CIL LONYDD SOLAR FARM

Flood Consequence Assessment and Conceptual Drainage Strategy

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Cil Lonydd Solar Farm
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Quality Management

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1 INTRODUCTION

Project Brief

1.1 RPS Consulting Services Ltd ('RPS') has been commissioned to prepare a Flood Consequence Assessment (FCA) and Conceptual Surface Water Drainage Strategy to support the planning application for the proposed Solar Farm development at Cil Lonydd, Newbridge ('the site').

Assessment Procedure

1.2 The aim of the FCA is to outline the potential for the site to be impacted by flooding, the impacts of the proposed development on flooding in the vicinity of the site, and the proposed measures which could be incorporated into the development to mitigate the identified risk.

1.3 The report has been prepared in accordance with the guidance detailed in the Planning Policy Wales and Technical Advice Note 15 (TAN15): Development and Flood Risk. Reference has also been made to the CIRIA SuDS manual (C753), the Newport City Council Preliminary Flood Risk Assessment (PFRA) and Local Flood Risk Management Strategy (LFRMS).

1.4 This report has been produced in consultation with Natural Resources Wales (NRW) and the Lead Local Flood Authority (LLFA). The site is not located within an Internal Drainage District (IDD).

1.5 This report is not intended to provide formal details of the final drainage design for the development. However, it provides information regarding the capabilities of the conceptual surface water drainage strategy to meet the requirements of TAN15. In December 2021, the Welsh Government released a new TAN15 for consultation but, due to further suspension, they are yet to confirm when the new TAN will come into effect.

1.6 The desk study was undertaken by reference to information provided / published by the following bodies:

- Natural Resources Wales (NRW);
- Caerphilly County Borough Council (CCBC);
- DataMapWales (DMW);
- British Geological Survey (BGS); and
- Ordnance Survey (OS).

2 PLANNING POLICY CONTEXT

National Planning Policy

Planning Policy Wales Edition 12, 2024

2.1.1 Planning Policy Wales sets out the land use planning policies of the Welsh Government. Chapter 6 'Distinctive and Natural Places' outlines the Welsh Government's objectives in terms of addressing flood risk.

2.1.2 Section 6.6.25 of Planning Policy Wales states:

> *"Development should reduce, and must not increase, flood risk arising from river and/or coastal flooding on and off the development site itself.*
>
> *The priority should be to protect the undeveloped or unobstructed floodplain from development and to prevent the cumulative effects of incremental development.."*

2.1.3 Planning Policy Wales is supplemented by a series of Technical Advice Notes (TAN). TAN15 provides technical guidance on development and flood risk.

Technical Advice Note (TAN) 15: Development and Flood Risk (December 2017)

2.1.4 TAN 15 provides technical guidance to supplement the policy set out within Planning Policy Wales in relation to development and flooding. The guidance relates to sustainability principles and provides a framework to allow risks arising from river flooding, coastal flooding and additional run off from developments to be assessed.

2.1.5 In relation to flood risk, TAN 15 indicates that the Assembly has a duty to ensure that development is sustainable and does not create problems for future generations. Managing flooding has an important role to ensure sustainable development by: guiding developments to locations with little or no risk from river, tidal or coastal flooding, managing consequences of flooding where developments can be justified and making provision for climate change.

2.1.6 TAN 15 confirms that each planning authority in Wales must prepare a Development Plan for its area. The development plans provide locational guidance for development, detailed site-specific policies, and identification of proposals for development. Catchment Flood Management Plans aim to take a holistic approach to flood management at a catchment scale and can provide guidance on managing risk to future developments. The information provided in local development plans and catchment flood management plans will aid with the application of the Justification Test.

Requirements of TAN 15

2.2 A Flood Consequence Assessment, to support a development application, should be proportionate to the risk and appropriate to the scale, nature and location of the development. The following will need to be considered;

- The consequences of flooding on the development, the consequences of the development on flood risk elsewhere and if appropriate mitigation measures can be incorporated into the design.
- Mechanisms of flooding, including sources of floodwater, how floodwater enters and flows across a site, height, and speed of floodwaters.
- Uncertainties in estimating flood events including use of historical records and forecasting.
- Security of proposed developments over their lifetime and ensuring those using the development have an awareness of the potential risks from flooding.

- Description of consequences under a range of extreme events including: mechanisms, sources, depths, speed, rate of rise, overland flood routes, velocity, access and egress, impacts on natural heritage, impact on flood risk in surrounding areas.
- Structural adequacy of defences to contain flows and withstand overtopping and if required the suitability of implementing a buffer zone adjacent to defences.
- Measures required to ensure flooding is managed to acceptable levels and ensure that the impact upon flood risk elsewhere in the flood plain is managed.

TAN15 updates

2.1.1 Updates to TAN15 will come in to force in 2024. These include updated modelling to incorporate the risk of climate change in Fluvial/Tidal Flood Zones. As well as the addition of Surface Water and Small Watercourses Flood Zones which also incorporate climate change.

2.1.2 This update takes precedent over current guidance as it provides more recent modelling, and the guidance will be in force following completion of the development. Therefore, although current guidance is referenced the updated guidance has been followed within this report.

Local Planning Policy

Caerphilly County Borough Council

2.3 The Caerphilly County Borough Local Development Plan was adopted in November 2010 and contains the following policies relating to flood risk and drainage:

Section A – The Development Strategy

- ***Key Objectives**: 15. Reduce the impact of flooding by ensuring that highly vulnerable development is directed away from areas of risk wherever possible.*

***Promote resource efficient settlement patterns**:*

- *1.38 Given the topography of the area and the way in which rapid urbanisation took place in the nineteenth century, a significant amount of urban development in Caerphilly has taken place within the flood plains of the Rivers Ebbw, Sirhowy and Rhymney and its tributaries. As a result of this historic development, large areas within the Principal Towns of Ystrad Mynach, Caerphilly and Risca/Pontymister lie within flood plains. It is therefore inevitable, despite the overall aim to avoid flood risk areas, that some existing development will be vulnerable to flooding.*
- ***1.39** Some flexibility is necessary however to enable the risks of flooding to be addressed whilst recognising the negative economic and social consequences of precluding investment in existing urban areas, particularly within the Principal Towns and the benefits of reusing previously developed land. In assessing the suitability of previously developed land for new development a judgement has been made in terms of the social, environmental and economic benefits of redeveloping sites.*
- ***1.40** As a general principle the Plan seeks to locate development away from the floodplain. However where development is considered appropriate having regard to the role and function of settlements and can be justified within the context of TAN 15, suitable mitigation measures will need to be incorporated within the design of any new development to ensure that it is as safe as possible. In particular, where development is proposed in vulnerable areas, the need for a flood consequences assessment will be highlighted as a requirement of any future planning application on sites allocated in the LDP. These assessments will be prepared in consultation with the Environment Agency. Wherever possible in such locations, redevelopment will also be planned in such a way as to provide increased protection for existing vulnerable urban areas.*

Section B – County Wide Policies

Policy CW5 – Protection of the Water Environment

a. Development proposals will only be permitted where:

b. They do not have an unacceptable adverse impact upon the water environment, and

c. Where they would not pose an unacceptable risk to the quality of controlled waters (including groundwater and surface water)

[…] 2.14

2.4 *Climate change, increases in populations and changes in lifestyle have all had an impact upon the water environment and the pressures upon it. Climate change will affect the amount of rain that falls, it will impact upon river flows, replenishing of groundwater, the quality of water available and incidents of flooding, particularly localised, flash flooding. The demands and pressures on water resources will also change, with the scale and nature of the problem differing across Wales, as will the approach to dealing with the problems. The approach to the protection of the water environment will need to take into account the quality and quantity of the local water resource, and how this impacts upon the wider environment in terms of preventing further deterioration of aquatic ecosystems, associated habitats, fisheries, promoting the sustainable use of water, and controlling water abstractions. This is particularly 50 important in terms of any development proposals that are likely to impact on the rivers Rhymney, Ebbw and Sirhowy.*

Preliminary Flood Risk Assessment

2.5 A Preliminary Flood Risk Assessment (PFRA) was produced for Caerphilly County Borough Council and was published in May 2011. The PFRA is aimed at providing high level overview of flood risk from all sources of flooding within the local area, including consideration of surface water, groundwater and ordinary watercourses. Relevant information has been referenced throughout this report.

Local Flood Risk Management Strategy

2.6 A Local Flood Risk Management Strategy (LFRMS) was produced in April 2013 by Caerphilly County Borough Council as LLFA. The LFRMS aims to understand the risks of various flooding sources that Newport may face, take proactive steps to mitigate these risks, raise awareness across communities and prepare for any such event. Local flood risk is any flood risk that derives from surface runoff, groundwater, or ordinary watercourses. Relevant information has been referenced throughout this report.

Flood Risk Management Plan

2.7 A Local Flood Risk Management Plan (FRMP) was produced in December 2015 by Caerphilly County Borough Council. The FRMP aims to understand the risk of flooding in specific communities areas while providing management plans in managing the flood risk. Relevant information has been referenced throughout this report.

Climate Change

2.8 The Technical Advice Note 15: Development and Flood Risk (TAN15) states that when considering new development proposals, it is necessary to take account of the potential impact of climate change over the lifetime of development. Residential development is assumed to have a lifetime of 100 years while a lifetime of 75 years is assumed for non-residential developments. To ensure future development can provide a safe and secure living and /or working environment throughout its lifetime, national planning policy requires proposals in areas of high flood risk to be accompanied by

an assessment of flooding consequences to and from the development, taking into account the impacts of climate change.

2.9 In line with TAN15, the climate change allowances have been informed by latest available information on climate change projections and different scenarios of carbon dioxide (CO2) emissions to the atmosphere. Allowances are provided for different epochs (periods) of time over the next century. This guidance will be reviewed when more up-to-date climate change research is available.

2.10 Both the central and upper end allowances should be assessed to understand the range of impact. As a minimum, proposals should be assessed against the central allowance to inform design levels. It is recommended that the 2080s changes are used when considering any time beyond 2115. Table 2 presents both the central and upper end estimates for climate change associated with rainfall intensity to understand the range of impacts expected over the development lifetime.

2.11 The development has an estimated lifetime of 40 years and as such, an upper estimate 2050's allowance of 20% has been used within the report.

Table 1. Change to extreme rainfall intensity compared to a 1961-90 baseline

Applies across all of Wales	Total potential change anticipated for '2020s' 2015- 39)	Total potential change anticipated for '2050s' (2040- 2069)	Total potential change anticipated for the '2080s' (2070-2115)
Upper Estimate	10%	20%	40%
Central Estimate	5%	10%	20%

3 CONSULTATION

Natural Resource Wales

3.1 Due to the site being located in Flood Zone 1 / DAM Zone A, it is indicated that the site is at a low risk of flooding from fluvial, tidal and pluvial sources therefore consultation with the Partnership and Strategic Overview Team at NRW has not been considered.

Water Authority

3.2 Due to the nature and the site location, consultation with the Water Authority has not been considered further.

Caerphilly County Borough Council

3.3 Pre-application advice was sought with Caerphilly Council. Advice relating to water and flood risk is included below.

3.4 Policy CW5 Protection of the Water Environment states that development proposals will only be permitted where they do not have an unacceptable adverse impact upon the water environment, and where they would not pose an unacceptable risk to the quality of controlled waters (including groundwater and surface water). The proposed development appears to have a combined construction area exceeding 100 square metres and therefore a separate application and consent would be required for Sustainable Drainage Approval Body (SAB).

3.5 Further comments regarding the Land Drainage requirements and processes have been included in the pre-application advice. For the full response please see Appendix A.

Internal Drainage Districts

3.6 The site is not located within an IDD.

4 SITE DESCRIPTION

Site Description

4.1 The site is located at National Grid Reference ST 22779 97300, is irregular in shape and occupies an area of approximately 37.50 hectares (ha). The site location is presented in Figure 1.

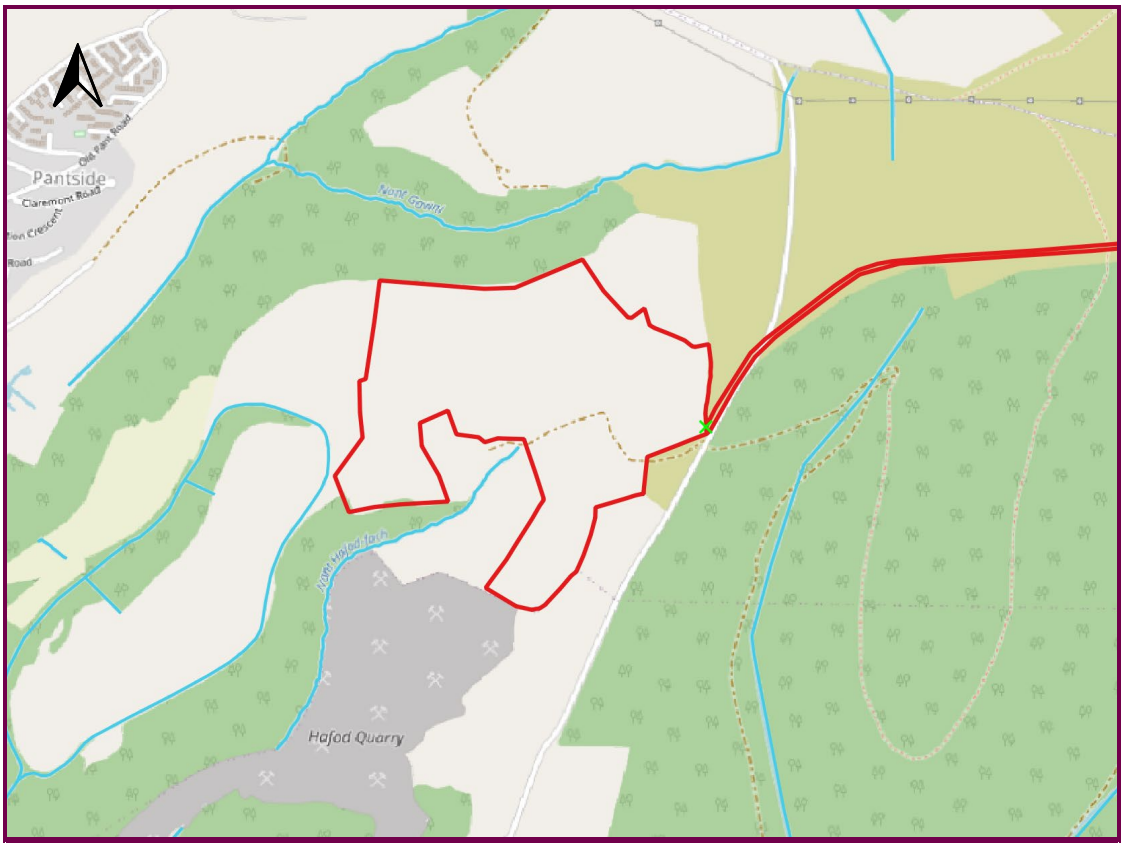

Figure 1. Site Location

4.2 The site is entirely greenfield; occupied by agricultural fields bound by mature trees and hedgerow.

4.3 Vehicular and pedestrian access to site to the site is taken via Twyn Road.

4.4 The site is 100% soft landscaping.

Surrounding Land Uses

4.5 The site is located in a primarily rural area. The southern site boundary borders Haford Quarry. The north and the east of the site is bordered by woodland, the west and some of the southern boundary borders further agricultural lands and greenfield. Along the eastern boundary of the site is an unnamed tarmac road, accessed by Twyn Road which provides access around the local area. Located on the central area of the southern boundary is a residential dwelling consisting of what appears to be farm buildings.

4.6 Located approximately 650m to the west of the site is the area of Pantside, which consists mainly of residential and community dwellings. Newbridge is located 1.6km to the south-west of the site.

