torfaen, NP4 0LS/Cymdogaethau, Cynllunio A Diogelu'r Cyhoedd, Cyngor Bwrdeistref Sirol Torfaen, Tŷ Blaen Torfaen, Ffordd Panteg, Y Dafarn Newydd, Pont-y-pŵl, Torfaen, NP4 0LS
Web Page/Tudalen We: http://www.torfaen.gov.uk/

Annex B
Correspondence and data provided by NRW

Park, Jack

From: Data Distribution <datadistribution@cyfoethnaturiolcymru.gov.uk>
Sent: 28 June 2022 14:22
To: Park, Jack
Subject: ATI-23469a - Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm NRW:00893510

Follow Up Flag: Follow up
Flag Status: Completed

Hi Jack.
Unfortunately, the flood map in this area is based on a nationally generated FRAW model, this was last updated in 2020. FRAW modelling uses LIDAR data to generate flood outlines with assumptions made about the channel capacity. This modelling was carried out for the production of flood extents only and is not suitable for detailed site specific assessments, therefore we are not able to provide any flood products for your site.

Thanks,

[redacted]
Cymorth Technegol Cyswllt Cyfoeth / Customer Hub Technical Support
Cwsmer, Cyfathrebu a Masnach/ Customer, Communications and Commercial
Cyfoeth Naturiol Cymru/Natural Resources Wales
[redacted]
Gwefan/Website:http://www.cyfoethnaturiolcymru.gov.uk/ /www.naturalresourceswales.gov.uk

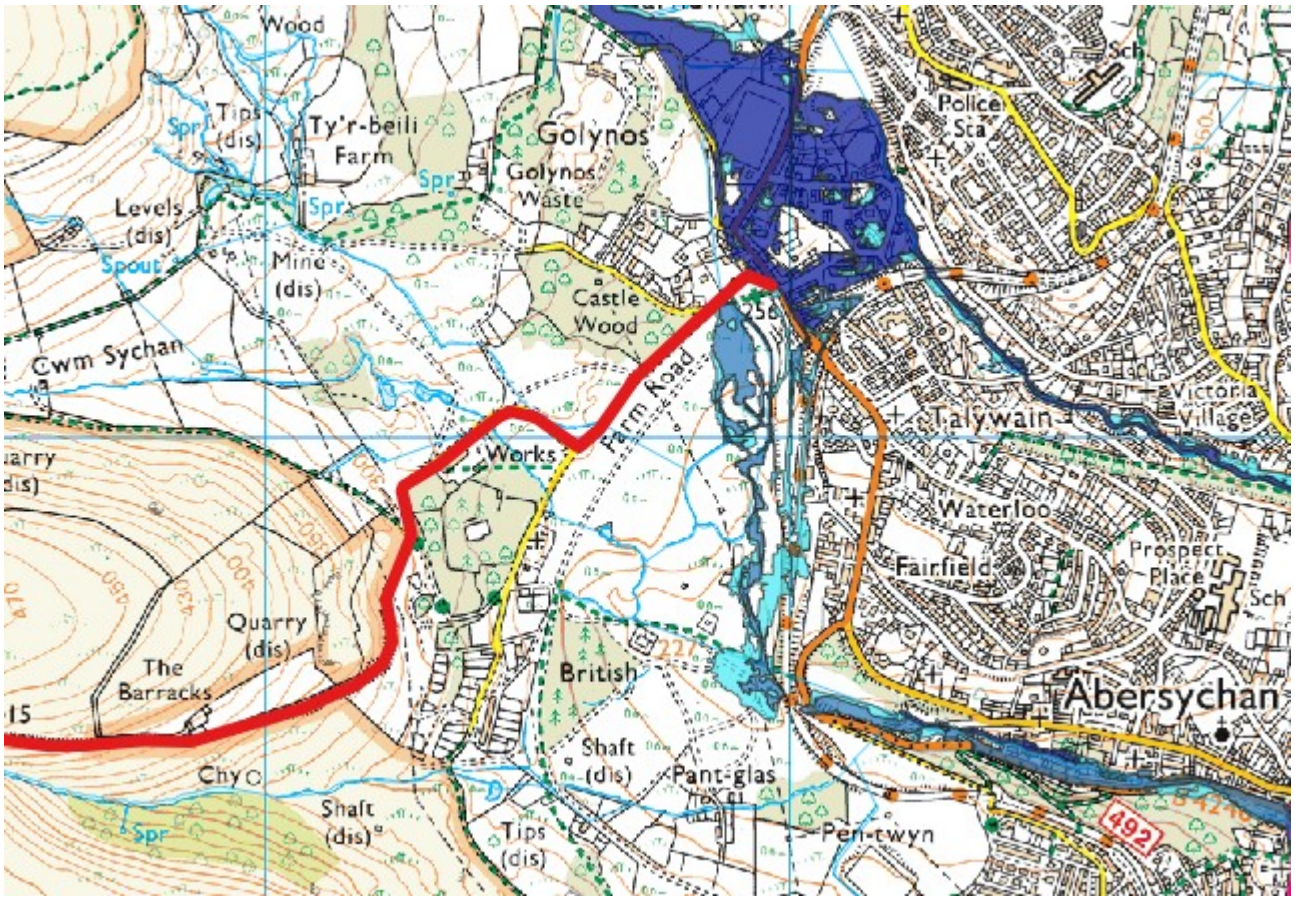
---

From: Park, Jack <jack.park@woodplc.com>
Sent: 28 June 2022 09:23
To: Data Distribution <datadistribution@cyfoethnaturiolcymru.gov.uk>
Subject: RE: ATI-23469a - Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm NRW:00893510

Good mornin [redacted]

Thank you for your email and attached data.

Regarding the flood modelling products requested, the access (included within the site boundary) intersects the flood outlines at Golynos – see snapshot below. The 'mm_id' attribute for the outlines here is 'Wales_Fluvial_1_V1.0_2018'. Could you please supply the relevant model for this location and watercourse.



Could you please also supply the requested rainfall data – see point 1 on the original data request email attached.

