Woolgar Hunter engineers

Geo-Environmental Desk Study & Mining Risk Assessment

Glyntaff Solar Farm, South Wales

Renantis UK Limited

Project: Glyntaff Solar Farm, South Wales

Client: Renantis UK Limited

Project No: GL 2025-1018

Version	Date	Description	Author	Reviewed By
V1.10	3rd March 2025	Final	M. Kerr	L Greenwell

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V1.00 series – Draft Issues
V1.10 series – Formal Issues

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Introduction

This Stage 1 Report provides a summary of the geo-environmental conditions for the proposed construction of a solar farm on lands at Glyn Taff Farm, Bryn Tail Lane, Pontypridd.

The historical map evidence has indicated that the site has predominantly been undeveloped agricultural/upland, typical of a valley landscape. This is with the exception of the industrial activities, predominantly quarrying and mining activities, scattered across the surrounding area. It is evident that Aber Valley was a key industrial hub for Coal Mining in the early to middle of the 19th Century.

Anticipated Ground Conditions

The documentary evidence suggests that the no or limited Made Ground would be anticipated at the site. The geological maps indicated that bedrock is at/near surface across the majority of the Site.

Superficial deposits will be present locally in the south east and north east of the Site, with these comprising of cohesive Glacial Till. Descriptions of the Glacial Till deposits are unavailable in the available borehole records but would be anticipated to be firm to stiff clay. Peaty soils are noted locally at the top of the hillside, close to Eglwysilan Road, this is not unexpected given the landscape. It is expected that these deposits will be very thin, localised pockets.

The geological map evidence indicates that the north of the site is underlain by a series of sedimentary bedrock deposits of the Hughes Sandstone Member of Carboniferous Age. These deposits comprise of thin bands of mudstones/siltstones/sandstones with interbeds of seatearths and mainly thin coals seams.

Environmental Considerations

In terms of land contamination, based on the available information and end use of the development, it is considered that the presence of made ground is generally unlikely; and accordingly, there is generally a low risk of potential historic contamination. The proposed enduse of the site is relatively insensitive to contamination with an overall low risk rating; thus, indicating that it is considered relatively unlikely that complete pollutant linkages could potentially occur.

At this stage of the development, it would be prudent to assume that any soil arising will attract the Standard Rate of Landfill Tax, which is currently set at £126.15 per tonne.

Given the potential contaminative sources on the site, and distance to the receptor assessment points, it is considered that there is a low risk to the Water Environment receptors at this site.

There is considered to be several sources on and near to the site which have the potential to be gas generating. The greatest source is likely from within any potentially worked coal seams, underlying the site. Furthermore, the documentary evidence indicates that parts of the site are located within areas of elevated naturally occurring radon. The greatest risk is likely to arise if any maintenance cabins or other structures are proposed. Risks, if found to be present, should be able to be mitigated through design.

Radon protection measures will be required in areas of enclosed structures. Each such structure should be assessed on a case by case basis to determine if basic or full radon protection measures will be required.

It is not known if the proposed development will include any enclosed working areas or buildings. Should the proposed development include any enclosed working areas or buildings, it would be prudent to monitor the gas levels during a site investigation.

Geotechnical Considerations

The proposals are for the construction of a ground-mounted solar photovoltaic farm, with associated landscaping works, infrastructure and access. As such, it is considered that the associated loadings will be low.

Ultimately, it is recommended that an intrusive investigation be undertaken to confirm the expected ground conditions to determine the nature and depth of the Made Ground and superficial deposits, as well as to determine the nature, depth and engineering properties of shallow bedrock and to confirm the presence of work coal seams, underlying the proposed development.

Based on the characteristics of the expected superficial deposits, it is considered that these deposits will be primarily cohesive in nature, with a low resulting permeability, and of limited thickness. This may limit the infiltration potential of the soils on the site.

Based on the mining risk assessment undertaken, the risk relating of mineral instability is considered to be low.

1.0 Introduction

1.1 Terms of Reference

Renantis UK Limited (hereafter denoted 'the Client'), is proposing to construct a solar farm on lands at Glyn Taff Farm, Bryn Tail Lane, Pontypridd.

The proposals involve the installation, operation and subsequent decommissioning of a renewable energy scheme comprising ground mounted photovoltaic solar arrays together with substation compound, transformer stations, internal access track, landscaping, biodiversity measures, boundary fencing, security measures, CCTV posts, monitoring house, storage containers access improvement and ancillary infrastructure. The solar arrays will have a combined capacity of up to 39.9MW.

The site comprises 38 agricultural fields that are currently in use for livestock farming. The site are separated into 2 No. parcels; the smaller located to the west, and the larger to the north and east of Glyn Taff Farm.

To assist with the proposed development, Woolgar Hunter was instructed by the Client to undertake a Stage 1 Desk Study review of the expected ground conditions across the site and to identify any associated implications for the proposed development.

1.2 Objectives and Scope of Works

At the first stage in the site appraisal process, a Stage 1 desk study review of documentary information has been undertaken to enable a Conceptual Model of the site to be developed, through an assessment of the following:

- Historic development of the site and surrounding area;
- Expected ground conditions, including the nature and thickness of geological deposits;
- Environmental conditions, including industrial consents and potentially contaminative land use, on and in the vicinity of the site;
- Hydrogeology and hydrology; and,
- Mining conditions.