4.7 The site boundary is not located within any designated sensitive areas such as, Special Area of Conservation (SAC), Special Protection Area (SPA) or Site of Special Scientific Interest (SSSI). There are also no designated sites located within 1 km of the site, therefore the site will not have

surface water potentially discharging to a Special Area of Conservation (SAC) or Special Protection Area (SPA).

Topography

4.8 A topographical survey has yet to be made available. Using OS mapping, the site is situated between 360m – 300 metres above ordnance datum (mAOD) with highest levels along the eastern boundary and lowest levels within the far west of the site.

5 PROPOSED DEVELOPMENT

Overview

5.1 The Proposed Development is for is for the installation of a renewable energy generating station comprising solar arrays together with substation, site accesses, security measures, access gates, battery storage and other ancillary infrastructure and landscaping and biodiversity enhancements.

5.2 Ancillary infrastructure within the Site will be connected by an export cable. The cable route will primarily travel eastwards along the follow highways and then cross land.

5.3 Proposed development relating to the solar modules, cable route and associated ancillary features is classified as 'Less Vulnerable', with exception to the battery units which are classified as 'Highly Vulnerable' within TAN15. Proposed development plans have been included as Appendix B.

Solar Panels and Mounting Frames

5.4 The panels would be composed of photovoltaic cells and would be designed to maximise the absorbency of the sun's rays and minimise solar glare. Each string of panels would be mounted on a rack comprising metal poles anchored to the ground using pile driven foundations. The use of these footings would ensure that there is no impact on subsurface features. Between each string of panels there would be a distance of between 3 m and 6 m to avoid inter-panel shading, depending on the topography with less space required on steeper slopes. The panels would be tilted at typically 15 to 25 degrees from the horizontal and would be orientated to face south towards the sun. The panels would be mounted at approximately 0.9m from the ground at the lowest point (the southern edge) to allow for livestock grazing. The panels could rise to approximately 2.8 m at the highest point (the northern edge), although the anticipated maximum height could be up to 3 m.

Inverters

5.5 30no. inverters would be located within the site which would appear as containerised units similar to shipping containers. Each unit would be placed on a permeable gravel base with a size of approximately 6.1 m by 3.2 m.

Battery Units

5.6 27no. battery energy storage units inverters would be located within the site. Each unit would be placed on a permeable gravel base with a size of approximately 12 m by 2.5 m.

Tracks

5.7 Internal tracks would provide access to the entire site. Where possible, existing farm access tracks would be used. Where new internal tracks are needed, these would mainly run adjacent to existing field boundaries with minimum buffers applied to minimise encroachment into hedgerows and other landscape features. The tracks would be constructed from stone (or equivalent) and would be used during construction and operation of the Proposed Development.

Other

5.8 The potential to provide surface water attenuation, including the use of Sustainable Drainage Systems (SuDS), has been considered as part of the preliminary design process (see Section 10 – Surface Water Management).

6 HYDROLOGICAL SETTING

Nearby Watercourses

6.1 OS Mapping indicates that the nearest Main River is the River Ebbw which flows in a southerly direction and located approximately 1.3km to the west of the site.

6.2 OS mapping indicates that the nearest surface water feature is the Nant Hafod-fach located on the southern boundary of the site, flows in a southerly direction and is assumed to discharge to the River Ebbw to the west.

6.3 Located to the west and the north of the site approximately 130 m at the nearest point is the Nant Gawni, which flows to the north. Located 280m to the east of the site is Nant Gwyddon which is a tributary of Ebbw River and flows in a southerly direction.

6.4 Located 20 m to the south-west of the site is an Ordinary Watercourse feature. Located 650 m to the north of the site is another Ordinary Watercourse feature. Both watercourses convey flow to the south.

6.5 The cable route corridor travels eastwards and crosses one unnamed ordinary watercourse, and then the cable route continues to travel eastwards and crosses two sections of the river Nant Gwyddon.

6.6 No significant artificial watercourses / features (e.g. canals, reservoirs) have been identified within 1km of the site.

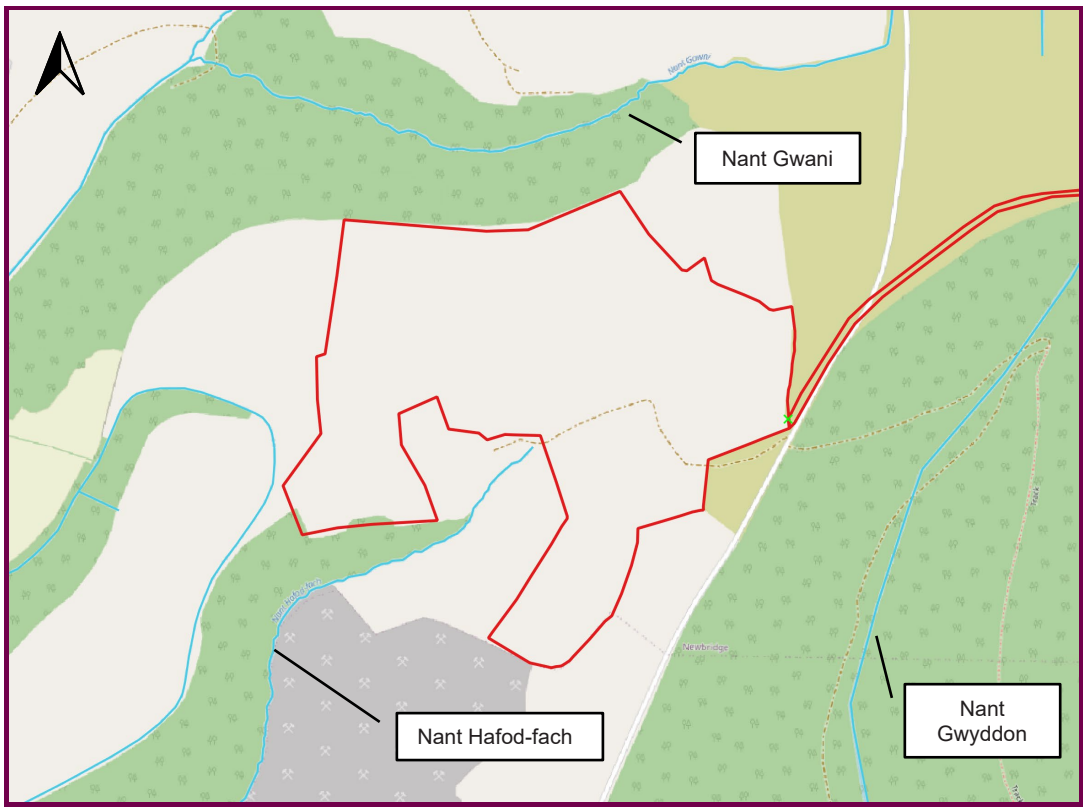

Figure 2. Nearby Hydrological Features

Development Advice Map

6.7 The Welsh Assembly Government produces Development Advice Maps (DAM) to accompany TAN 15. These maps show the degree of flood risk which is to be applied to the site for the planning

process and thus establish the suitability of the site for development. These maps are based upon the Natural Resources Wales flood maps and similarly they can be modified through the presentation of data (i.e. hydraulic modelling) to illustrate that a site is within a different flood zone. The DAM zones are listed below, alongside their attributed planning actions.

- Zone A: Areas considered to be at little or no risk of fluvial or tidal/coastal flooding. Flood risk within this zone does not need to be considered further.
- Zone B: Areas known to have been flooded in the past evidenced by sedimentary deposits. Areas within this zone are further checked against the 0.1% flood level.
- Zone C1: Based on Environment Agency 0.1% flood outline and are areas of the floodplain developed served by significant flood defence infrastructure.
- Zone C2: Based on the Environment Agency 0.1% flood outline and areas of the floodplain without significant flood defence infrastructure.

6.8 The DAM indicates that the whole of the site, including the cable corridor is located in Zone A. Due to the site location it is not deemed to be served by significant infrastructure such as flood defences.

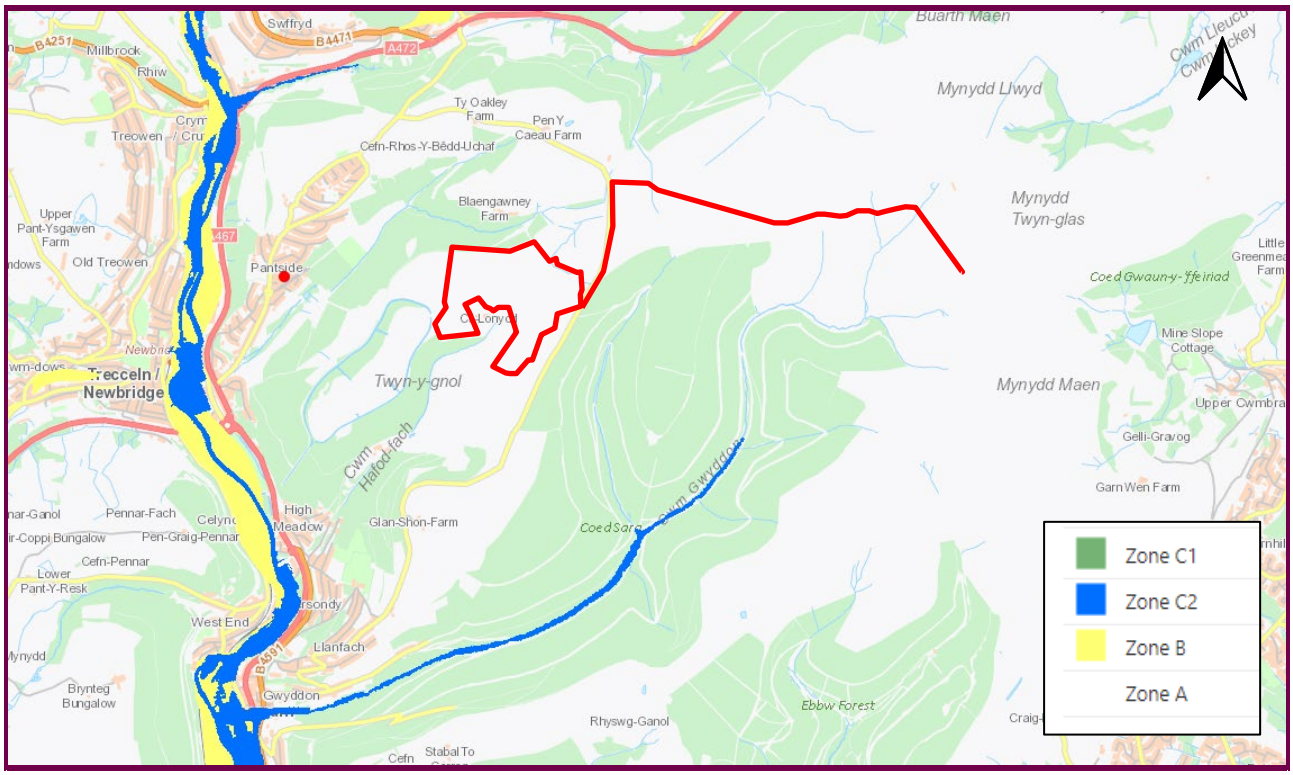

Figure 3. NRW Development Advice Map

Flood Map for Planning

6.1.1 RPS notes a revised TAN15 is due to be implemented in 2024. This will be supported by the new Flood Map for Planning, which includes climate change information to show how this will affect flood risk extents over the next century. It shows the potential extent of flooding assuming no defences are in place.

6.1.2 The Flood Map for Planning has no official status for planning purposes until the revised TAN 15 is implemented. However, given the completion of the development is likely to extend beyond this date and it provides more up to date assessment of the risk it takes precedent over current guidance. As such mitigation has been referenced in line with the findings of this data.

6.1.3 The climate change data is taken from the 'central estimate' epochs and as such is considered an appropriate assessment of future risk for developments in line with TAN15 guidance. The Flood Zones are divided into the following categories:

- **Flood Zone 1 (Rivers)** are areas with a less than 0.1% (1 in 1000) chance of flooding from rivers each year, including the effects of climate change.
- **Flood Zone 2 (Rivers)** are areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from rivers each year, including the effects of climate change.
- **Flood Zone 3 (Rivers)** are areas with more than 1% (1 in 100) chance of flooding from rivers each year, including the effects of climate change.

6.9 Flood Zones are presented within Figure 4. The whole site, including the cable corridor, is situated within Flood Zone 1.

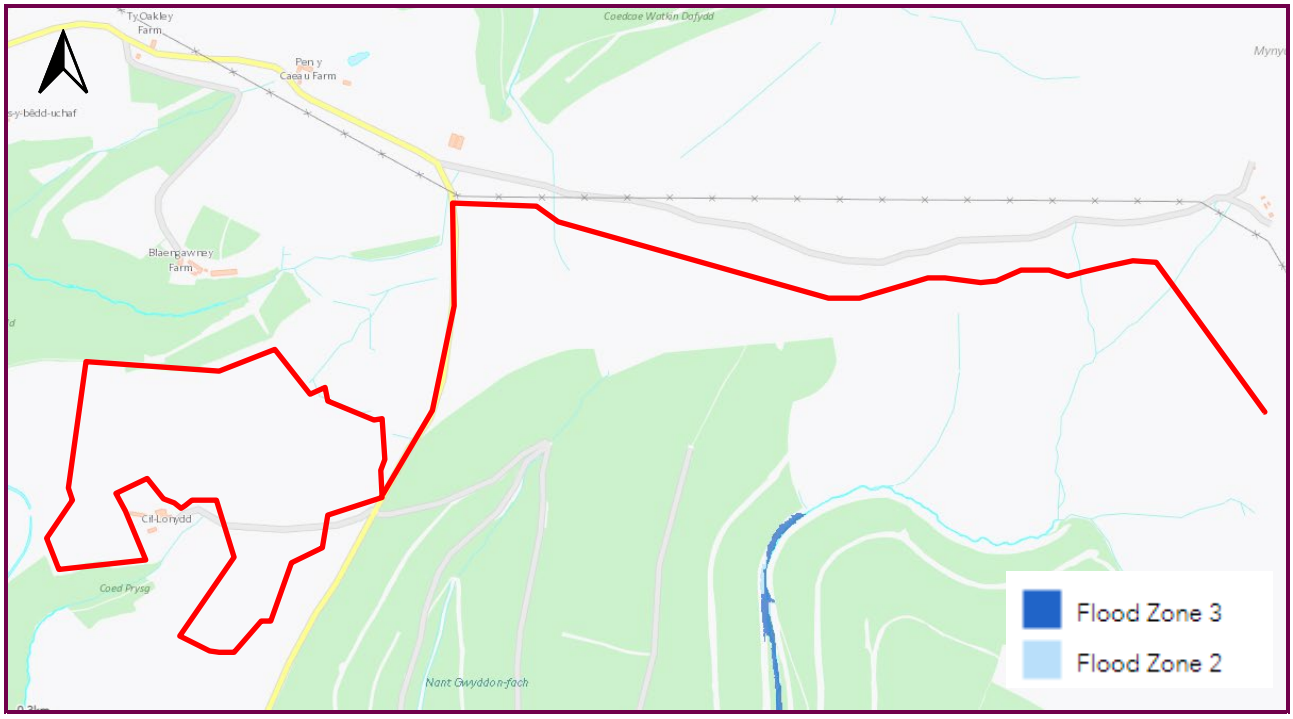

Figure 4. NRW Flood Map for Planning (Rivers and Sea)

Fluvial and Tidal Flood Risk Classification

6.10 NRW National Flood Maps - Flood Risk from Rivers mapping is further used to assess flood risk to the Site with risk of flooding divided into the following categories:

- **High risk**: The area has a chance of flooding of greater than 1 in 30 (3.3%) each year.
- **Medium risk**: The area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%) each year.
- **Low risk:** The area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%) each year.
- **Very low risk**: The area has a chance of flooding of less than 1 in 1000 (0.1%) each year.