Thanks,
Jack

Jack Park
Consultant
[redacted]
www.woodplc.com

From: Data Distribution <datadistribution@cyfoethnaturiolcymru.gov.uk>
Sent: 23 June 2022 12:11
To: Park, Jack <jack.park@woodplc.com>
Subject: ATI-23469a - Data Request (EIA/Flood risk): Mynydd Llanhilleth Wind Farm NRW:00893510

Hi Jack.

Please find attached the available data. I have split this email into subjects and the responses from our area teams.

Groundwater:
Within the area of interest there are no groundwater monitoring boreholes, but just outside is an artesian borehole we monitor occasionally. The data for this borehole log is attached, but there is no continuous groundwater level data for this site.

WQ:
We have included all parameters for the sample's sites in the area of interest.

Flood risk:
This site lies outside of our flood outlines and is not in the flood map therefore we have no data for this site.

Thanks,

[redacted]
Cymorth Technegol Cyswllt Cyfoeth / Customer Hub Technical Support
Cwsmer, Cyfathrebu a Masnach/ Customer, Communications and Commercial
Cyfoeth Naturiol Cymru/Natural Resources Wales
[redacted]
Gwe an We s te: ttp: www.cy oet natur o cymru.gov.u www.natura resourceswa es.gov.u

Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.
Our purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future.

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi

Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay

Annex C
Estimation of Surface Water Runoff Attenuation Volumes

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 10 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.887	0.487	0.3	12.5	12.7	9.7	O K
30 min Summer	99.933	0.533	0.3	13.1	13.4	12.0	O K
60 min Summer	99.947	0.547	0.3	13.3	13.6	12.9	O K
120 min Summer	99.911	0.511	0.3	12.8	13.1	10.9	O K
180 min Summer	99.870	0.470	0.3	12.2	12.5	8.9	O K
240 min Summer	99.831	0.431	0.2	11.7	11.9	7.2	O K
360 min Summer	99.760	0.360	0.2	10.6	10.7	4.7	O K
480 min Summer	99.702	0.302	0.1	9.6	9.7	3.1	O K
600 min Summer	99.655	0.255	0.1	8.7	8.8	2.1	O K
720 min Summer	99.618	0.218	0.1	7.9	8.0	1.5	O K
960 min Summer	99.566	0.166	0.1	6.7	6.7	0.8	O K
1440 min Summer	99.510	0.110	0.0	5.0	5.0	0.3	O K
2160 min Summer	99.488	0.088	0.0	3.7	3.7	0.2	O K
2880 min Summer	99.477	0.077	0.0	3.0	3.1	0.2	O K
4320 min Summer	99.465	0.065	0.0	2.3	2.3	0.1	O K
5760 min Summer	99.458	0.058	0.0	1.9	1.9	0.1	O K
7200 min Summer	99.454	0.054	0.0	1.7	1.7	0.1	O K
8640 min Summer	99.450	0.050	0.0	1.5	1.5	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	119.805	0.0	18.6	16
30 min Summer	86.688	0.0	26.9	25
60 min Summer	60.150	0.0	37.3	42
120 min Summer	39.107	0.0	48.5	74
180 min Summer	30.466	0.0	56.7	106
240 min Summer	25.481	0.0	63.2	136
360 min Summer	19.671	0.0	73.2	194
480 min Summer	16.264	0.0	80.7	254
600 min Summer	13.976	0.0	86.7	312
720 min Summer	12.315	0.0	91.6	370
960 min Summer	10.030	0.0	99.5	490
1440 min Summer	7.466	0.0	111.1	730
2160 min Summer	5.529	0.0	123.4	1088
2880 min Summer	4.485	0.0	133.5	1464
4320 min Summer	3.394	0.0	151.5	2196
5760 min Summer	2.824	0.0	168.1	2832
7200 min Summer	2.482	0.0	184.6	3584
8640 min Summer	2.252	0.0	201.0	4272

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	99.447	0.047	0.0	1.4	1.4	0.1	O K
15 min Winter	99.884	0.484	0.3	12.4	12.7	9.5	O K
30 min Winter	99.923	0.523	0.3	13.0	13.3	11.5	O K
60 min Winter	99.920	0.520	0.3	12.9	13.2	11.4	O K
120 min Winter	99.847	0.447	0.2	11.9	12.1	7.9	O K
180 min Winter	99.778	0.378	0.2	10.9	11.0	5.2	O K
240 min Winter	99.720	0.320	0.1	9.9	10.0	3.5	O K
360 min Winter	99.632	0.232	0.1	8.2	8.3	1.7	O K
480 min Winter	99.577	0.177	0.1	6.9	7.0	0.9	O K
600 min Winter	99.542	0.142	0.0	6.0	6.1	0.6	O K
720 min Winter	99.520	0.120	0.0	5.3	5.4	0.4	O K
960 min Winter	99.498	0.098	0.0	4.3	4.4	0.3	O K
1440 min Winter	99.481	0.081	0.0	3.2	3.3	0.2	O K
2160 min Winter	99.467	0.067	0.0	2.4	2.4	0.1	O K
2880 min Winter	99.459	0.059	0.0	1.9	2.0	0.1	O K
4320 min Winter	99.449	0.049	0.0	1.5	1.5	0.1	O K
5760 min Winter	99.444	0.044	0.0	1.3	1.3	0.0	O K
7200 min Winter	99.441	0.041	0.0	1.1	1.1	0.0	O K
8640 min Winter	99.439	0.039	0.0	1.0	1.0	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	2.088	0.0	217.5	5008
15 min Winter	119.805	0.0	18.6	17
30 min Winter	86.688	0.0	26.9	26
60 min Winter	60.150	0.0	37.3	44
120 min Winter	39.107	0.0	48.5	76
180 min Winter	30.466	0.0	56.7	106
240 min Winter	25.481	0.0	63.2	136
360 min Winter	19.671	0.0	73.2	192
480 min Winter	16.264	0.0	80.7	250
600 min Winter	13.976	0.0	86.7	308
720 min Winter	12.315	0.0	91.6	368
960 min Winter	10.030	0.0	99.5	484
1440 min Winter	7.466	0.0	111.1	728
2160 min Winter	5.529	0.0	123.4	1104
2880 min Winter	4.485	0.0	133.5	1424
4320 min Winter	3.394	0.0	151.5	2148
5760 min Winter	2.824	0.0	168.1	2928
7200 min Winter	2.482	0.0	184.6	3536
8640 min Winter	2.252	0.0	201.0	4336