6.11 The NRW Flood Maps indicated that the site, including cable corridor, is at negligible risk of flooding from fluvial sources. These flood risk classifications are synonymous with Flood Zones and take into account the effect of any flood defences that may be in this area, indicating the site is classified as

the equivalent as Flood Zone 1 whereby this area has an annual chance of flooding of less than 1 in 1000 (0.1%).

6.12 The NRW Flood Map for Fluvial Flooding is included as Figure 3.

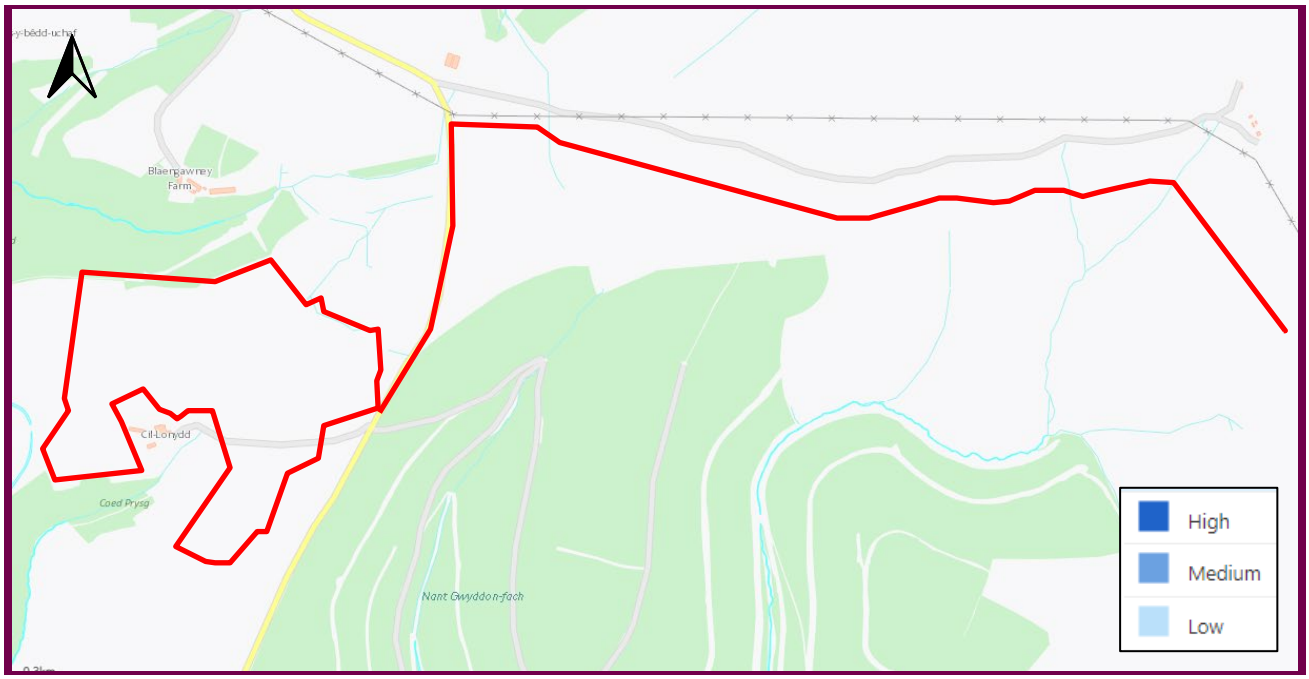

Figure 5. NRW Flood Risk from Rivers Map

6.13 The NRW Flood Risk from the Sea map is included in Figure 4 and shows that the site and the cable route have negligible risk of flooding from fluvial sources. These flood risk classifications are synonymous with Flood Zones and take into account the effect of any flood defences that may be in this area, indicating the site is classified as the equivalent as Flood Zone 1 whereby this area has an annual chance of flooding of less than 1 in 1000 (0.1%).

6.14 The NRW Flood Map for Tidal Flooding is included as Figure 3.

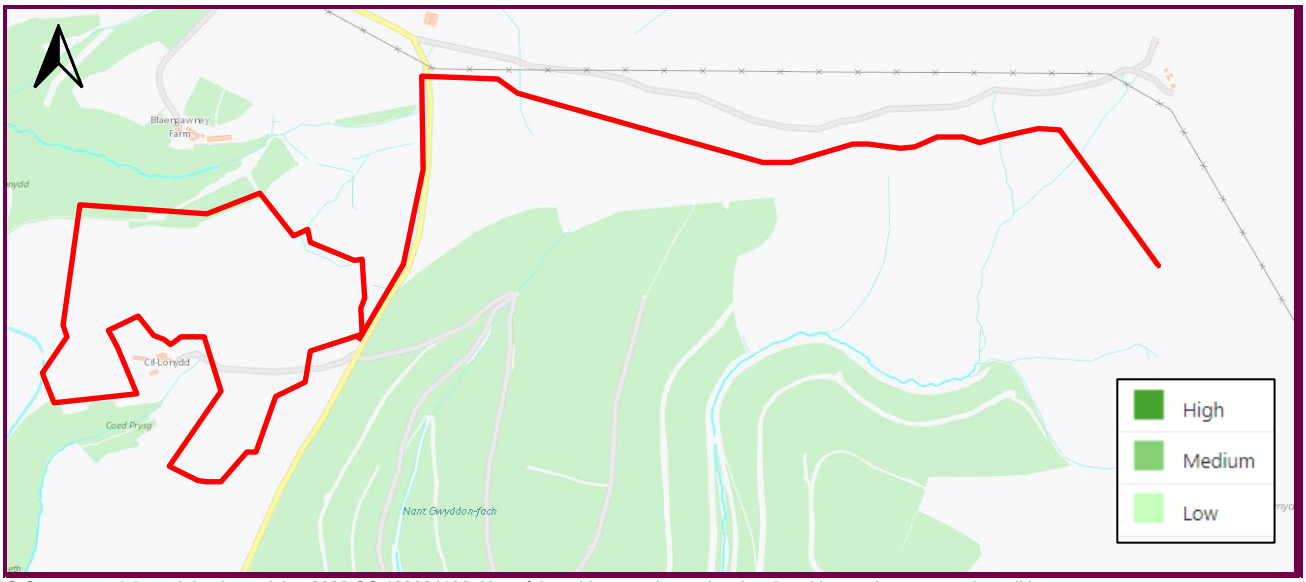

Figure 6. NRW Flood Risk from the Sea Map

Flood Warning Area

6.15 A Flood Warning Area is defined as "*geographical areas where we expect flooding to occur and where we provide a Flood Warning Service. They generally contain properties that are expected to flood from rivers or the sea and in some areas, from groundwater*."

6.16 The site is not located in the Flood Warning Area.

Surface Water Flood Risk Classification

6.1.1 NRW online surface water flood mapping provides surface water flood extents for the 1 in 30, 1 in 100 and 1 in 1,000-year return periods. The risk classifications correspond to the following return periods:

- **High risk** – areas which have a chance of flooding greater than 1 in 30 year (3.3%);
- **Medium risk** – areas which have a chance of flooding between 1 in 100 year (1%) and 1 in 30 (3.3%);
- **Low risk** – areas which have a chance of flooding between 1 in 1000 year (0.1%) and 1 in 100 year (1%); and,
- **Very low risk** – areas which have a chance of flooding less than 1 in 1000 year (0.1%).

6.17 The surface water flood map indicates that the majority of the site is not at risk from surface water flooding. However, on the southern boundary of the site there appears to be a low and medium surface flood risk. This appears to be associated with Nant Hafod-fach and the risk appears to be retained within the channel.

6.18 Majority of the site is indicated to not be affected by depths and velocity associated with surface water flooding. However, on the southern boundary of the site there is an isolated area which is at risk in a low to high risk scenarios, however depths are not expected to exceed 900mm. This risk appears to be associated with Nant Hafod-fach and looks retained within the ordinary water course. In all risk scenarios, the surface water is expected to remain below 1m/s and flow in a southerly direction.

6.19 There is a high to low risk of surface water flooding along the cable route corridor, this is associated with where the cable route crosses Nant Gwyddon.

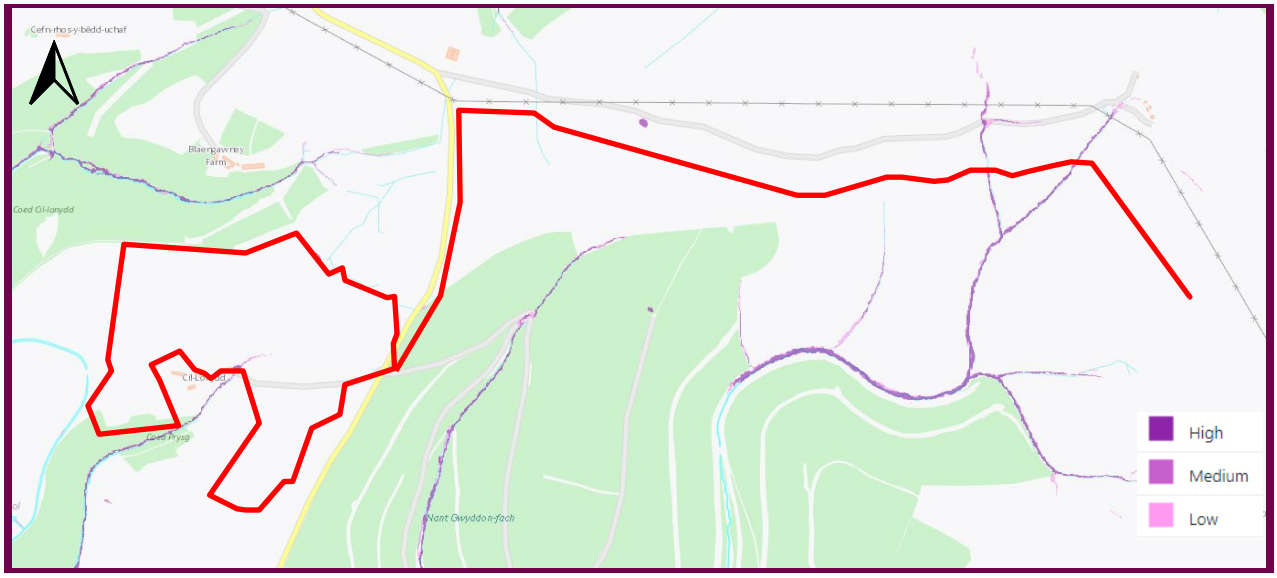

Figure 7. NRW Surface Water Flood Risk Map

TAN15 Future Risk

6.20 The NRW's new Flood Map for Planning includes Flood Zones for surface water and small watercourses with consideration for climate change and how it will affect flood risk extents over the next century. As noted, the Flood Map for Planning has no official status for planning purposes until officially instated.

6.21 However, the risk has been displayed in Figure 8 to show how the new modelling work undertaken and how climate change risk may impact the site in the future. The extent of the risk shows that majority of the site is located within Flood Zone 1, except for a small overland flow route on the southern boundary of the site being a mixture of Zone 2 and 3.

6.22 The cable route is deemed to be located within Flood Zone 3, where the route crosses Nant Gwyddon.

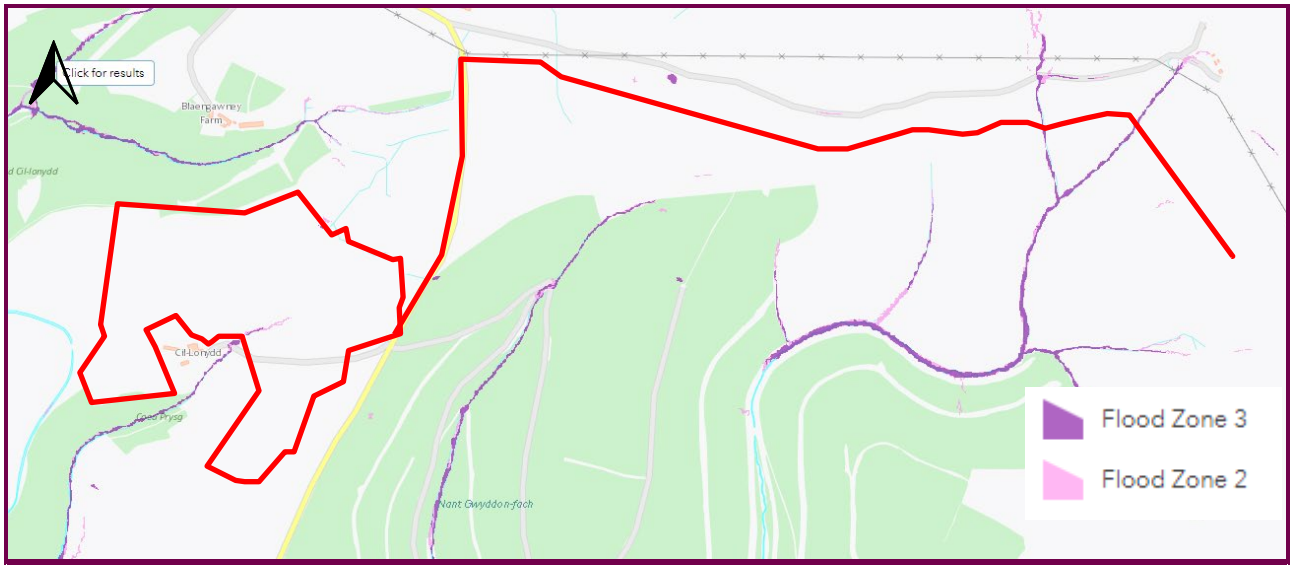

Figure 8. Flood Map for Planning Surface Water and Small Watercourses (Updated TAN15 mapping)

Reservoir Flood Risk Classification

6.23 NRW mapping also indicates that the site is not located within an area potentially at risk from reservoir flooding.

Local Authority Flood Risk Documents

6.24 The CCBC PFRA was published in May 2011. It provides an overview of flood risk from various sources within the borough. Information relevant to this assessment is summarised below:

- Located within the Wales Indicative Flood Risk Area.
- The site is not located within an area which has experienced Emergency Flooding Service Requests consisting of Major Highway Flooding, Property Flooding, Sandbag Request, Unblocking culverts and unblocking highway gully
- The site is not located within an area which has a history of sewer flooding.
- Potential areas of the site may be affected by the surface water flood risk, as indicated by the 1 in 200 year surface water flood risk map.

6.25 The CCBC FRMP was published in December 2015. It provides an overview of the flood risk from various sources within the borough. Information relevant to this assessment is summarised below:

- The site is located within the community area of Newbridge, which covers an approximate area of 1036 and is deemed as a Flood Risk Area.
- States that Agricultural Land of Grades 1, 2 and 3 (ha) are not located within a flood risk area.
- Non-residential properties at risk of flooding are 49.
- The Newbridge area generally drains towards the River Ebbw which flows in a southerly direction through the centre of Newbridge.
- Majority of Newbridge is shown to have low susceptibility to groundwater flooding based on the underlying geology. Groundwater flooding can occur in several old mine shafts, however there is not deemed to be any old mine shafts within the site vicinity.
- Based on the DG5 incidents register, there were no high-risk areas identified within the Newbridge area.
- The flood risk maps indicate that the main local flood risks in Newbridge relate to the surface water flooding where the local drainage system is not effective in capturing runoff, or ordinary watercourses where culverts may have restricted capacity.

7 HYDROGEOLOGICAL SETTING

7.1 British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is not situated on any superficial deposits. The bedrock geology is Hughes Member which is formed of sandstone.

7.2 BGS borehole mapping indicates that there are no borehole logs recorded onsite. The nearest borehole logs are located approximately 0.21km south of the site, reference ST29NW63.

- Borehole 1 had deposits of red brown clay between 0 – 4.5m bgl, Gritstone was present at 4.50m bgl. From 6.5 – 9.5m bgl the substrate was light brown clay and some slightly coarser gritstone. From 9.5m bgl until 14.00m bgl was further Gritstone.
- Borehole 12 had variations of Gritstone, from 2.60m all the way until 24.09m bgl.
- Borehole 13 had Gritstone present from 3.58m to 11.05m bgl. From 11.05m to 13.00m bgl brown sandy sandstone was present.
- There were no records of any water being struck.

7.3 The soils are described as ‘Freely draining acid loamy soils over rock’ by the National Soils Research Institute.

7.4 According to the BGS GeoIndex Aquifer Designation Mapping Aquifer Designation Mapping, the bedrock geology is classified as a Secondary A Aquifer, these formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.

7.5 DMW online groundwater Source Protection Zone (SPZ) mapping indicates that the site is not located within a groundwater SPZ.

7.6 NRW online groundwater vulnerability mapping shows that the bedrock geology and superficial deposits underlying the site is considered to have a high vulnerability.

8 FLOOD RISK AND MITIGATION

8.1 The key sources of flooding that could potentially impact the site are discussed below:

Fluvial Flooding

8.2 As presented within Figure 3, the site is located entirely within DAM Zone A.

8.3 The NRW Flood Map for Planning, as seen in Figure 4, indicates that the site is located within Flood Zone 1 whereby this area would have an annual chance of flooding of less than 1 in 1000 (0.1%).

8.4 The site is not located in an area benefiting from flood defences according to the NRW.

8.5 The site is not located within an area considered to be at risk of flooding within the PFRA.

8.6 The development is classified within TAN 15 as 'less vulnerable development' and is considered to be suitable within DAM Zone A.

8.7 Overall, the risk of flooding from fluvial sources is deemed to be low.

Tidal Flooding

8.8 Due to the site's location, it can be considered negligible to the risk of flooding from tidal sources.

Flooding from Sewers

8.9 Sewer flooding can occur during periods of heavy rainfall when a sewer becomes blocked or is of inadequate capacity. Due to the greenfield nature of the site and rural surrounding area, no drainage or sewer infrastructure is expected to be present within or to the site's immediate vicinity.

8.10 Based on the DG5 incidents register, there were no high-risk areas identified within the Newbridge area and there are no historic flood incidences from sewers recorded at the site.

8.11 The risk from sewer flooding can be considered low.

Surface Water Flooding (Overland Flow)

8.12 This can occur during intense rainfall events, when water cannot soak into the ground or enter drainage systems.

8.13 The NRW Flood Map for Planning for surface water indicates that majority of the site is not at risk of surface water flooding. There is on the southern boundary of the site there appears to be a low and medium surface flood risk, which corresponds with 1 in 100 and 1 in 1000-year return periods. However, most of the risk appears to be retained with the Ordinary Water Course of Nant Hafod-fach.

8.14 The FRMP indicates that the main local flood risk in Newbridge surface water flooding due to local systems not being effective in capturing runoff, or ordinary watercourses and where culverts may have restricted capacity. However, this information is not site specific.

8.15 Therefore, the risk from surface water flooding can be considered low.

Groundwater Flooding

8.16 This can occur in low-lying areas when groundwater levels rise above surface levels, or within underground structures. BGS mapping indicates that the site has a bedrock geology of a Hughes Member which is formed of sandstone.

8.17 The FRMP indicated that majority of Newbridge is shown to have low susceptibility to groundwater flooding based on the underlying geology. Groundwater flooding can occur in several old mine shafts, however there is not deemed to be any old mine shafts within the site vicinity.

8.18 Based on the above the risk associated with groundwater flooding is assessed as low.

Other Sources

8.19 There is a limited risk of flooding occurring as a result of a break in a water main.

8.20 The risk of flooding associated with reservoirs, canals and other artificial structures is considered to be low given the absence of any such structures in the site vicinity.

Event Exceedance

8.21 The mitigation measures proposed as part of the development scheme are considered appropriate to help mitigate against event exceedance scenarios.

9 POTENTIAL IMPACTS

Impermeable Areas

Solar Arrays

9.1 The majority of the Cil Lonydd Solar Farm developed area will be occupied by solar arrays. Although arrays have a large land take, the actual ground impact is negligible. The only intrusion will be from the pile-driven posts. There will be one post for about 6-7 panels, so likely to be 6-7m between each post. Posts are made of galvanized steel and are not solid poles. Traditional fixed solar arrays have surface area ground impact in the range of 0.0012 m^2 - 0.0014 m^2.

9.2 The number of the modules in this solar farm would be approximately 71,080 with panel width of 1.3 m. Assuming that there will be posts every 6 m the total number of posts would be 11,847.

9.3 Based on this, if the 0.0014 m^2 per post is assumed, the total solar farm ground impact would be 16.58 m^2 on a 37.5 ha (375, 000 m^2) Site. This means that what covers the majority of the land as “development” will have a ground impact on 0.004% of the Site.

Inverter Units

9.4 There will be 32 Inverter Units on the Site. Each unit would be approximately 3.2 m x 6.1 m (area of 19.52 m^2). Therefore, these thirty Inverter Units across the Site could potentially give rise to 624.6 m^2 of new impermeable surface.

9.5 624.6 m^2 of inverter units dispersed across the 375, 000 m^2 Site will represent a 0.17% impact based on a top-down view that assumes they create new impermeable surface.

9.6 However, it is proposed that the inverter units will be designed to be on a permeable base (i.e. gravel base).

Battery Storage Units

9.7 The proposed site plan includes 27 battery units on the site. Each battery unit would be approximately 2.5 m x 12 m (area of 30 m^2). A welfare facility and parking spaces are also proposed adjacent to the battery storage facility. The area in which battery storage units are proposed is to be underlain by a lined gravel based, giving rise to an impermeable area of 3600 m^2.

9.8 3600 m^2 dispersed across the 375,000 m^2 Site will represent a 0.96% impact based on a top-down view that assumes they create new impermeable surface.

Access Tracks

9.9 It is proposed that the internal access tracks will be comprised of gravel and fully permeable with no tarmac or other hardstanding type surface. Most will follow existing farm tracks so would not even be new access routes. As such they will have no impact with respect to surface water drainage. Geotextile membrane layers will help to secure the aggregate to prevent it sinking into the soil and this will help prevent ground compaction.

9.10 After the construction of the solar farm the heaviest vehicles likely to use the tracks are occasional van or 4x4 type vehicles. There will be less intensive traffic around the Site compared to existing farm use. This means there is low risk of over-use causing compaction that could compromise permeability. Despite this, it will be reasonable to include monitoring and maintenance of the internal accesses over the lifetime of the solar farm.

9.11 In construction there will be no HGVs using the internal access tracks around the Site except from the highway into the Site. All HGVs making deliveries to the Site for construction will drop off in temporary construction compounds at the access point, to be shown on design and layout drawings.

Materials will then be delivered around the Site by tractor-trailer type vehicles which are the same as vehicles that currently use these routes around the working farm. This means there is low risk of traffic/vehicles causing excess soil compaction either in construction or during operation which could limit the efficacy of the tracks' permeability.

Summary

9.12 The proposed impermeable surface areas within the 37.5 ha (375,000 m^2) site are presented within Table 2 below. In total, the new impermeable areas create a ground impact across 1.13% of the site.

Table 2. Impermeable areas

Development	M^2 Area
Solar Arrays	16.58
Inverter Units	624.6
BESS Compound	3600
Potential Total	**4,241.18 m^2**

10 SURFACE WATER MANAGEMENT

10.1 Introduction

10.1.1 New potential impermeable areas within the site are equivalent to 4,241.18 m^2, 1.13% of the whole Site area.

10.1.2 The sustainable management of surface water is an essential element of reducing future flood risk to the site and its surroundings. Legislation and guidance relating to sustainable drainage systems are presented within Section 2, legislation and guidance.

10.1.3 Undeveloped sites generally rely on natural drainage to convey or absorb rainfall, with water infiltrating into the ground or coalescing across the surface towards watercourses.

10.1.4 Modelling work (Cook and McCuen 2013) shows that solar panels themselves do not have a significant effect on runoff volumes, peak flows or times to peak. However, where design decisions or lack of maintenance lead to bare ground then the peak discharge may increase requiring storm water management.

10.1.5 Ancillary features are expected to increase hardstanding within each site. Reducing the permeability of at least part of the site will however lead to marked changes in each site's response to rainfall. Without specific measures to manage surface water the volume of water and peak flow rate are likely to increase. Inadequate surface water drainage arrangements can threaten the Project itself and increase the risk of flooding to others.

10.1.6 Surface water arising from a developed site should as far as is practicable be managed in a sustainable manner to mimic the natural hydrology of the site while reducing the risk of flooding and elsewhere, taking climate change into account.

10.1.7 Generally, this type of development is considered to have a design life of 40 years. Therefore, for the purposes of this assessment, taking into account Wales climate change allowances a 20 % increase in peak rainfall intensity has been included as climate change allowance, which caters up to the year 2115. No climate change guidance is available beyond 2115.

10.2 Existing Surface Water Runoff Rates

Greenfield Runoff Rate

10.2.1 The existing runoff rate has been calculated using the Interim Code of Practice for Sustainable Drainage Systems (ICP SuDS) Method. Existing greenfield runoff rates are presented in Table 3 Existing surface water run-off rates per hectare are listed below. ICP SuDS calculations are included as Appendix C.

- Area: 1ha
- Standard-period Average Annual Rainfall: 1450 mm/yr
- Soil (global soils index): 0.400
- Region number: 9 (catchment based on Flood Studies Report Figure I.2.4.).

Table 3 Existing surface water run-off rates

Return Period (years)	Runoff Rate (l/s) Per ha
1 in 1	7.0
Q_{BAR}	8.0
1 in 30	14.1
1 in 100	17.1

Q_{BAR} = mean annual flood low
l/s = litres per second

10.2 The presence of solar panels and associated ancillary buildings will result in total potential new impermeable surfaces 4,241.18m^2/1.13% of the whole site area. If a conservative approach is adopted, it is assumed that the ancillary buildings will entail new hardstanding within the site.

10.3 Consideration of Drainage Hierarchy

10.1 The PPG advises of the following hierarchy for the disposal of surface water;

1. Infiltration;
2. To a surface water body;
3. To a surface water sewer, highway drain or another drainage system; or
4. To a combined sewer.

10.2 The drainage hierarchy has been considered as follows.

Infiltration

10.3 BGS bedrock geology mapping records the site is not situated on any superficial deposits. The site is situated on a bedrock geology of Hughes Member which is formed of sandstone. The bedrock geology is also classified as a Secondary A Aquifer which are formed of permeable layers and are capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.

10.4 The Cranfield Soil and Agrifood Institute Soilscapes mapping shows soils within the local area of the site to be classified as Soilscape 13; freely draining acid loamy soils over rock. Within MicroDrainage, the site corresponds with the SOIL index 0.15 / Soil type 1 – 'Well drained, permeable sandy or loamy soils wand shallow analogues over highly permeable limestone, chalk, sandstone or related drifts' (mapping information from MicroDrainage software / Flood Studies Report (NERC, 1975)).

10.5 Soakaway testing in accordance with BRE 365 has yet to be undertaken within the site to establish infiltration rates within the site. Therefore, in lieu, the CIRIA SuDS Manual C753 Table 25.1 'Typical infiltration coefficients based on soil texture (after Bettes, 1996) has been used to establish indicative infiltration rates expected to be found on-site. As per table 25.1 of the SuDS manual therefore we classify soils within the site as 'sandy loam'. Based on this table, soil within the local area is classified to have typical infiltration coefficients of between $1*10^{-7}$ – $1*10^{-5}$. A best case infiltration rate of 0.036m/hr has been assumed within the surface water calculations.

To a Surface Water Body

10.6 In regards to the inverter units, if discharge to ground is unfeasible, discharging to a surface water body is considered the next feasible option. There is Nant Hafod-fach located to the south of the site

and is ordinary watercourse running from to south of the site. In addition, appropriate consent will be required for surface water discharge into the ordinary watercourse.

10.3.1 In regards to the battery storage units, it is proposed to discharge flows to Nant Hafod-fach. Possible third party consents may be required in addition to appropriate discharge consents from the LLFA prior to construction.

10.4 Proposed Development Conceptual Drainage Strategy

10.4.1 A conceptual drainage strategy is based on the Proposed Development Layout as presented within Appendix D. The discharge location and method of surface water flows is to be determined at detailed design stage prior to SAB approval, following soakaway testing.

Solar Panels

10.4.2 It is expected precipitation would be intercepted by between 25% to 40% of the surface of the site typically over-sailed by solar PV modules. A known concern is the risk of water "sheeting" off a solar array façade. As a result of the construction of the solar panels, some rainfall will be intercepted by the surface of the arrays before reaching ground level. Intercepted rainfall will either run down the face of the panels and drip onto the ground below or will be lost due to evaporation from the face of the panels. Without mitigation there is a risk of erosion of the ground on which rainwater drips. This could then result in the formation of rivulets which could increase the speed at which runoff discharges from the site.

10.4.3 However, the potential for erosion to occur as a result of the 'drip effect' is appropriately mitigated by features of the solar arrays themselves, typical solar arrays are constructed with gaps between each panel on an array which allows surface water to fall to the vegetated ground beneath.

10.4.4 As presented within Figure 9, the solar PV modules for Plas Power are to have a 25 degree pitch on the horizontal plane. This will reduce the flow velocity of run-off landing on the solar PV modules, resulting in run-off to drip down through gaps between individual panels and thus reducing the risk of water sheeting and run-off from the lower edge of the modules. Figure 10 is from the underside of a typical array providing a helpful visual aid to show what the gaps are like. These images are provided for context and comparison only.

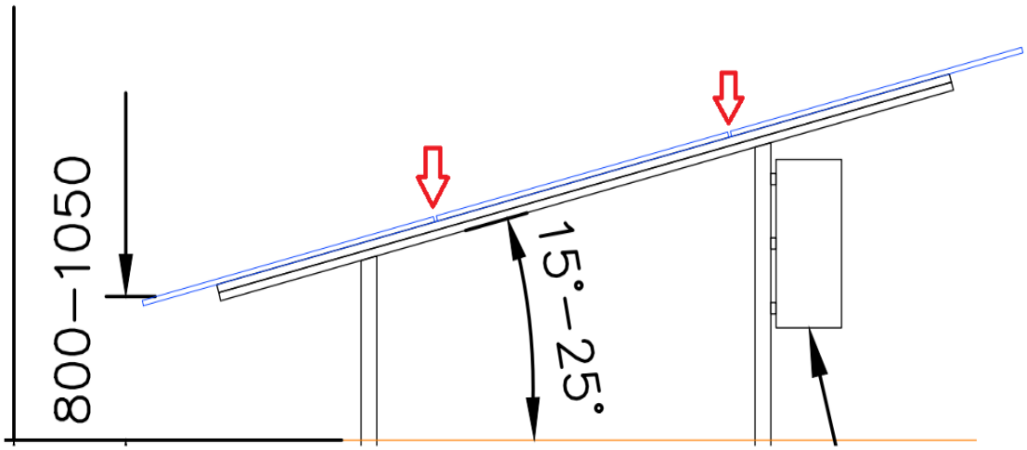

Figure 9. Typical Solar Array

Figure 10. Underside of a solar panel

Battery Units and Inverter Units

10.2 The report takes a conservative approach and suggests that the ancillary buildings on site will entail new hardstanding. The Inverter Units comprise of prefabricated containers. They are not intended as permanent buildings as the site will require full reinstatement of the land to agricultural use at the end of the site's operational life. Therefore, there is no interest in creating any kind of permanent foundation for the temporary ancillary buildings. No poured concrete or other non-permeable foundation will be used.