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Winter	99.438	0.038	0.0	0.9	0.9	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	2.088	0.0	217.5	4992

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 323674 202811 SO 23674 02811
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	1.000
Cv (Winter)	1.000
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.062

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.031	4	8	0.031

Model Details

Storage is Online Cover Level (m) 100.000

Swale Structure

Infiltration Coefficient Base (m/hr)	0.03600	Length (m)	100.0
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.5
Safety Factor	2.0	Slope (1:X)	75.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	99.400	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6		

Orifice Outflow Control

Diameter (m) 0.075 Discharge Coefficient 0.950 Invert Level (m) 99.400

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 358 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.752	0.352	0.6	0.3	1.0	17.7	O K
30 min Summer	99.812	0.412	0.7	0.3	1.1	25.2	O K
60 min Summer	99.873	0.473	0.9	0.4	1.2	33.9	O K
120 min Summer	99.922	0.522	0.9	0.4	1.3	41.6	O K
180 min Summer	99.948	0.548	1.0	0.4	1.4	46.0	O K
240 min Summer	99.963	0.563	1.0	0.4	1.4	48.7	O K
360 min Summer	99.979	0.579	1.0	0.4	1.4	51.7	O K
480 min Summer	99.987	0.587	1.1	0.4	1.5	53.2	Flood Risk
600 min Summer	99.991	0.591	1.1	0.4	1.5	53.8	Flood Risk
720 min Summer	99.991	0.591	1.1	0.4	1.5	53.8	Flood Risk
960 min Summer	99.986	0.586	1.1	0.4	1.5	53.0	Flood Risk
1440 min Summer	99.970	0.570	1.0	0.4	1.4	50.0	O K
2160 min Summer	99.942	0.542	1.0	0.4	1.4	45.0	O K
2880 min Summer	99.917	0.517	0.9	0.4	1.3	40.9	O K
4320 min Summer	99.879	0.479	0.9	0.4	1.2	34.7	O K
5760 min Summer	99.849	0.449	0.8	0.4	1.2	30.3	O K
7200 min Summer	99.828	0.428	0.8	0.3	1.1	27.3	O K
8640 min Summer	99.811	0.411	0.7	0.3	1.1	25.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	119.805	0.0	18.6	22
30 min Summer	86.688	0.0	26.9	36
60 min Summer	60.150	0.0	37.3	66
120 min Summer	39.107	0.0	48.5	124
180 min Summer	30.466	0.0	56.7	182
240 min Summer	25.481	0.0	63.2	240
360 min Summer	19.671	0.0	73.2	302
480 min Summer	16.264	0.0	80.7	366
600 min Summer	13.976	0.0	86.7	434
720 min Summer	12.315	0.0	91.6	502
960 min Summer	10.030	0.0	99.5	642
1440 min Summer	7.466	0.0	111.1	916
2160 min Summer	5.529	0.0	123.4	1324
2880 min Summer	4.485	0.0	133.5	1728
4320 min Summer	3.394	0.0	151.5	2472
5760 min Summer	2.824	0.0	168.1	3232
7200 min Summer	2.482	0.0	184.6	3968
8640 min Summer	2.252	0.0	201.0	4672

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	99.797	0.397	0.7	0.3	1.1	23.2	O K
15 min Winter	99.752	0.352	0.6	0.3	1.0	17.7	O K
30 min Winter	99.813	0.413	0.7	0.3	1.1	25.2	O K
60 min Winter	99.874	0.474	0.9	0.4	1.2	34.0	O K
120 min Winter	99.923	0.523	0.9	0.4	1.3	41.8	O K
180 min Winter	99.949	0.549	1.0	0.4	1.4	46.3	O K
240 min Winter	99.965	0.565	1.0	0.4	1.4	49.2	O K
360 min Winter	99.980	0.580	1.1	0.4	1.4	51.9	Flood Risk
480 min Winter	99.987	0.587	1.1	0.4	1.5	53.1	Flood Risk
600 min Winter	99.989	0.589	1.1	0.4	1.5	53.5	Flood Risk
720 min Winter	99.987	0.587	1.1	0.4	1.5	53.2	Flood Risk
960 min Winter	99.978	0.578	1.0	0.4	1.4	51.5	O K
1440 min Winter	99.952	0.552	1.0	0.4	1.4	46.8	O K
2160 min Winter	99.911	0.511	0.9	0.4	1.3	39.8	O K
2880 min Winter	99.874	0.474	0.9	0.4	1.2	34.0	O K
4320 min Winter	99.818	0.418	0.8	0.3	1.1	25.9	O K
5760 min Winter	99.775	0.375	0.7	0.3	1.0	20.4	O K
7200 min Winter	99.745	0.345	0.6	0.3	0.9	16.9	O K
8640 min Winter	99.723	0.323	0.6	0.3	0.9	14.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	2.088	0.0	217.5	5440
15 min Winter	119.805	0.0	18.6	22
30 min Winter	86.688	0.0	26.9	36
60 min Winter	60.150	0.0	37.3	64
120 min Winter	39.107	0.0	48.5	120
180 min Winter	30.466	0.0	56.7	178
240 min Winter	25.481	0.0	63.2	232
360 min Winter	19.671	0.0	73.2	334
480 min Winter	16.264	0.0	80.7	378
600 min Winter	13.976	0.0	86.7	456
720 min Winter	12.315	0.0	91.6	534
960 min Winter	10.030	0.0	99.5	688
1440 min Winter	7.466	0.0	111.1	982
2160 min Winter	5.529	0.0	123.4	1408
2880 min Winter	4.485	0.0	133.5	1812
4320 min Winter	3.394	0.0	151.5	2592
5760 min Winter	2.824	0.0	168.1	3336
7200 min Winter	2.482	0.0	184.6	4040
8640 min Winter	2.252	0.0	201.0	4760