10.3 The containers must have a floor level that is off the ground by at least 100mm and they are typically located on plinths or blocks 100-500mm off the ground. Within the proposed development, the containers will sit atop a 300mm deep gravel base with a 500mm void between the floor level of the unit and the permeable foundation beneath. Therefore, the only impermeable surface would be the area of blocks that stabilise the invertors on the gravel base.

Inverter Units

10.4 Each inverter unit is to be underlain by a gravel base and served by a downpipe to collect roofwater and direct it to the permeable gravel-filled infiltration trench filled with a 30% void ratio to provide surface water attenuation. The gravel base will not alter the underlying condition beyond the topsoil; what would otherwise be topsoil will be replaced by gravel, which has 30% more porosity and storage capacity than the existing topsoil would have.

10.5 Conceptual drainage calculations have been undertaken using the industry standard MicroDrainage software. Calculations are presented within Appendix E to assess attenuation requirements for the 1 in 100-year rainfall event plus a 20% uplift to account for climate change. Attenuation requirements and attenuation volumes to be provided for ancillary features are presented below within Table 4.

Table 4. Attenuation requirements and volumes for inverter units

30% void ratio gravel base dimension	Volume to be provided	Attenuation required for each unit
5.5 m * 8.0 m	3.96m^3	0.5m^3

10.6 Across the entire site, 16m^3 of attenuation will be required for the 32 Inverter Units. In the event the gravel base serving inverter units reaches capacity excess water will overtop and be conveyed by gravity across the fields mimicking the existing Site runoff characteristics. This approach will aid in managing flood flows, whilst at the same time ensuring that the vegetated ground cover and existing and new boundary vegetation receive suitable hydration.

Battery Units

10.4.1 A gravel base is proposed within the battery units area. The gravel base will be lined to avoid potential contamination of groundwater in the event of a fire It is proposed the base of the gravel is to be laid at a gradient of 1/500 to enable surface water to be adequately conveyed to the discharge point.

10.4.2 Conceptual drainage calculations have been undertaken using the industry standard MicroDrainage software. Calculations are presented within Appendix E to assess attenuation requirements for the 1 in 100-year rainfall event plus a 20% uplift to account for climate change. Approximately 256.5m^3 of attenuation will be required, based on the 1 in 1-year greenfield runoff rate being achieved and considering the entirety of the battery storage compound as impermeable. Attenuation requirements are presented below within **Table 5** and within Appendix E.

Table 5. Attenuation requirements and volumes for battery units

30% void ratio gravel base dimension	Volume to be provided	Discharge rate
3515m^2	256.5m^3	2.5l/s

Access Tracks

10.7 It is proposed that the internal access tracks will be fully permeable with no tarmac or other hardstanding type surface. Most will follow existing farm tracks so would not even be new access routes. As such they will have no impact with respect to surface water drainage. Geotextile membrane layers will help to secure the aggregate to prevent it sinking into the soil and this will help prevent ground compaction.

10.8 After the construction of the solar farm the heaviest vehicles likely to use the tracks are occasional van or 4x4 type vehicles. There will be less intensive traffic around the site compared to existing farm use. This means there is low risk of over-use causing compaction that could compromise permeability. Despite this, it will be reasonable to include monitoring and maintenance of the internal accesses over the lifetime of the solar farm.

10.9 In construction there will be no HGVs using the internal access tracks around the Site except from the highway into the Site. All HGVs making deliveries to the site for construction will drop off in temporary construction compounds at the access point. Materials will then be delivered around the site by tractor-trailer type vehicles which are the same as vehicles that currently use these routes around the working farm. This means there is low risk of traffic/vehicles causing excess soil compaction either in construction or during operation which could limit the efficacy of the tracks' permeability. Based on the above no attenuation is required.

Event Exceedance

10.10 The conceptual surface water drainage strategy provides storage up to the 1 in 100 year plus climate change event. In an event exceeding this magnitude, detailed drainage design will identify mitigation measures to ensure that the resulting above-ground flooding will be confined to temporary shallow flooding of the on-site road network and will not affect the buildings on site or significantly increase flood risk to off-site locations.

10.11 The conceptual drainage strategy incorporates interceptor channels around the site, to collect any overland flows that may occur during high intensity rainfall events and events that exceed the design standard of the drainage strategy. Surface water will be stored in the interceptor channels before infiltrating into the ground. The dimensions of the interceptor channels is subject to detailed design, following results from infiltration testing.

10.12 Event exceedance planning will be undertaken as part of the final design process. Suitable mitigation measures will be incorporated into the development to ensure water is retained on-site.

Management of Fire Water

10.13 In order to manage the risk associated with a highly unlikely fire event of the batter storage, the development will include both a provision for the supply of fire water via water tanks and/or hydrants, in addition containment of fire water used to supress any fire. At detailed design, an onsite fire containment strategy will be incorporated into the overall site drainage design.

10.14 In the unlikely event of a fire the unit on fire will be left to burn out, in accordance with general guidance for Battery units, whilst water will be focussed on the adjacent battery units to ensure the fire is contained. As a consequence, the runoff generated is less likely to pose a contamination risk.

10.15 Runoff used to cool the units will be initially intercepted by the gravel surfacing from where it will be conveyed by gravity to interceptor swales/channels and held for inspections via a penstock or similar for testing prior to release or tanking off site for treatment as appropriate.

10.16 This design intercepts and isolates potentially contaminated runoff from the wider SuDS system for all fire events and thus prevents contaminated runoff entering the wider hydrological network.

SuDS Maintenance

10.17 Table 6 and Table 7 below shows a typical drainage maintenance plan suitable for gravel subbases and interceptor channels (extracted from SuDS Manual C753). Gravel base maintenance

Table 6. Gravel Base Maintenance

Maintenance schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly, or as required
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect gravel for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from gravel	Six monthly, or as required

Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the gravel (if applicable), using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required

Table 7. Interceptor Channels maintenance

Maintenance schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Remove litter and debris	Monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the gravel (if applicable), using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
Remedial factors	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required

Construction Stage Drainage

10.18 During construction of the development, the building contractor will be responsible for management and disposal of rainwater runoff generated from the site in its temporary condition.

10.19 The contractor shall develop a formal site management plan, which will address pollution management and control in relation to site plant and vehicles, raw materials storage and waste generation, to ensure that all surface water runoff generated in the temporary condition will be free of contamination.

10.20 The site will be subject to topsoil strip and bulk earthworks to prepare the site to the correct level for development. The contractor shall provide temporary drainage measures to contain runoff within the development site boundary ensuring that this is sized appropriately, and that means to remove excess surface water are available for use at all times.

11 SUMMARY AND CONCLUSIONS

11.1.1 A site-specific Flood Consequence Assessment following the guidance of the Planning Policy Wales and TAN 15 has been undertaken for a solar farm and batter units on land at Cil Lonydd, Newbridge.

11.2 Flood Risk

11.2.1 The site is located within DAM Zone A and B and is located within Flood Zone 1 (fluvial and tidal) and is assessed to have a low risk of flooding from this source and all other forms of flooding.

11.2.2 The development is classified within TAN 15 as 'highly vulnerable' and 'less vulnerable' development and is considered to be suitable at this location.

11.3 Surface Water Management

11.3.1 A surface water management strategy has been produced to incorporate appropriate management techniques that will mitigate potential increase in runoff from the Proposed Development.

11.3.2 SuDS techniques include filter strips, swales and attenuation for ancillary features is proposed via gravel basis in which infrastructure will be located upon. Access tracks will be constructed out of permeable materials.

11.3.3 Solar PV arrays are designed in such a way to prevent surface water sheeting off panels and potentially causing erosion. Panels are designed to allow surface water to drip off, landing onto filter strips below.

11.3.4 The surface water and soil management measures incorporated within the Proposed Development will ensure that there is negligible alteration to local drainage patterns, flow directions and will manage suspended sediments from entering the drainage channels.

11.3.5 Where construction has resulted in soil compaction, the areas between panel rows would be tilled / scarified to an appropriate depth and then re-seeded with an appropriate vegetation cover. Any existing field or tile drainage system will be restored, where affected by construction will be maintained by the client for the life of the development. Furthermore, all areas of the application area, where appropriate, will have vegetation cover at all times.

11.3.6 Impermeable areas associated with ancillary features will be placed on a gravel subbase sized to accommodate the 1 in 100-year rainfall event plus a 20% uplift to account for climate change. The battery storage unit area is to be lined to avoid potential contamination of groundwater in the event of a fire.

APPENDICES

Appendix A

Caerphilly Council Borough Council

Tŷ Tredomen,
Parc Tredomen,
Ystrad Mynach,
Hengoed CF82 7WF

Tredomen House,
Tredomen Park,
Ystrad Mynach,
Hengoed CF82 7WF

Cyfarwyddwr Corfforaethol - Economi a'r Amgylchedd
Corporate Director - Economy and Environment

www.caerffili.gov.uk | www.caerphilly.gov.uk

Mr M Todd-Jones
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CF10 5AZ

Head of Regeneration and Planning
Pennaeth Adfywio a Chynllunio

Your Ref/Eich Cyf:
Our Ref/Ein Cyf: SPA/23/0015
Contact/Cysylltwc E Rowley
Telephone/Ffon:
E Mail/E Bost: rowlee@caerphilly.gov.uk

Date/Dyddiad: 05.104.2022

Dear Mr Todd-Jones

TOWN AND COUNTRY PLANNING ACT 1990
REFERENCE NO. SPA/23/0015

Proposed solar farm, access and ancillary development at:
Cil Lonydd Farm Abercarn Mountain Road Hafodyrynys.

I refer to your enquiry received on 22 February 2023 and provide the following advice for your information:

PLANNING HISTORY 2010 ONWARDS

There is no relevant planning history relating to this specific site that would be relevant to this enquiry.

POLICY SUMMARY

National Planning Guidance particular (but not exhaustive) the requirements of:

- Future Wales: The National Plan (Edition 11, 2021);
- Planning Policy Wales (Edition 11, 2021);
- Technical Advice Note 5: Nature Conservation and Planning (2009);
- Technical Advice Note 6: Planning for Sustainable Rural Communities (2010);
- Technical Advice Note 12: Design (2016);
- Technical Advice Note 15: Development and Flood Risk (2004);

- Technical Advice Note 18: Transport (2007); and
- Technical Advice Note 24: The Historic Environment (2017).

DEVELOPMENT PLAN POLICIES

The Caerphilly County Borough Local Development Plan (LDP) up to 2021 was adopted in November 2010 and the following policies are relevant to the proposed development at the enquiry site are:

Strategic Policies

- Policy SP2 Development Strategy - Development within the Northern Connections Corridor (NCC);
- Policy SP4 Settlement Strategy;
- Policy SP5 Settlement Boundaries;
- Policy SP6 Place Making;
- Policy SP8 Mineral Safeguarding; and
- Policy SP10 Conservation of Natural Heritage.

Countywide Policies

- Policy CW2 Amenity;
- Policy CW3 Design considerations - Highways;
- Policy CW4 Natural Heritage Protection;
- Policy CW5 Protection of the Water Environment;
- Policy CW15 General Locational Constraints;
- Policy CW19 Locational Constraints - Rural Development and Diversification;
- Policy CW22 Locational Constraints - Minerals;
- Policy CW23 Locational Constraints - Mineral Site Buffer Zones; and
- Policy NH2 Visually Important Local Landscapes (VILLs).

Supplementary Planning Guidance

Relevant Guidance can be found in Supplementary Planning Guidance;

- LDP 4 Trees and Development.

The document can be viewed on the website link provided below.

https://www.caerphilly.gov.uk/Business/Planning-and-building-control-for-business/Local-Development-Plan/Supplementary-Planning-Guidance-(SPG)

INITIAL POLICY ASSESSMENT

In accordance with The Developments of National Significance (Wales) Regulations 2016 (as amended), please accept this correspondence as the Local Planning

Authority's response for the purposes of the Regulations. These comments are made without prejudice to the consideration by the local planning authority of any matters relating to the prospective DNS application.

Advice contained herein has primarily focussed on local planning policy and guidance but, clearly, should be read in conjunction with relevant national policy and guidance.

The enquiry site is located outside of the settlement boundary where development is normally strictly controlled to prevent inappropriate development in the countryside Policy SP5 (Settlement Boundaries) states that the boundaries are defined in order to define the area within which development would normally be allowed, to promote the effective use of urban land and to prevent fragmented development and inappropriate development in the countryside. The enquiry proposal fails to accord with Policy SP5.

The LDP Proposals Map indicates that the enquiry site within a Visually Important Local Landscape (VILL) NH2.3 Abercarn, a Sandstone Safeguarding Area (Policy SP8) and a Mineral Site Buffer Zone (MN1.3). Three Sites of Site of Importance for Nature Conservation (SINC) are also located adjacent to enquiry site being NH 3.112 Coed Cil-Lonydd, East of Newbridge, NH3.113, Mynydd Maen, East of Newbridge, NH3.128 Cwm Hafod-Fach Woodlands, North of Abercarn. In addition, Bridleway Abercarn BR179 and Restricted Byways Abercarn RBW171,172, 316 and 320 run through the site.

In terms of surrounding designations, the following ecological designations are found within a 250 metre buffer of the enquiry site:

- SINC NH 3.112 Coed Cil-Lonydd, East of Newbridge;
- SINC NH 3.113 Mynydd Maen, East of Newbridge;
- SINC NH 3.124 Gwydon Valley Woodlands, Abercarn; and
- SINC NH 3.128 Cwm Hafod-Fach Woodlands, North of Abercarn.

In terms of surrounding designations, the following historic designations are found within 3km of the vicinity of the enquiry site:

- Schedule Ancient Monument (SAM) MM250 Charcoal Blast Furnace at Abercarn.

In terms of surrounding designations, the following historic designations are found within 5km of the vicinity of the enquiry site:

- Schedule Ancient Monument (SAM) MM035 Twyn Tudor;
- Schedule Ancient Monument (SAM) MM044 Twm-Barlwm Mound and Bailey Castle;
- Schedule Ancient Monument (SAM) MM045 Cairns West of Craig y Dyffryn;
- Schedule Ancient Monument (SAM) MM141 St Illtyd Castle Mound;
- Schedule Ancient Monument (SAM) MM192 Old Beam Pump & Winding Engine, Glyn Pits;

- Schedule Ancient Monument (SAM) MM256 Iron Ore Scours at Upper Race, Pontypool;
- Schedule Ancient Monument (SAM) MM259 Former Dam of Cwmcarn Canal Reservoir;
- Schedule Ancient Monument (SAM) MM269 Pen y Fan Canal Reservoir; and
- Schedule Ancient Monument (SAM) MM271 Llanderfel Church.

It should also be noted that the eastern boundary of the enquiry site adjoins registered Common Land.

The enquiry site itself measures approximately 28.6 hectares and is an irregular shaped parcel of land comprising of a series of agricultural fields of varying sizes and bound by a mixture of mature woodland, trees and hedgerows. The fields are primarily used for pasture grazing and according to Data Map Wales the Agricultural Land Classification is predominantly Grades 4 and 5, which is not considered to be the best and most versatile type of agricultural land that should be conserved as a finite resource.

The enquiry details proposes to develop a 40MW solar farm and associated ancillary development, including a substation with an operational life of approximately 50 years. The point of connection is proposed to be located at an existing substation to the southeast on Mynydd Maen Common, which would be connected to the site by a cable route running 3km in length. The power generated would be enough to power approximately 15,000 typical family homes.