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Winter	99.707	0.307	0.5	0.3	0.8	12.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Winter	2.088	0.0	217.5	5544

Model Details

Storage is Online Cover Level (m) 100.000

Swale Structure

Infiltration Coefficient Base (m/hr)	0.03600	Length (m)	100.0
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.5
Safety Factor	2.0	Slope (1:X)	300.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	99.400	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0032-4000-0600-4000
Design Head (m)	0.600
Design Flow (l/s)	0.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	99.400
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	0.4	Kick-Flo®	0.287	0.3
Flush-Flo™	0.143	0.3	Mean Flow over Head Range	-	0.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.3	1.200	0.5	3.000	0.8	7.000	1.2
0.200	0.3	1.400	0.6	3.500	0.9	7.500	1.2
0.300	0.3	1.600	0.6	4.000	0.9	8.000	1.3
0.400	0.3	1.800	0.6	4.500	1.0	8.500	1.3
0.500	0.4	2.000	0.7	5.000	1.0	9.000	1.4
0.600	0.4	2.200	0.7	5.500	1.1	9.500	1.4
0.800	0.5	2.400	0.7	6.000	1.1		
1.000	0.5	2.600	0.8	6.500	1.1		

Print | Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Phillip Clay
Site name:	Mynydd Llanhilleth
Site location:	NP13 2AY

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.71089° N
Longitude:	3.12355° W
Reference:	2284205055
Date:	Nov 01 2022 11:17

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	3	3
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.37

Hydrological characteristics	Default	Edited
SAAR (mm):	1438	1438
Hydrological region:	9	9
Growth curve factor 1 year:	0.88	0.88
Growth curve factor 30 years:	1.78	1.78
Growth curve factor 100 years:	2.18	2.18
Growth curve factor 200 years:	2.46	2.46

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	6.67	6.67
1 in 1 year (l/s):	5.87	5.87
1 in 30 years (l/s):	11.87	11.87
1 in 100 year (l/s):	14.54	14.54
1 in 200 years (l/s):	16.41	16.41

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 75 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	99.884	0.084	12.5	44.5	O K
30 min Summer	99.913	0.113	12.5	66.1	O K
60 min Summer	99.941	0.141	12.5	86.9	O K
120 min Summer	99.957	0.157	12.5	98.8	O K
180 min Summer	99.963	0.163	12.5	103.6	O K
240 min Summer	99.965	0.165	12.5	104.7	O K
360 min Summer	99.960	0.160	12.5	101.3	O K
480 min Summer	99.951	0.151	12.5	94.5	O K
600 min Summer	99.940	0.140	12.5	86.5	O K
720 min Summer	99.929	0.129	12.5	78.1	O K
960 min Summer	99.907	0.107	12.5	61.7	O K
1440 min Summer	99.873	0.073	12.5	36.1	O K
2160 min Summer	99.850	0.050	12.4	18.7	O K
2880 min Summer	99.845	0.045	10.2	15.3	O K
4320 min Summer	99.840	0.040	7.9	11.7	O K
5760 min Summer	99.836	0.036	6.6	9.7	O K
7200 min Summer	99.834	0.034	5.7	8.5	O K
8640 min Summer	99.832	0.032	5.2	7.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	102.690	0.0	17
30 min Summer	74.304	0.0	31
60 min Summer	51.557	0.0	58
120 min Summer	33.520	0.0	92
180 min Summer	26.114	0.0	126
240 min Summer	21.841	0.0	162
360 min Summer	16.861	0.0	232
480 min Summer	13.941	0.0	300
600 min Summer	11.979	0.0	366
720 min Summer	10.556	0.0	430
960 min Summer	8.598	0.0	552
1440 min Summer	6.399	0.0	780
2160 min Summer	4.739	0.0	1104
2880 min Summer	3.844	0.0	1468
4320 min Summer	2.909	0.0	2200
5760 min Summer	2.420	0.0	2904
7200 min Summer	2.127	0.0	3672
8640 min Summer	1.930	0.0	4336

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Summer	99.831	0.031	4.9	7.2	O K
15 min Winter	99.884	0.084	12.5	44.5	O K
30 min Winter	99.913	0.113	12.5	66.0	O K
60 min Winter	99.941	0.141	12.5	86.7	O K
120 min Winter	99.954	0.154	12.5	96.9	O K
180 min Winter	99.958	0.158	12.5	99.7	O K
240 min Winter	99.956	0.156	12.5	98.2	O K
360 min Winter	99.944	0.144	12.5	89.2	O K
480 min Winter	99.927	0.127	12.5	76.7	O K
600 min Winter	99.910	0.110	12.5	63.5	O K
720 min Winter	99.893	0.093	12.5	51.1	O K
960 min Winter	99.865	0.065	12.5	30.2	O K
1440 min Winter	99.847	0.047	10.9	16.6	O K
2160 min Winter	99.841	0.041	8.3	12.3	O K
2880 min Winter	99.837	0.037	6.8	10.0	O K
4320 min Winter	99.832	0.032	5.0	7.5	O K
5760 min Winter	99.829	0.029	4.1	6.3	O K
7200 min Winter	99.827	0.027	3.7	5.5	O K
8640 min Winter	99.826	0.026	3.3	4.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
10080 min Summer	1.789	0.0	5048
15 min Winter	102.690	0.0	17
30 min Winter	74.304	0.0	31
60 min Winter	51.557	0.0	58
120 min Winter	33.520	0.0	96
180 min Winter	26.114	0.0	134
240 min Winter	21.841	0.0	174
360 min Winter	16.861	0.0	246
480 min Winter	13.941	0.0	316
600 min Winter	11.979	0.0	380
720 min Winter	10.556	0.0	442
960 min Winter	8.598	0.0	550
1440 min Winter	6.399	0.0	750
2160 min Winter	4.739	0.0	1124
2880 min Winter	3.844	0.0	1468
4320 min Winter	2.909	0.0	2200
5760 min Winter	2.420	0.0	2944
7200 min Winter	2.127	0.0	3744
8640 min Winter	1.930	0.0	4336

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Winter	99.825	0.025	3.1	4.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
10080 min Winter	1.789	0.0	5080

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 323674 202811 SO 23674 02811
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	1.000
Cv (Winter)	1.000
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.250

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	2	0.100	2	4	0.150

Model Details

Storage is Online Cover Level (m) 100.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.03600	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	50.0
Max Percolation (l/s)	694.4	Slope (1:X)	1000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.800	Membrane Depth (m)	0

Annex D
Meeting Minutes

AGENDA & MEETING NOTES

PROJECT NUMBER	807095	**MEETING DATE**	02 December 2022
PROJECT NAME	Mynydd Llanhilleth Wind Farm	**VENUE**	Teams
CLIENT	Pennant Walters Ltd	**RECORDED BY**	Jack Park
MEETING SUBJECT	Drainage strategy approach – pre-application consultation		

PRESENT	Jack Park (JP) – WSP Ana Braid (AB) – WSP Phillip Clay (PC) – WSP Michael Farmer (MF) – Caerphilly County Borough Council (CCBC) Jason Small (JS) - Caerphilly County Borough Council (CCBC)
APOLOGIES	None
DISTRIBUTION	
CONFIDENTIALITY	**Internal**

ITEM	SUBJECT	ACTION	DUE
1	**Introduction** AB introduced the proposed Mynydd Llanhilleth Wind Farm and baseline conditions in terms of flood risk and hydrology.		
2	**Outline Drainage Strategy** PC provided an overview of the proposed outline surface water drainage strategy, proposed indicative SuDS solutions and compliance with National Standards for SuDS for Wales		
2.1	JS advised that consideration is needed to land stability risk in known mining areas, springs and in areas of peat, for where infiltration is proposed.		
2.2	JS indicated that if infiltration rates are not favourable for full infiltration, then consideration should be given to interception storage (first 5mm).		
2.3	Return period (RP) for construction phase could be reduced, based on a probability of risk associated with the construction programme duration. Using 1 in 100 year RP will result in an over-designed drainage system, which results in a negative impact to the project's environmental targets. JS suggested the RP to be in the order of 1 in 10 year to 1 in 20 year, with no climate change allowance required.		

2.4	JS advised to aim to re-use as much as the temporary drainage system as practicable, to reduce the impact on the existing site conditions.		
2.5	JS advised that compound arrangements are to be considered at the detailed design stage, as each element of this area may require different drainage systems due to the level of pollution and flood risk.		
2.6	JS noted that the SAB does not apply Conditions on applications. The SAB requests detailed information of the proposed drainage systems, for which they appreciate that this is not due to be developed until much later in the programme. Instead, it is proposed to agree principles and suggested on-going meetings throughout the project to remain informed prior to the application submission.		
2.7	PC highlighted the proposal for covering the turbine concrete pads with topsoil once the construction stage is complete, and therefore not providing a drainage system for these areas. JS commented that the concrete pads should be perforated to allow free flow of water during rainfall events.		
2.8	PC explained the access road drainage system and JS highlighted that a dry swale could be used in some locations, to provide additional storage and treatment measures.		
2.9	PC queried the Cv value to use when modelling and JS confirmed it is 1.0.		
2.10	PC queried the return periods to use, as the standards do not cover 1 in 30 year. JS suggested showing modelling results for 1 in 1, 1 in 30 and 1 in 100 year plus climate change in the detailed application.		
2.11	**AOB** For Ordinary Watercourse consents, MF and JS confirmed that Max Nebe (also at CCBC) should be contacted. CCBC offer a free-pre-app advice service, for which Max can assist with.		

NEXT MEETING

N/A

AGENDA & MEETING NOTES

PROJECT NUMBER	807095	**MEETING DATE**	18 July 2023
PROJECT NAME	Mynydd Llanhilleth Wind Farm	**VENUE**	Teams
CLIENT	Pennant Walters Ltd	**RECORDED BY**	Jack Park
MEETING SUBJECT	Meeting subject		

PRESENT	Jack Park (JP) – WSP Ana Braid (AB) – WSP Phillip Clay (PC) – WSP Mark Strickland (MS) – Torfaen County Borough Council (TCBC) Mia McAndrew (MM) - Torfaen County Borough Council (TCBC)
APOLOGIES	None
DISTRIBUTION	
CONFIDENTIALITY	Choose an item.

ITEM	SUBJECT	ACTION	DUE
1	**Introductions** MM advised that the application will come to Justin Jones, who is a new Principal Planner at TCBC MS noted that he is retiring on 25th August 2023 and that subsequently Ordinary Watercourse consent applications will go to Carys Williams (Flood Risk Officer) for review. However, MS can be contacted after this date if required though Carys. MS advised that crossings will be dealt with at the detailed design stage via Ordinary Watercourse consents. These are assessed on an individual basis based on a £50 fee per crossing, and there is a 50-60 day turnaround.		
2	**Project background** AB provided update on Proposed Development and application process, noting that WSP held a meeting with Caerphilly County Borough Council in June 2023 who were able to provide generic advice for Ordinary Watercourse consents. JP introduced the proposed Mynydd Llanhilleth Wind Farm and baseline conditions in terms of flood risk and hydrology.		