With regard to the principle of the proposed development **Policy CW15 – General Locational Constraints** sets out the types of uses that would be acceptable outside of settlement boundaries and Criterion C states that development proposals will not be permitted outside settlement boundaries unless the proposed development is either:-

i. Associated with either agriculture, forestry or the winning and working of minerals or
ii. For the conversion, rehabilitation or replacement of rural buildings and dwellings, or
iii. For recreation, leisure and tourism proposals that are suitable in a countryside location or
iv. Associated with the provision of public utilities, infrastructure and waste management facilities that cannot reasonable located elsewhere or
v. Associated with the reclamation/treatment of derelict or contaminated land.

A solar farm would therefore accord with criterion iv. In terms of the principle of the development, ideally large-scale solar PV arrays should be directed towards previously developed land. However, with relatively few sites of appropriate status and size within the Caerphilly County Borough, solar farms are generally located within the countryside and are considered acceptable in principle. Furthermore, paragraph 3.7.2 of Technical Advice Note 6: Planning for Sustainable Rural Communities identifies renewable energy as an appropriate form of farm diversification and Policy 17 of Future Wales states that the Welsh Government strongly supports the principle of developing renewable and low

carbon energy from all technologies at all scales to meet future energy needs.

In terms of the need for the proposed renewable energy development paragraph 5.7.7 Planning Policy Wales (PPW) highlights the importance of renewable and low carbon energy developments in tackling the climate emergency and increasing energy security Furthermore paragraphs 5.7.3 and 5.7.15 PPW clearly states that the planning system should facilitate the delivery of renewable energy targets. It is therefore considered that the proposed 40MW solar farm would make a beneficial contribution to meeting the Welsh Government's target to generate 70% of consumed electricity by renewable means by 2030. This material consideration would need to be afforded significant weight as part of any future planning application in accordance with the requirements of Policy 17 of Future Wales.

On that basis, clearly there is always going to be a degree of visual harm associated with the proposed development and as such the overriding issue is whether the level of such harm would be acceptable when balanced against the objectives of national and local planning policy in respect of renewable energy to meet the energy demands of the county borough.

In line with national planning policy, **SP6 (Place Making)** requires development proposals to contribute to the creation of sustainable places by having full regard to the context of the local, natural, historic and built environment and its special features. In that regard there are no historical assets within the enquiry site but there are many within a 3-5 km buffer distance of the site. Given the low lying nature of the scheme, despite being located in an elevated position it is considered unlikely that the proposed development would result in a demonstrably and unacceptably damaging effect upon the setting of any scheduled monument.

The visual appearance of the proposed development, its scale and its relationship to its surroundings and context are material planning considerations. The proposal will therefore need to be assessed against national design guidance contained in TAN 12 Design and against LDP 6: Building Better Places to Live in order to ensure that the requirements of SP6 can be fully met.

Policy SP10 (Conservation of Natural Heritage) recognises the natural heritage as a positive asset that enriches people's quality of life. In this context Policy SP10 indicates that the Council will protect, conserve, enhance and manage this asset in the consideration of all development proposals. The Preliminary Ecological Appraisal suggests a series of further surveys that will need to be provided and the Local Planning Authority is supportive of this approach. Whilst the Council's Ecologist has not provided comments as part of this enquiry, any development that would disturb or otherwise harm protected species or their habitats will only be permitted in exceptional circumstances where the effects are minimised or mitigated through careful design, work scheduling or other appropriate measures.

In tandem with Policy SP10, **Policy CW4 (Natural Heritage Protection)** states that development proposals that affect locally designated natural heritage features, will only be permitted where it conserves and, where appropriate, enhances the distinctive visual and sensory landscape features or characteristics of the VILL and where it would not cause unacceptable harm to the particular features of the SINC. In that

regard one of the main issues will clearly be visual and landscape impact, including the cumulative impacts of the proposed development. However, it is also noted that any impacts could potentially be improved with a comprehensive landscaping scheme. Whilst the proposal is considered to be temporary in nature, despite its operational lifespan estimated to be 50 years, the proposed development is considered to be flexible and adaptable in terms of the relative ease of returning the site to its former condition and use on the expiration of the development's life. In summary, clearly the proposed development is resource efficient and climate responsive however the potential visual and landscape effects cannot be quantified at this stage based on the details submitted to accompany this enquiry. Comments from this Council's Landscape Architect are provided below.

Whilst it is noted that the enquiry site is does not fall within a designated SINC, given its proximity, appropriate mitigation should be provided to ensure that there is no reduction in the overall value of the adjacent individual SINCs. Furthermore, Policy 9 of Future Wales states that, among other things, action towards securing the maintenance and enhancement of biodiversity (to provide a net benefit), the resilience of ecosystems and green infrastructure assets must be demonstrated as part of development proposals.

Furthermore, **Policy CW6 (Trees, Woodland and Hedgerow Protection)** sets out the considerations for trees as part of development proposals. Criterion C states that development will only be permitted where development proposals have made all reasonable efforts to retain protect and integrate trees, woodlands or hedgerows within the development site.

Having regard to the above policies, there is very little information submitted with regards to the proposed layout and the impact upon existing trees and hedgerows within the site and it will be necessary to identify the root protection areas for trees and those trees identified for removal to ensure that appropriate mitigation can be provided together with providing adequate protection to safeguard existing trees.

Policy CW2 (Amenity) indicates that development proposals would not result in over-development of the site and/or its surroundings. Furthermore, the policy indicates that the proposed use would need to be compatible with the surrounding land uses and would not give rise to any unacceptable impacts on adjacent properties or land.

In that regard, it is understood that there is only one residential receptor in close proximity to the enquiry site and that property is likely to be associated with the enquiry site and the farm diversification scheme, as such it is unlikely that the proposed development would give rise to amenity impacts by virtue of its isolated location.

In terms of Public Rights of Way (PRoW), several footpaths and restricted byways are found within the vicinity of the enquiry site and there are concerns in respect of glint and glare from the photovoltaic panels which would lessen a user's overall experience as they travel through the site. The submission details are not accompanied by a Glint and Glare report, however it is understood that this would be submitted should the proposal proceed to the next stage.

Further concerns are also raised by the Council's Public Rights of Way Officer and detailed comments are provided below.

In regards to visual amenity, the concerns raised in respect of the loss of any trees and hedgerows has already been discussed.

Policy CW3 (Design Considerations – Highways) requires development proposals to have regard for the safe, effective and efficient use of the transportation network. The car parking standards that are required to be met are set out in supplementary planning guidance LDP5 Car Parking Standards. Limited comments in respect of these matters are provided by the Transportation Engineering Manager based on the level of highway details to accompany the enquiry submission details. The access route to the site has not been indicated and whether the intended route would require a certain level of works for vehicles to pass safely, particularly during the construction period.

Policy CW5 Protection of the Water Environment states that development proposals will only be permitted where they do not have an unacceptable adverse impact upon the water environment, and where they would not pose an unacceptable risk to the quality of controlled waters (including groundwater and surface water). The proposed development appears to have a combined construction area exceeding 100 square metres and therefore a separate application and consent would be required for surface water drainage from the Sustainable Drainage Approval Body (SAB). Whilst it is recommended that separate pre-application advice is sought from the SAB, some general advice on the development of a drainage scheme is provided.

Policy CW22 Location Constraints - Minerals states that proposals for development of a temporary nature within identified mineral safeguarding areas will not be approved unless they can be completed, and the site restored to a condition that does not inhibit mineral extraction, within the timescale that the mineral is likely to be needed. It is noted from the supporting information that the operational lifetime of the solar farm is 50 years, after which they will be de-commissioned and the site reinstated to its former condition. Whilst all of the enquiry site is within a sandstone safeguarding area**,** there are currently no known proposals to work the sandstone resource within this 50 year timeframe. The benefits of the proposals in terms of renewable energy and its reversibility would take precedence over any existing resource and it is therefore considered that the proposed development would meet the requirements of this policy.

Furthermore, it should be noted that some of the site, particularly the southern field parcels are within a mineral buffer zone associated with Hafod Fach Quarry, Abercarn (MN1.3), an active quarry.

Policy CW23 Locational Constraints - Mineral Site Buffer Zones states that development proposals for sensitive or minerals development will not be permitted within the mineral site buffer zones identified on the LDP proposals map. The proposed development would not hinder the existing buffer zone.

Advice from Consultees

The additional service requiring the comments of the consultees has been sought and the following comments are provided:-

Comments from **Strategic Planning**

The site characteristics and constraints are as follows;

- Neither protected nor allocated for a specific land use in the current LDP;
- Outside the LDP's defined settlements;
- In a low-risk flood zone;
- Next to, but not in, several Sites of Importance for Nature Conservation (SINCs);
- In the Abercarn Visually Important Local Landscape;
- In a sandstone safeguarding area; and
- Small parts of the site are in a high-risk Coal Mining Development Referral Area.

The principle of development accords with relevant policies (or parts of policy documents) in the following ways:

- The proposal would 'focus significant development on [a] greenfield [site] that has regard for the social and economic functions of the area' (see criterion A of LDP policy SP2: Development Strategy - Development in the Northern Connections Corridor);
- The proposal seems unlikely to 'prejudice the implementation of wider comprehensive redevelopment or constrain the development of any adjacent site for its allocated land-use' (see criterion A of LDP policy CW15);
- The proposal is 'associated with the provision of public utilities [and] infrastructure … that cannot reasonably be located elsewhere' (it is unlikely that a 'solar farm' of this size could be built in one of the defined settlements) (see criterion C (iv) of LDP policy CW15);
- Policy 17 (Renewable and Low Carbon Energy and Associated Infrastructure) of Future Wales says that the Welsh Government 'strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet our future energy needs';
- Planning Policy Wales (PPW) says that 'low carbon electricity must become the main source of energy in Wales' (see paragraph 5.7.1) and that the planning system should 'maximise renewable and low carbon energy generation' (see paragraph 5.7.7) (sections 5.7 and 5.9 of PPW set out broad support for this type of development proposal).

I shall not comment on Policy 18 (Renewable and Low Carbon Energy Developments of National Significance) of Future Wales, because its criteria are more relevant to general development-management issues than to the principle of development.

There are no obvious conflict arises between other policies and the principle of development and as such no objection is raised, however in that the site is in the Abercarn Visually Important Local Landscape and next to several SINCs, I recommend that you seek advice from a landscape architect and an ecologist.

Comments from the **Transportation Engineering Manager**

The highway authority have the following comments on the highway / transport aspects of the scheme:-

Having reviewed the submitted documentation there doesn't appear to be any information relating to highway / transport issues. Therefore, any future planning application should include the following documentation:-

A **Transport Statement** should be provided setting out the following details :-

- Impact on the local highway Network of the initial construction phase and principles of final decommissioning;
- Any short term junction / highway mitigation to accommodate any abnormal loads with the haul route to be fully considered and agreed;
- Projected daily vehicle type and numbers both during and after construction;
- Full access details into the site;
- Swept Path analysis of proposed largest vehicle using route and access into site
- Internal parking / loading and unloading areas;
- Construction staff numbers during construction; and
- Parking provision in accordance with LDP-5 parking standards for ongoing maintenance.

A **Construction Management Plan** - this to include full details of routes, type of construction vehicles, anticipated vehicle numbers per day, peak periods to be avoided, swept path analysis in narrow restricted areas, temporary changes to the adopted highway if required, use of banksmen, parking and maneuvering areas within site.

I trust the above is helpful but would confirm that the advice given having regard to the information that is at hand at the present time and is wholly without prejudice to the formal consideration given on any planning application submitted for planning permission on the site.

Comments from **Environmental Health**

No adverse comments are offered.

Comments from the **Landscape Architect**

Having studied the documents supplied in relation to the proposed Solar farm covering an area of 28.6 hectares, please see my observations below.

Appendix A Landscape and Visual Impact Assessment Methodology
I note the LVIA is to follow best practice based on the following guidance and welcome the overall methodology to be used in respect of both Landscape and Visual Assessment.

• Landscape Character Assessment: Guidance for England and Scotland (The Countryside Agency and Scottish Natural Heritage, 2002);
• Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3) (Landscape Institute and Institute of Environmental Management and Assessment, 2013);
• An Approach to Landscape Character Assessment (Natural England, 2014);
• Technical Guidance Note 2/19 Residential Visual Amenity Assessment (Landscape Institute, 2019);
• Technical Guidance Note 02/21: Assessing landscape value outside national designations (Landscape Institute, May 2021).

Zone of Theoretical Visibility and 5KM Study Area
For the Landscape and Visual Impact Assessment (LVIA), given the scale and form of the solar development and location, its considered that a study area of 5KM is acceptable in this instance and is considered sufficient to identify any significant impact that may arise as result of the proposed solar farm development.

In terms of the ZTV Figure 2 and the proposed viewpoints, the proposed viewpoint locations are acceptable. However, whilst its appreciated that visibility from the settlements is anticipated to be limited it would still be in the interests of the Authority to request an additional viewpoint from Pantside, Old Pant Road / entrance to Claremont Road, which would be representative of the nearest residential settlement at approximately 1.5km northwest of the site.

Cumulative Assessment
It is noted that a cumulative impact assessment will be undertaken which is also welcomed. This has the potential to be large and complex and it is important that the most important cumulative effects are identified and addressed as clearly as possible. Those that are most important being, existing or consented largescale energy infrastructure, along with those currently being considered within the planning system. This will need to include largescale energy infrastructure, windfarms / turbines, and solar arrays. The study area would need to be defined, and from a Caerphilly Borough perspective, it's likely that a radius of 10 possibly 15km will be required. However, this will depend on the size, scale, form, and height of the existing and proposed developments. An early cumulative ZTV draft would be required to inform dialogue and agreement on the number and location of viewpoints and accompanying visualisations. The cumulative impact, however, may also require that further viewpoints are required to fully identify the scale and extent of the impact, and therefore reserve the right to request further viewpoints in this respect.

Layout and design

Due to the type of development, including size and scale, this is highly likely to have a direct impact landscape character and local visual amenity notably from Public Rights of Way. To gain an understand of the proposed development all structures and apparatus the below will need to be detailed.

- Suitably scaled plans, showing the site layout including location and details of all substations, structures, apparatus, access tracks and haul routes, temporary compounds, fencing, gates, CCTV and other ancillary infrastructure;
- Suitably scaled and detailed visuals and elevations and sections including appearance of the development, materials, colour, and heights of the solar panels and ancillary equipment and buildings;
- Topographic information including existing and proposed; and
- Existing Green Infrastructure (GI) plan along with an GI enhancement and management strategy / masterplan for the site.

Please note, I reserve the right to request additional information at any later stage.

Comments from **Ecology**

No comments have been received by the Council's Ecologist however the surveys suggested in paragraphs 4.3.18 and 4.3.19 of the Preliminary Ecological Appraisal which include Semi-improved grassland survey, Tree and woodland edge survey, Breeding bird survey, Great crested newt survey, Badger survey, Bat roost surveys of trees and Bat activity surveys are considered to be a reasonable approach.

Comments from **Public Rights of Way**

There are a number of public rights of way in the area of the proposed: NWBG/RBW172 and ABEC/BR179 (formerly Restricted Byway 172 and Bridleway 179 in the former Parish of Abercarn) cross the site. From the submitted proposed layout, the PROW network appears relatively unaffected. However, the south-western parcel is crossed by NWBG/RBW172, and the existence of the public right of way would not be consistent with such a development.

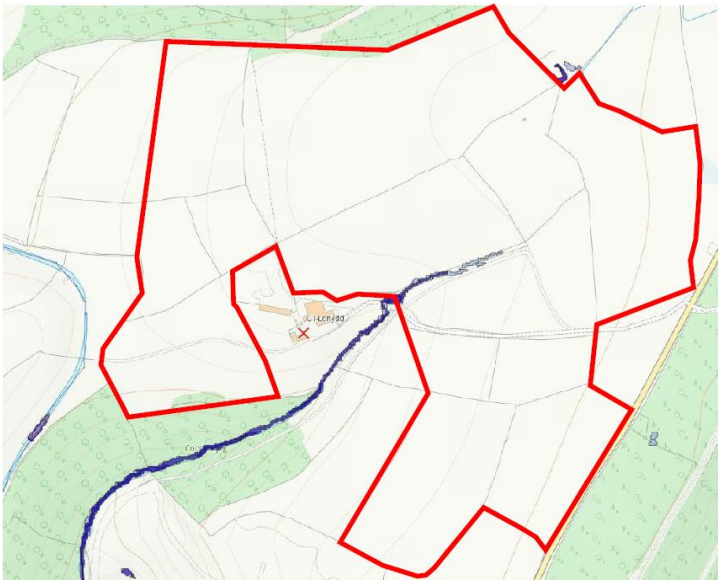
ABEC/BR179 crosses the site, but on the edge of a number of field parcels, and sufficient space will be required to be reserved to allow continued access.

With regard to the effects of glint and glare from the proposed solar panels, there are a significant number of panels proposed adjacent to, and North of NWBG/RBW172. Restricted byways hold rights for pedestrians, and equestrians (including horse drawn vehicles). Given the location and proximity of the panels, some may cause adverse effects on users of this PROW in particular in relation to glint and glare. The bridleway (ABEC/BR179) to the South may be less affected given its orientation, however it is suggested that the effects be mitigated by the creation of a suitable screen to a height to prevent mounted riders being affected.

In conclusion based on the current iteration, we would oppose the development.

Comments from **Land Drainage**

Having considered the documentation provided to support the above application, we wish to advise you of concerns we have regarding this application. We feel there is insufficient evidence to make substantive comments at this stage. Our concerns regarding your application can be found under the Proposed Site Location Plan below:



1. We recommend that the SAB process should be started as soon as possible as this process could significantly affect the design and layout of the site. The preferred route is for the applicant to request SAB Pre-Application Advice which would then be followed by a Full SAB Application. The right of the developer to connect to the existing DCWW sewers is dependent on a successful outcome to the SAB process.

2. To comply with the requirements of the SAB Standards, a site investigation should be carried out to investigate the suitability of SuDs on site, in accordance with the hierarchy found under Standard 1 – Surface Water runoff Destination, of the Statutory Standards for Sustainable Drainage Systems.

3. The Applicant has not submitted any information regarding Standards 2-6 of the Statutory Standards.

4. The applicant has not indicated how they intend to dispose of surface water within the application form and no separate information in relation to surface water and flood risk has been provided. As such significantly more information must be provided for us to make more substantial comments.

Notes:

- The site has areas that are at Medium risk of flooding from surface water and small watercourses.
- The site is in an area that is known to be susceptible to groundwater flooding.

As the proposed development is above the 100m² SuDS threshold, a separate SAB application will be required for the site.

If it is intended to take these proposals further, we recommend that the SAB process should be started as soon as possible as this process could affect the design and layout of the site. The preferred route is for the applicant to request SAB Pre-Application Advice which would then be followed by a Full SAB Application. The SAB process is also important as the right of the developer to connect to the existing DCWW sewers is dependent on a successful outcome to the SAB process.

Please note that the advice on any SAB Application has been given above but further advice on the development of a drainage scheme for the site is given below:

When submitting a scheme for drainage the applicant should consider the following, please note that these recommendations should not be regarding as exhaustive, and each application will be considered on a site-specific basis.

The applicant should incorporate Sustainable Drainage principles into their drainage design where possible, to minimise the impacts to existing/proposed drainage infrastructure/receiving watercourses. Particular reference should be given to the requirements and advice contained within the following documents:

i. Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems – Published by Welsh Government, 2018.
ii. The SUD's Manual C753, Published by Ciria, 2015.
iii. Code of practice for surface water management for development sites, BS 8582:2013.
iv. Rainfall Runoff Management for Developments, Published by the Environment Agency – Report SC030219.
v. Sewers for Adoption 7th Edition, published by WRc plc, August 2012.
vi. Technical Advice Note 15: Development and Flood Risk, Published by Welsh Government, dated December 2004.

Section 106 and Community Infrastructure Levy (CIL) contributions

None.

Any other material planning considerations

- The visual appearance of the proposed development, its scale and its relationship to its surroundings and context are material planning

considerations.

- Part of the site is located within a high risk coal mining development referral area and therefore a Coal Mining Risk Assessment (CMRA) is likely to be required. You are advised to seek advice from The Coal Authority as to whether the development would require a CMRA for the underground cabling works and minor foundation designs to support the solar arrays, transformers and substation.

- The proposed construction area would exceed 100 square metres and development of the site would be subject to Sustainable Drainage Approval. Schedule 3 of the Flood and Water Management Act (FWMA) 2010 requires surface water drainage for new developments to comply with mandatory National Standards for sustainable drainage (SuDS). It also requires surface water drainage systems to be approved by a SuDS Approving Body (SAB), before construction work with drainage implications may begin.

  It is recommended that separate pre-application advice is sought from the SAB Authority.

- You should also be aware that a number of proposed changes and updates to planning guidance Technical Advice Note 15 are currently being reviewed by Welsh Government and the implementation dates and regard should be given to the impact of those changes and updates. Further information should be sought from planningpolicy@gov.wales.

Other requested matters in respect of consultation

- Address details of neighbouring properties that the LPA would consult if it were dealing with the application.
  Cil Lonydd Farm, Abercarn, Mountain Road, Hafodyrynys

- Contact details of each Councillor representing each electoral ward in which the site is situated.
  The County Borough Councillors and their contact details for the Newbridge Ward are available using the following link to the Council's website https://democracy.caerphilly.gov.uk/mgCommitteeMailingList.aspx?ID=0&LLL=0

- Contact details of the Community Council(s) in which the site is situated.
  None.

- Contact details of Natural Resources Wales.
  southeastplanning@cyfoethnaturiolcymru.gov.uk

- Contact details of the Local Highway Authority.
  highwaydevctrl@caerphilly.gov.uk

- The nearest public building to the application site within which a draft of the

planning application could be made available and where the applicant could also hold a consultation event (Covid-19 restrictions permitting).
Newbridge Library for access to public internet facilities. The Local Planning Authority is unable to comment on public venues for consultation events.

To conclude it is clear that the main consideration for this enquiry is an assessment of the benefits of the development in terms of renewable energy production, the principle of which is supported by national and local planning policy, and the impact of the development. The application should address those matters raised in this correspondence.

Having regard to the relevant planning policies and guidance, the level of weight to be accorded to the issue of need must however be balanced with the degree of impact upon the environment most particularly in terms of ecology, visual and landscape effects including cumulative and the historic environment for which the Local Planning Authority is broadly supportive of the intended scope of the Environmental Impact Assessment (EIA). These “impacts” can only begin to be realistically quantified with the benefit of an Environmental Statement (ES) that is informed by the EIA. Other matters, whilst needing to be addressed, can potentially be positively addressed within the application subject to appropriate mitigation and any necessary planning conditions.

Please be advised that this is the informal opinion of an Officer, given on the basis of the information currently available to the Officer in relation to your query. The opinion is given on a without prejudice basis and is not binding upon the Authority. It should also be noted that there is no further opportunity for Officers to enter into subsequent discussions with applicants following receipt of this information provided, any revised scheme would be subject to a new pre-planning application enquiry and its associated fees.

I trust this information is of assistance to you.