	MS noted that he is familiar with the project area and wouldn't envisage at first glance any major issues in relation to flood risk or watercourse crossings.		
3	**Proposed crossing methodology** JP outlined the initial proposed approach to Ordinary Watercourse crossings, incorporating advice received from CCBC: - The preference will be to use culverts for new crossings of surface water flowpaths and Ordinary Watercourses, the design of which will be confirmed at the detailed design stage. - Crossing points of any pre-existing will be surveyed prior to construction works (post consent) to establish the structural integrity of the crossings and suitable mitigation measures will be identified and proposed, where necessary to ensure no detrimental impact to the structure. Any new culverts required will be sized at the detailed design stage in consultation and subject to consent from the relevant LLFAs. - The crossing points associated with the grid connection cable will be individually reviewed at the detailed design stage, though it is assumed open-cut methodologies will predominantly be used. A minimum cover level of 600mm will be considered beneath the bed of the watercourse/channel.		
4	**Overview of crossings** JP provided overview of each proposed crossing point and shared site photographs, where available, to provide further context on the nature of the watercourses.		
4.1	**British Road crossings** JP introduced the two existing British Road crossings of the Blaengaefog Brook and Cwmsychan Brook. MS advised that there will need to be a consideration to the structural integrity of the culverts when transporting windfarm components. Provided that vehicle loads are less than 44 tons, then there is envisaged to be minimal issues but if the loads exceed this then TCBC would require abnormal load approval. Given the state of the British Road, MS advised resurfacing is likely to be required at some points. JP queried whether any details of these existing structures are known. MS advised that TCBC are unlikely to hold details, but noted that another team within WSP are working on a development at the adjacent British site and have recently surveyed these structures. The survey details could be used to inform a 'stress test' to understand the likely loading that the structures can withstand.		
4.2	**Access track and grid connection crossings**		

	JP introduced the remaining access track and grid connection crossing points, primarily situated on elevated ground and associated with minor surface water flowpaths rather than any established watercourses. MS advised that the minimum culvert size is 600mm diameter and envisages no issues with this approach for crossing points introduced. MS noted that there are very localised areas of peat and springs so each crossing point should be assessed on an individual basis. PC queried whether there is any preference for culvert type or material. MS advised that there is no preference for the culvert type, but HDPE would typically be preferred provided that these are pinned down and bedded correctly considering wind speeds in the area. MS noted that low key solutions are preferred that blend into the landscape, without the need for concrete headwalls (coir rolls/bag style headwalls suggested).		
4.1	**Geotechnical considerations** MS advised that there are mine tailings and tips within the wider area, which should be considered in further detail with regards to any changes to flow conveyance or infiltration with the potential to mobilise large quantities of sediment downstream. This should be assessed at the detailed design stage and allowance made for mitigation measures to address.		

NEXT MEETING

N/A

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322000 323000 324000 325000 326000 327000

205000 204000 203000 202000 201000 200000

N

Pen-y-Bont
Waun Wen
Blaenau Gwent
Duffryn Rd
Tillery St
Gray St
Adam St
Gladstone St
Carlyle St
Abertyleri / Abertillery
Penrhiwgarreg
Cwm Sychan
Ty'r-Beili Farm
The Bungalow
Golynos
Cwm Ffrwd
Hillcrest
Abersychan
Earl St
Neville St
Victoria Village
Cwm Afon
The Woodlands
Talywain
Manor Rd
Waterloo
A4043
Prospect Place
Fairfield
Lewis St
Old La
Valentine Rd
Lasgarn
High St
The Promenade
Brook Cottage
British Rd
British
Coetgae
Aberbeeg Rd
Castle St
Richmond Rd
Cwm Farm Rd
Cwm Nant-y-groes
Byrgwm
Six Bells
Graig Rd
The Gilfach-Wen Farm
Ty-Dafydd
Pen-twyn
Snatchwood
The Beeches
Ty-Rhiw Frank
Penrhwyn Rd
B4246
Charlesville
Freehold Land
Cwm-du Wood
Pistyll-Gwyn
Greenland Farm
Pentre-Piod / Pentrepiod
St Luke's Rd
Hospital Rd
Cemetery Rd
Victoria Rd
Llanhiledd / St Illtyd
Argoed Farm
Cwm Du
Booth's La
Hollybush Cottage
Tal-Ochor Farm
Cwm Ffrwd-oer
Mount Pleasant
Oaktree Farm
Pontnewynydd
Ty-Llwyd
Troy Rd
Cwm Cyffin
Brynithel
Blaen-nant-y-caws
Cwm Ffrwd-Oer Farm
Plasycoed Rd
Pen-Tranch Cottage
Fowler
Wainf
Fairfield
Ty Shon Jacob Farm
Llanhiledd / Llanhilleth
Hyde Pl
Oxford Pl
High St
Incline Cottages
Plasycoed Farm
Coed Parciau
Tranch
The Old Black Barn Farmhouse
Beech Mount
Coch-Y-North Rd
Parke's La
Crumlin Rd
A472
Pen-Yr-Heol Rd
Llanhilleth Farm
Pant-y-gaseg
High Path
Coed Trinant
Royal Oak House
Ty'r-Hen-Forwyn
Cefn-y-Crib Farm
Mountain View House
Mynydd Bungalow

1
2
3
4
6
7
8

Key

- Turbine location
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track

0 500 1,000 m

Scale at A3: 1:20,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.1
Proposed development layout

August 2024

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321000 322000 323000 324000 325000 326000 327000 328000

205000 204000 203000 202000 201000 200000 199000

N

Key

- Turbine location
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track

Elevation (m AOD)

High : 548.98

Low : 117.88

0 250 500 750 1,000 1,250 m

Scale at A3: 1:25,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.2
LiDAR topography elevations

August 2024

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321000 322000 323000 324000 325000 326000 327000 328000