Yours sincerely

Appendix B

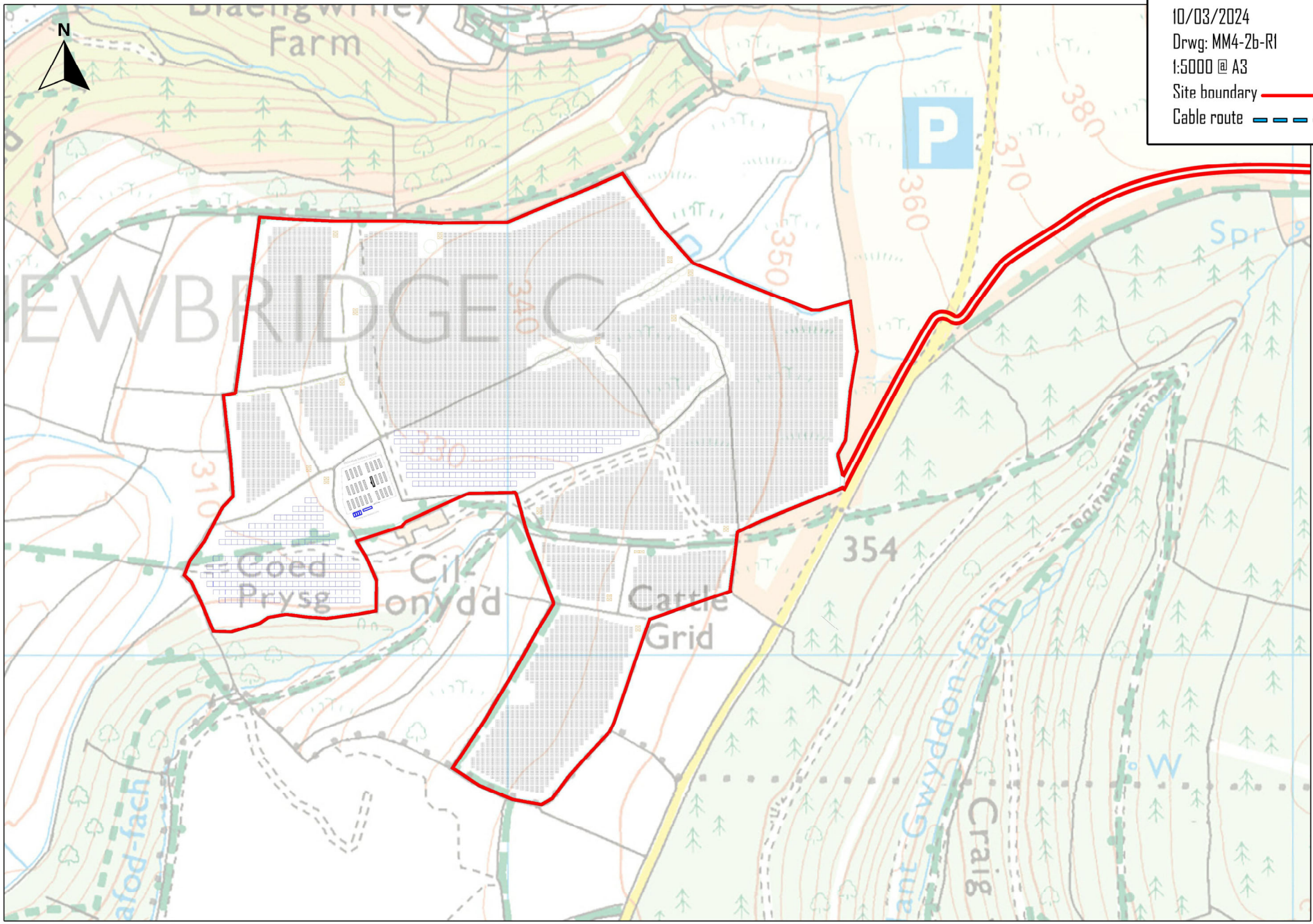
Development Plans

Cil-Lonydd Solar Scheme

Indicative Site Layout Plan

10/03/2024
Drwg: MM4-2b-RI
1:5000 @ A3

Site boundary
Cable route
Inverters
Trees



CENIN

Cil-Lonydd Solar Scheme

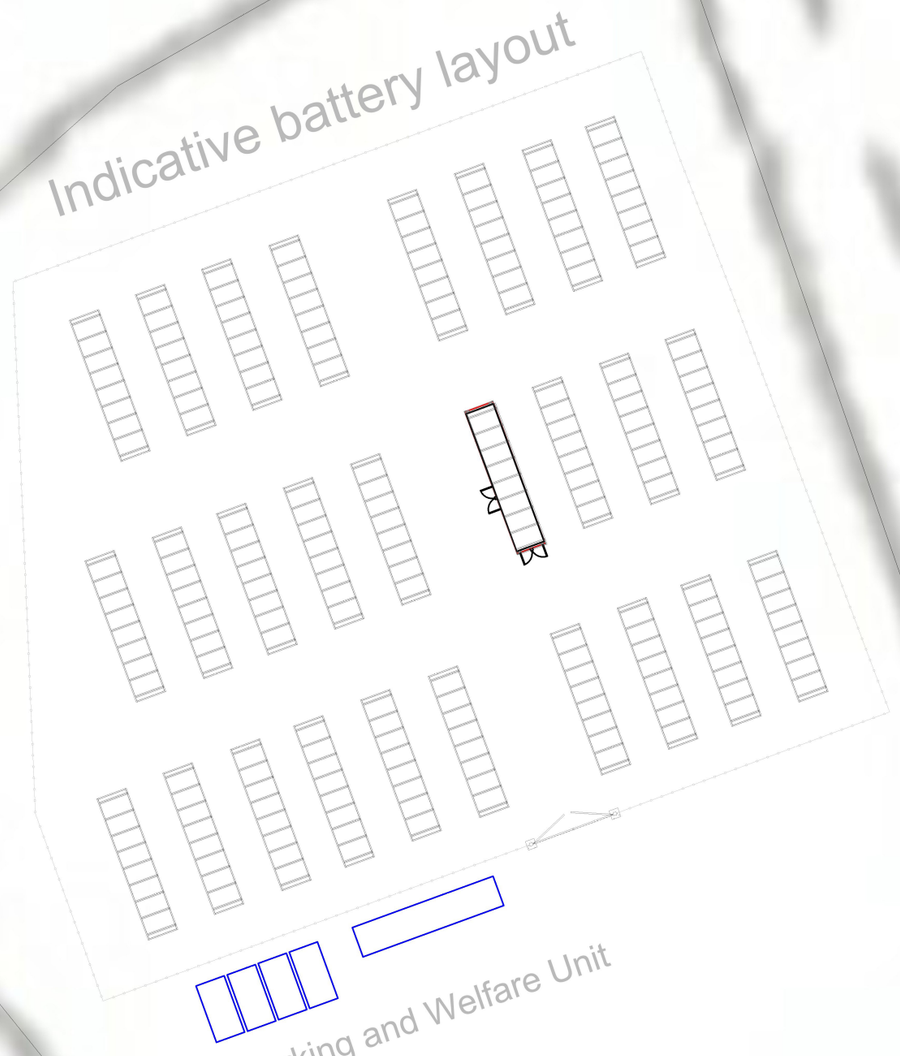
Indicative Battery Compound

20/02/2024

Drwg: MM4-2e

Site boundary

CENIN



Appendix C

Greenfield Runoff Rates

ICP SUDS Mean Annual Flood

Input

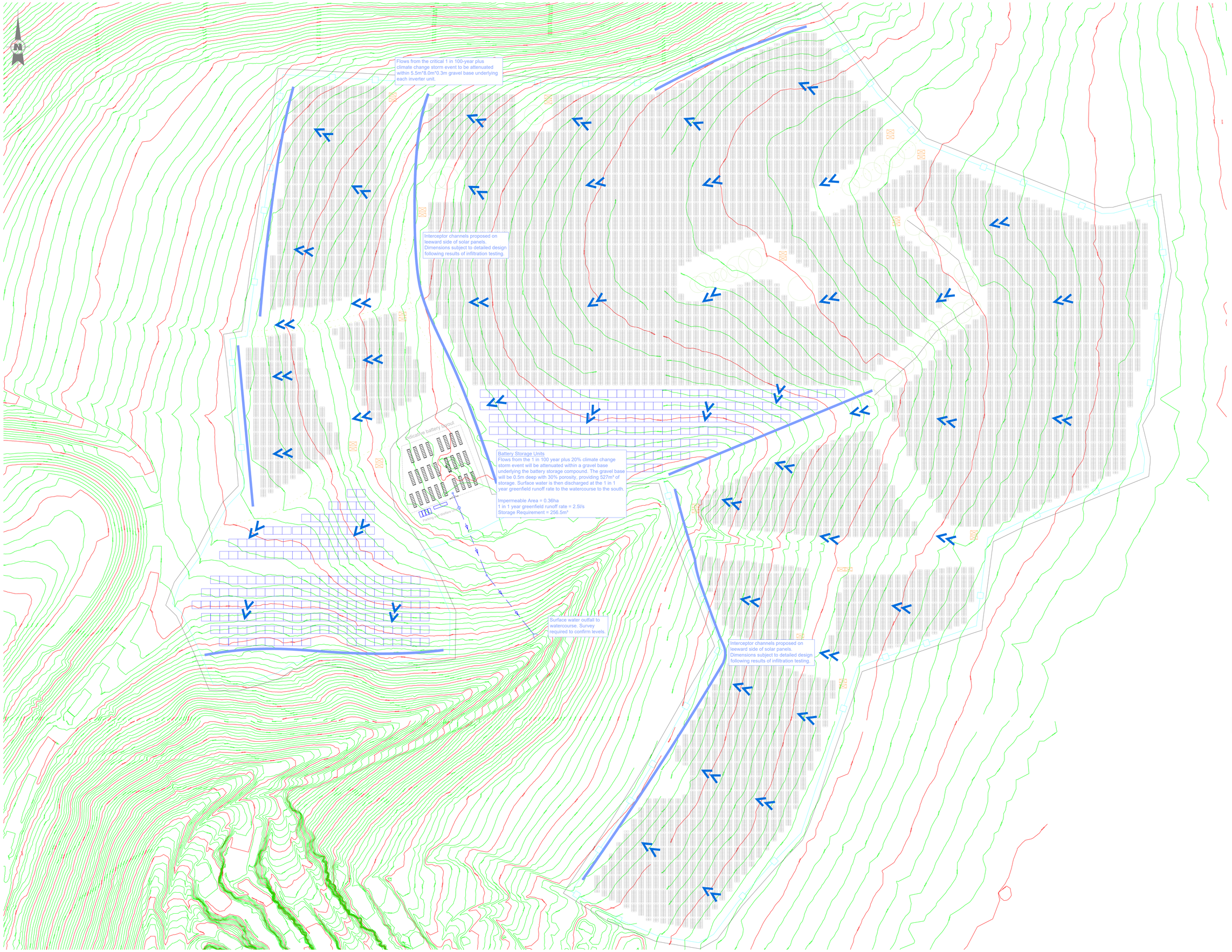
Return Period (years)	2	Soil	0.400
Area (ha)	1.000	Urban	0.000
SAAR (mm)	1450	Region Number	Region 9

Results l/s

QBAR Rural	8.0
QBAR Urban	8.0
Q2 years	7.4
Q1 year	7.0
Q30 years	14.1
Q100 years	17.4

Appendix D

Conceptual Drainage Strategy



Notes

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3. This drawing should be read in conjunction with all other relevant drawings and specifications.

PRELIMINARY

SUBJECT TO DETAILED DESIGN

This drawing illustrates a sketch proposal only and as such is subject to detailed site investigation including ground conditions/contaminants, drainage, design and planning/density negotiations. The layout maybe based upon an enlargement of an OS sheet or other small scale plans and its accuracy will need to be verified by Survey. Full risk analysis under the CDM Regulations has not been undertaken.

KEY

- Surface Water Manhole
- Surface Water Pipe Line
- Surface Water Headwall
- Indicative overland flow exceedance route
- Interceptor channel

Rev.	Description	By	Ckd	Date
A	First Issue.	JH	JM	23.04.24

A TETRA TECH COMPANY

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Client: Cenin Renewables Ltd

Project: Cil Lonydd Solar Farm

Title: Conceptual Drainage Strategy

Status	Scale	Date Created
Preliminary	1:1000 @A0	23.04.24

Task Team Manager	Information Author	Task Information Manager
AM	JH	JM

Document Number: DR01

RPS Project Number: HLEF03802

Revision: A

rpsgroup.com

Appendix E

MicroDrainage Calculations

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

Half Drain Time : 875 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	323.563	0.063	0.0	2.3	2.3	66.1	O K
30 min Summer	323.590	0.090	0.0	2.4	2.4	93.8	O K
60 min Summer	323.621	0.121	0.0	2.4	2.4	126.1	O K
120 min Summer	323.649	0.149	0.0	2.5	2.5	155.5	O K
180 min Summer	323.667	0.167	0.0	2.5	2.5	174.6	O K
240 min Summer	323.680	0.180	0.0	2.5	2.5	188.1	O K
360 min Summer	323.696	0.196	0.0	2.5	2.5	204.8	O K
480 min Summer	323.704	0.204	0.0	2.5	2.5	213.0	Flood Risk
600 min Summer	323.707	0.207	0.0	2.5	2.5	216.1	Flood Risk
720 min Summer	323.707	0.207	0.0	2.5	2.5	216.0	Flood Risk
960 min Summer	323.703	0.203	0.0	2.5	2.5	212.1	Flood Risk
1440 min Summer	323.695	0.195	0.0	2.5	2.5	203.4	O K
2160 min Summer	323.683	0.183	0.0	2.5	2.5	191.2	O K
2880 min Summer	323.673	0.173	0.0	2.5	2.5	180.4	O K
4320 min Summer	323.656	0.156	0.0	2.5	2.5	162.9	O K
5760 min Summer	323.642	0.142	0.0	2.5	2.5	148.6	O K
7200 min Summer	323.633	0.133	0.0	2.5	2.5	138.4	O K
8640 min Summer	323.625	0.125	0.0	2.5	2.5	130.3	O K
10080 min Summer	323.619	0.119	0.0	2.4	2.4	124.0	O K
15 min Winter	323.571	0.071	0.0	2.4	2.4	74.5	O K
30 min Winter	323.601	0.101	0.0	2.4	2.4	105.8	O K
60 min Winter	323.637	0.137	0.0	2.5	2.5	142.6	O K
120 min Winter	323.669	0.169	0.0	2.5	2.5	176.7	O K
180 min Winter	323.691	0.191	0.0	2.5	2.5	199.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	103.016	0.0	69.1	26
30 min Summer	73.511	0.0	98.7	40
60 min Summer	50.244	0.0	135.1	70
120 min Summer	32.090	0.0	172.6	128
180 min Summer	24.771	0.0	200.1	188
240 min Summer	20.595	0.0	221.8	246
360 min Summer	15.782	0.0	255.3	364
480 min Summer	12.982	0.0	280.0	482
600 min Summer	11.112	0.0	299.6	600
720 min Summer	9.761	0.0	315.8	696
960 min Summer	7.913	0.0	341.3	808
1440 min Summer	5.852	0.0	378.6	1058
2160 min Summer	4.318	0.0	419.0	1472
2880 min Summer	3.497	0.0	452.7	1880
4320 min Summer	2.641	0.0	513.1	2688
5760 min Summer	2.196	0.0	568.4	3512
7200 min Summer	1.931	0.0	625.5	4320
8640 min Summer	1.754	0.0	681.2	5096
10080 min Summer	1.628	0.0	738.0	5848
15 min Winter	103.016	0.0	77.4	26
30 min Winter	73.511	0.0	110.7	40
60 min Winter	50.244	0.0	151.5	68
120 min Winter	32.090	0.0	193.6	126
180 min Winter	24.771	0.0	224.1	184

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

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
240 min Winter	323.706	0.206	0.0	2.5	2.5	215.5	Flood Risk
360 min Winter	323.727	0.227	0.0	2.5	2.5	236.6	Flood Risk
480 min Winter	323.738	0.238	0.0	2.5	2.5	248.1	Flood Risk
600 min Winter	323.743	0.243	0.0	2.5	2.5	254.1	Flood Risk
720 min Winter	323.746	0.246	0.0	2.5	2.5	256.5	Flood Risk
960 min Winter	323.743	0.243	0.0	2.5	2.5	254.2	Flood Risk
1440 min Winter	323.730	0.230	0.0	2.5	2.5	240.5	Flood Risk
2160 min Winter	323.713	0.213	0.0	2.5	2.5	222.1	Flood Risk
2880 min Winter	323.696	0.196	0.0	2.5	2.5	204.5	O K
4320 min Winter	323.666	0.166	0.0	2.5	2.5	173.8	O K
5760 min Winter	323.642	0.142	0.0	2.5	2.5	148.2	O K
7200 min Winter	323.623	0.123	0.0	2.5	2.5	128.7	O K
8640 min Winter	323.608	0.108	0.0	2.4	2.4	112.9	O K
10080 min Winter	323.596	0.096	0.0	2.4	2.4	100.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
240 min Winter	20.595	0.0	248.5	242
360 min Winter	15.782	0.0	285.8	358
480 min Winter	12.982	0.0	313.4	472
600 min Winter	11.112	0.0	335.5	586
720 min Winter	9.761	0.0	353.7	696
960 min Winter	7.913	0.0	382.3	910
1440 min Winter	5.852	0.0	402.7	1140
2160 min Winter	4.318	0.0	469.6	1600
2880 min Winter	3.497	0.0	506.9	2052
4320 min Winter	2.641	0.0	574.3	2908
5760 min Winter	2.196	0.0	636.7	3752
7200 min Winter	1.931	0.0	700.1	4544
8640 min Winter	1.754	0.0	763.0	5360
10080 min Winter	1.628	0.0	826.3	6152

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 322779 197300 ST 22779 97300
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.360

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.120	4	8	0.120	8	12	0.120

Model Details

Storage is Online Cover Level (m) 324.000

Infiltration Blanket Structure

Infiltration Coefficient Base (m/hr)	0.00000	Diameter/Width (m)	60.0
Safety Factor	2.0	Length (m)	58.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	323.500		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0075-2500-1000-2500
Design Head (m)	1.000
Design Flow (l/s)	2.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	323.400
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.5	Kick-Flo®	0.627	2.0
Flush-Flo™	0.307	2.5	Mean Flow over Head Range	-	2.2

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)	Depth (m)	Flow (l/s)
0.100	2.1	0.800	2.3	2.000	3.4	4.000	4.7	7.000	6.2
0.200	2.4	1.000	2.5	2.200	3.6	4.500	5.0	7.500	6.4
0.300	2.5	1.200	2.7	2.400	3.7	5.000	5.3	8.000	6.6
0.400	2.5	1.400	2.9	2.600	3.9	5.500	5.5	8.500	6.8
0.500	2.4	1.600	3.1	3.000	4.1	6.000	5.7	9.000	7.0
0.600	2.1	1.800	3.3	3.500	4.5	6.500	6.0	9.500	7.1

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

Half Drain Time : 36 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	9.724	0.024	0.1	0.3	Flood Risk
30 min Summer	9.731	0.031	0.1	0.4	Flood Risk
60 min Summer	9.737	0.037	0.2	0.5	Flood Risk
120 min Summer	9.738	0.038	0.2	0.5	Flood Risk
180 min Summer	9.738	0.038	0.2	0.5	Flood Risk
240 min Summer	9.737	0.037	0.2	0.5	Flood Risk
360 min Summer	9.734	0.034	0.1	0.4	Flood Risk
480 min Summer	9.731	0.031	0.1	0.4	Flood Risk
600 min Summer	9.729	0.029	0.1	0.4	Flood Risk
720 min Summer	9.727	0.027	0.1	0.4	Flood Risk
960 min Summer	9.723	0.023	0.1	0.3	Flood Risk
1440 min Summer	9.719	0.019	0.1	0.2	Flood Risk
2160 min Summer	9.715	0.015	0.1	0.2	Flood Risk
2880 min Summer	9.712	0.012	0.1	0.2	Flood Risk
4320 min Summer	9.710	0.010	0.0	0.1	Flood Risk
5760 min Summer	9.708	0.008	0.0	0.1	Flood Risk
7200 min Summer	9.707	0.007	0.0	0.1	Flood Risk
8640 min Summer	9.707	0.007	0.0	0.1	Flood Risk
10080 min Summer	9.706	0.006	0.0	0.1	Flood Risk
15 min Winter	9.727	0.027	0.1	0.4	Flood Risk
30 min Winter	9.735	0.035	0.2	0.5	Flood Risk
60 min Winter	9.741	0.041	0.2	0.5	Flood Risk
120 min Winter	9.741	0.041	0.2	0.5	Flood Risk
180 min Winter	9.739	0.039	0.2	0.5	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	103.016	0.0	21
30 min Summer	73.511	0.0	31
60 min Summer	50.244	0.0	48
120 min Summer	32.090	0.0	82
180 min Summer	24.771	0.0	114
240 min Summer	20.595	0.0	146
360 min Summer	15.782	0.0	210
480 min Summer	12.982	0.0	272
600 min Summer	11.112	0.0	334
720 min Summer	9.761	0.0	394
960 min Summer	7.913	0.0	516
1440 min Summer	5.852	0.0	756
2160 min Summer	4.318	0.0	1112
2880 min Summer	3.497	0.0	1476
4320 min Summer	2.641	0.0	2204
5760 min Summer	2.196	0.0	2936
7200 min Summer	1.931	0.0	3656
8640 min Summer	1.754	0.0	4400
10080 min Summer	1.628	0.0	5120
15 min Winter	103.016	0.0	22
30 min Winter	73.511	0.0	32
60 min Winter	50.244	0.0	50
120 min Winter	32.090	0.0	86
180 min Winter	24.771	0.0	120

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
240 min Winter	9.737	0.037	0.2	0.5	Flood Risk
360 min Winter	9.732	0.032	0.1	0.4	Flood Risk
480 min Winter	9.729	0.029	0.1	0.4	Flood Risk
600 min Winter	9.726	0.026	0.1	0.3	Flood Risk
720 min Winter	9.723	0.023	0.1	0.3	Flood Risk
960 min Winter	9.720	0.020	0.1	0.3	Flood Risk
1440 min Winter	9.715	0.015	0.1	0.2	Flood Risk
2160 min Winter	9.711	0.011	0.0	0.1	Flood Risk
2880 min Winter	9.709	0.009	0.0	0.1	Flood Risk
4320 min Winter	9.707	0.007	0.0	0.1	Flood Risk
5760 min Winter	9.706	0.006	0.0	0.1	Flood Risk
7200 min Winter	9.705	0.005	0.0	0.1	Flood Risk
8640 min Winter	9.705	0.005	0.0	0.1	Flood Risk
10080 min Winter	9.705	0.005	0.0	0.1	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	20.595	0.0	154
360 min Winter	15.782	0.0	218
480 min Winter	12.982	0.0	280
600 min Winter	11.112	0.0	344
720 min Winter	9.761	0.0	406
960 min Winter	7.913	0.0	524
1440 min Winter	5.852	0.0	758
2160 min Winter	4.318	0.0	1132
2880 min Winter	3.497	0.0	1496
4320 min Winter	2.641	0.0	2216
5760 min Winter	2.196	0.0	3000
7200 min Winter	1.931	0.0	3672
8640 min Winter	1.754	0.0	4360
10080 min Winter	1.628	0.0	5240

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 322779 197300 ST 22779 97300
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.002

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.001	4	8	0.001	8	12	0.001

Model Details

Storage is Online Cover Level (m) 10.000

Infiltration Blanket Structure

Infiltration Coefficient Base (m/hr)	0.03600	Diameter/Width (m)	5.5
Safety Factor	2.0	Length (m)	8.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	9.700		