205000 204000 203000 202000 201000 200000 199000

N

Afon Tyleri
Gwastad
Spring Cottage
Beili Glass Farm
The Bungalows
Nant Ffrwd
Pen-y-Bont
Waun Wen
Afon Tillery
Afon Ebwy Fach
Blaenau Gwent
Ty'r-Beili Farm
The Bungalow
Abersychan
Nant y Maelor
Pen-yr-heol
Golynos
Victoria Village
Talywain
Afon Lwyd
Cefn Bach
Abertyleri / Abertillery
Cwm Sychan
Blaengaefog Brook
Waterloo
Pant y Pwdyn
Nant y Groes
Coetgae
Byrgwm
British
Prospect Place
Fairfield
Lasgarn Wood
Cwmsychan Brook
Six Bells
Brook Cottage
Arail
Pen-twyn
Snatchwood
The Beeches
Penlasgarn-isaf
Ysgubor Arail
Nant Cwmmllwydrew
The Gilfach-Wen Farm
Ty-Rhiw Frank
Ty-Dafydd
Cwm-du Wood
Pistyll-Gwyn
Greenland Farm
Freehold Land
Charlesville
Pentre-Piod / Pentrepiod
Hollybush
Nant-Ddu
Llanhiledd St Illtyd
Argoed Farm
Tal-Ochor Farm
Cwm Ffrwd-oer
Mount Pleasant
Ty-Llwyd
Oaktree Farm
Nant Ffrwd-oer
Pontnewynydd
Nant Cyffin
Cwm Cyffin
Cwm Ffrwd-Oer Farm
Wainfelin
Blaen-nant-y-caws
Pen-Tranch Cottage
Brynithel
Nant Caws
Ty Shon Jacob Farm
Llandwr
Llanhilleth / Llanhilleth
Nant-y-Cnyw
Plasycoed Farm
Tranch
Coed Parciau
Incline Cottages
The Old Black Barn Farmhouse
Beech Mount
Sowhill
Trosnant Brook
Llanhilleth Farm
Part-y-gaseg
High Path
Llanerch-Uchaf
Trinant
Coed Trinant
Mountain View House
Cefn-y-Crib Farm
Ty'r-Hen-Forwyn
Royal Oak House
Myny dd Bungalow
Old School House
Afon Ebwy
Trinant
Ty Lan-Twyn
Ty Richard Jones' Farm
Cefn-Crib Farm
Swffryd-Ganol
Llanerch-Isaf
Tir-Shon-Shenkin
Coed Golynos
Upper Race
The Mount
Old Washery
Twyn Calch
Nant Dar

Key

- Turbine location
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track
- Main river
- Ordinary watercourse
- Spring
- Pond

0 250 500 750 1,000 1,250 m

Scale at A3: 1:25,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.3
Hydrological context

August 2024

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N

Afon Tyleri
Afon Ebwy Fach
Afon Tillery
Nant y Groes
Nant Cwmmllwydrew
Nant Cyffin
Nant y Cnyw
Afon Ebwy
Trinant
Nant Ffrwd
Blaengaefog Brook
Cwmsychan Brook
Afon Lwyd
Nant y Maelor
Nant Ddu
Nant Ffrwd-oer
Nant Caws
Trosnant Brook
Nant Dar

Gwastad
Waun Wen
Cefn Bach
Coetgae
Byrgwm
Arail
Ysgubor Arail
Cwm-du Wood
Coed Parciau
Coed Golynos
Twyn Calch
Lasgarn Wood

Spring Cottage
The Bungalows
Beili Glass Farm
Pen-yr-heol
Ty'r-Beili Farm
The Bungalow
Golynos
Abersychan
Victoria Village
Talycoain
Waterloo
Prospect Place
Fairfield
British
Brook Cottage
Penlasgam House
Penlasgarn-Isaf
Pen-twyn
Snatchwood
The Beeches
Ty-Rhiw Frank
Charlesville
Pistyll-Gwyn
Greenland Farm
Freehold
Pentre-Piod / Pentrepiod
Hollybush
Tal-Ochor Farm
Cwm Ffrwd-oer
Mount Pleasant
Oaktree Farm
Wainfelin
Cwm Ffrwd-Oer Farm
Pen-Tranch Cottage
Ty Shon Jacob Farm
Tranch
Sowhill
Pont-Y-Pwl / Pontypo
Blaen-nant-y-caws
Playcoed Farm
Beech Mount
Blaendare Rd
The Mount
Upper Race
Blaen-nant-y-caws
Blaenau Gwent
Pen-y-Bont
Abertyleri / Abertillery
Pant y Pwdyn
Six Bells
Llanhiledd St Illtyd
Argoed Farm
Ty-Llwyd
Brynithel
Llanhilleth
Incline Cottages
The Old Black Barn Farmhouse
Llanhilleth Farm
Part-y-gaseg
Mountain View
Myny dd Bungalow
Cefn-y-Crib Farm
Old School House
Ty'r-Hen-Forwyn
Ty Lan-Twyn
Cefn-Crib Farm
Ty Richard Jones' Farm
Tir-Shon-Shenkin
Old Washery
Swffryd-Ganol
Llanerch-Isaf
Llanerch-Uchaf
Trinant
Coed Trinant
Royal Oak House
The Gilfach-Wen Farm
Ty-Dafydd
Aber-big
Brynithel
Pen-twyn
Incline Cottages

Key

- Turbine location
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track
- Main river
- Ordinary watercourse

Flood Map for Planning (Rivers)

- Flood Zone 3
- Flood Zone 2
- Flood Zone 1

0 250 500 750 1,000 1,250 m

Scale at A3: 1:25,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.4
NRW Flood Map for Planning (Rivers)

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N

Blaenau Gwent
Pen-y-Bont
Waun Wen
Nant Ffrwd
Abersychan
Nant y Maelor
Ty'r-Beili Farm
The Bungalow
Golynos
Victoria Village
Afon Tillery
Pant y Pwdyn
Cwm Sychan
Blaengafog Brook
Waterloo
Prospect Place
Fairfield
Afon Lwyd
Coetgae
Nant y Groes
Cwm Nant-y-groes
Byrgwm
British
The Barracks
Cwmsychan Brook
Brook Cottage
Bells
Afon Ebwy Fach
Nant Cwmmllwydrew
The Gilfach-Wen Farm
Ty-Rhiw Frank
Pen-twyn
Snatchwood
The Beeches
Ty-Dafydd
Cwm-du Wood
Pistyll-Gwyn
Greenland Farm
Freehold
Pentre-Piod / Pentrepiod
Llanhiledd
Argoed Farm
St Illtyd
Hollybush
Nant Ddu
Tal-Ochor Farm
Cwm Ffrwd-oer
Mount Pleasant
Ty-Llwyd
Oaktree Farm
Nant Ffrwd-oer
Nant Cyffin
Cwm Cyffin
Blaen-nant-y-caws
Cwm Ffrwd-Oer Farm
Pen-Tranch Cottage
Brynithel
Nant Caws
Ty Shon Jacob Farm
Llanhilleth
Nant y Cnyw
Cwm Cnyw
Plasycoed Farm
Coed Parciau
Incline Cottages
The Old Black Barn Farmhouse
Beech Mount
Trosnant
Llanhilleth Farm
Coed Trinant
Afon Ebwy
Part-y-gaseg
High Path
Mountain View House
Cefn-y-Crib Farm
Ty'r-Hen-Forwyn
Mynydd Bungalow

Key

- Turbine location
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track
- Main river
- Ordinary watercourse

Development Advice

- Zone A
- Zone B
- Zone C1
- Zone C2

0 250 500 750 1,000 m

Scale at A3: 1:20,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.5
NRW Development Advice Map

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Key

- Turbine location
- Met mast
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track
- Main river
- Ordinary watercourse

Crossing point

- Access track
- Grid Connection

Flood Map for Planning (Surface water and small watercourses)

- Flood Zone 3
- Flood Zone 2
- Flood Zone 1

0 250 500 750 1,000 m

Scale at A3: 1:20,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.6 a
NRW Flood Map for Planning (Surface Water and Small Watercourses)

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N

The Gilfach-Wen Farm

Ty-Dafydd

GC1 GC2 GC3

3 4 5 6 7 8

Nant Pidu

Blaen-nant-y-caws

Pen-Rhiw

Nant Caws

Key

- Turbine location
- Met mast
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track
- Main river
- Ordinary watercourse

Crossing point

- Access track
- Grid Connection

Flood Map for Planning (Surface water and small watercourses)

- Flood Zone 3
- Flood Zone 2
- Flood Zone 1

0 250 m

Scale at A3: 1:7,500

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.6 b
NRW Flood Map for Planning (Surface Water and Small Watercourses)

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325000

326000

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N

Talywain Golf Club

Ty'r-Beili Farm

The Bungalow

Blaengaefog Brook

Golynos

Castle Wood

Nant Ffrwd

Commercial Rd

Ambleside

Bluett Rd

Cwmsychan

Blaengaefog Brook

1

2

British Rd

British

The Barracks

Church Rd

Gwrt-Y-Porth Fawr

British School

Noddfa Baptist Church

Cwmsychan Brook

B4246

Ridge Rd

The Promenade

Key

Turbine location

Met mast

Site boundary

Grid connection

Crane pad

Crane pad storage

Substation

Construction compound

Access track

Main river

Ordinary watercourse

Crossing point

Access track

Grid Connection

Flood Map for Planning (Surface water and small watercourses)

Flood Zone 3

Flood Zone 2

Flood Zone 1

0 250 m

Scale at A3: 1:5,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.6 c
NRW Flood Map for Planning (Surface Water and Small Watercourses)

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Key

- Turbine location
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track
- Flood risk from reservoirs

0 250 500 750 1,000 m

Scale at A3: 1:20,000

0 0.63 1.3

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.7
Flood Risk Assessment Map Wales - Flood risk from reservoirs

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Blaenau Gwent
Abertyleri / Abertillery
Pant y Pwdyn
Coetgae
Six Bells
Waun Wen
Byrgwm
Nant y Groes
Afon Tillery
Afon Ebwy Fach
Nant Ffrwd
Ty'n-Beili Farm
The Bungalow
Golynos
Abersychan
Nant y Maelor
Woodlands
Victoria Village
Talywain
Waterloo
Prospect Place
Fairfield
Blaengafog Brook
Cwmsychan Brook
Afon Lwyd
The Barracks
Brook Cottage
Pen-twyn
Ty-Rhiw Frank
The Beeches
Coed Parciau
Beech Mount
Trosnant
Charlesville
Freehold Land
Pistyll-Gwyn
Greenland Farm
Pentre-Piod / Pentrepiod
Hollybush
Nant Ddu
Tal-Ochor Farm
Cwm Ffrwd-oer
Mount Pleasant
Oaktree Farm
Nant Ffrwd-oer
Wainfelin
Pen-Tranch Cottage
Ty Shon Jacob Farm
Tranch
Cwm Ffrwd-Oer Farm
Blaen-nant-y-caws
Nant Caws
Plasycoed Farm
Plasycoed Rd
Cwm-du Wood
Ty-Isafydd
Nant Cwmmllwydrew
The Gilfach-Wen Farm
Llanhilleth St Illtyd
Argoed Farm
Ty-Llwyd
Nant Cyffin
Brynithel
Llanhilleth
Nant y Cnyw
Incline Cottages
The Old Black Barn Farmhouse
Llanhilleth Farm
Coed Trinant
Afon Ebwy
Royal Oak House
Cefn-y-Crib Farm
Ty'r-Hen-Forwyn
Mynydd Bungalow
Mountain View House
Pant-y-gaseg
High Path
Old
FR1
FR2
FR3
FR4
FR5

Key

- Turbine location
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track
- Main river
- Ordinary watercourse
- Flood risk receptor

Flood Map for Planning (Surface water and small watercourses)

- Flood Zone 3
- Flood Zone 2
- Flood Zone 1

0 200 400 600 800 1,000 m

Scale at A3: 1:20,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.8
Flood risk receptors

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Key

- Turbine location
- Site boundary
- Grid connection
- Crane pad
- Crane pad storage
- Substation
- Construction compound
- Access track
- Indicative crossing points
- DCWW water main (indicative)

0 250 500 750 1,000 m

Scale at A3: 1:20,000

Mynydd Llanhilleth Wind Farm
Flood Consequence Assessment

Figure 10A.9
DCWW water main asset

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