The following tasks were undertaken to achieve the objectives listed above:

- Review of available historical maps;
- Review of geological maps;
- Review of available archive borehole logs;
- Review of available BGS Environmental Geology Maps;
- Review of information held on the Coal Authority Interactive Viewer;
- Review of information held on the Water Watch Wales website;
- Review of information held on the Natural Resources Wales website; and,
- Obtaining a Coal Authority Mining Report (CON29M).

1.3 Study Limitations

In reviewing this report, a number of study limitations should be borne in mind. These are presented at the rear of the report, immediately following the text.

1.4 Report Layout

Following this introduction, the remainder of the report is set out as follows:

- Section 2 – Site location and description;
- Section 3 – Historical and industrial development of the site;
- Section 4 – Expected ground conditions;

- Section 5 – Conceptual site model & environmental assessment;
- Section 6 – Geotechnical considerations;
- Section 7 – Intrusive investigation considerations;
- Section 8 – Conclusions and recommendations

Selected information collected during this study is presented in the Figures and Appendices that follow the text.

2.0 Site Location and Description

The proposed solar farm is located on lands at Glyn Taff Farm, Bryn Tail Lane, Pontypridd. The site is centered around Glyn Taff Farm at approximate National Grid Reference (NGR) E 309333, N 189800 and covers a total area of c.70.9 hectares.

The site is bound to the north by a minor road, known as Eglwysilan Road, with the west bounded by Pontypridd Golf Club. The east of the site is bounded by agricultural fields, with the south of the site bounded by the access road Bryn Tail road and areas of fields and woodland. As previously stated, the site is separated into 2 No. parcels, a smaller parcel located to the west of Glyn Taff Farm, and a larger located to the north and east of Glyn Taff Farm. These parcels are separated by settlements denoted 'Hendre-Prosser' and 'Bryn Tail' and their access road. Please note that the OS mapping denotes Glyn Taff Farm as Bryn Tail.

The site comprises 38 agricultural fields that are currently in use for livestock farming, including areas containing stone walls, hedgerows and woodland. The OS maps indicate that various drains and issues flow through both sites. T

The topography of the Site is indicated to slope downwards to the south west, from approximately 330mAOD adjacent to Eglwysilan Road, to 140mAOD at the southern most point of the site. This is consistent with the location of the site on the east side of the Taff Valley.

The immediate surrounding area is noted to contain Pontypritt Golf Course, a cemetery and agricultural land, with the settlements of Glyntaff located to the southwest of the Site.

3.0 Historical & Industrial Development of the Site

3.1 Historical Development

The historical development of the site was evaluated following inspection of available maps on the National Library of Scotland website and library archives. The following maps were examined during the course of this study:

Table 1: Historical Maps Viewed

Map	Scale	Date
County Series: Glamorganshire Glamorganshire	 1:10,560 1:2,500	 1885, 1901, 1921, 1949, 1953, 1873, 1898-1899, 1919, 1947, 1956
OS Maps: National Grid ST08NE/ST09SE OS Great Britain ST08/ST09	 1:10,560 1:10,000 1:2500 1:25,000	 1960, 1965, 1949-1974 1960-1961 1950-1956
Other Maps: Bartholomew half-inch		1904, 1942-1944

Development of Site

The site is shown to have a limited history of development, comprising of agricultural land since the earliest available mapping. Limited changes are noted, with these being restricted to changes in field boundaries, access roads/cart tracks, and the addition of overhead electric power cables in the 1940s.

Surrounding area

The earliest available maps show the surrounding area to be predominantly agricultural, divided into fields and woodlands. Buildings, considered to be Farm Steadings are noted to the scattered across the surrounding area; particularly of note is Bryn-Tyle (later Bryn Tail, currently Glyn Taff Farm) and Hendre-Prosser previously noted adjacent to the site. In addition, the Village of Glyntaff is located from approximately 250m west of the site is noted to contain limited industries (Taff Vale Iron Works, Station, Coke Yard), with these being located more than 500m south and downgradient of the site.

From the 1898 maps, the maps show the presence of the evidence of mining in the surrounding area. An 'Old Coal Level' is located in the current day woodland located off site between Glyn Taff Farm and Hendre-Prosser. In addition, several quarries/old quarries are located downgradient of the site in the surrounding area, the closest of which are 50m, 130m, 160m, and 280m southwest of the site. These quarries are located within, and at the outskirts of Glyntaff and Pointypridd. Further expansion of mining activities are noted until the 1950s mapping. Mining and quarrying activities no longer appearing active from the 1965 mapping.

From the 1949-1974 mapping, the map shows a "sheep wash" upgradient of the site, within approximately 150m of the site boundary.

Summary

The historical map evidence has indicated that the site has predominantly been undeveloped agricultural/upland, typical of a valley landscape. This is with the exception of the industrial

activities, predominantly quarrying and mining activities, scattered across the surrounding area. It is evident that Aber Valley was a key industrial hub for Coal Mining in the early to middle of the 19th Century. Historical Extracts can be found within Figures 2-4.

Further discussions of the Mining activities undertaken at the site can be found in Section 4.3.

4.0 Expected Ground Conditions

4.1 Geology

To provide an insight into the ground conditions, reference was made to the Geology of Britain and Geoindex interactive maps on the British Geological Survey website. Historical borehole/trial pit logs presented on the BGS website were also reviewed; albeit the closest records are shown to be 500m northeast and south of the site.

The following information obtained from all sources reviewed is summarised below:

Made Ground

Made Ground is not documented within the geological maps present on site. Given the history of the site, no or limited Made Ground would be anticipated at the site.

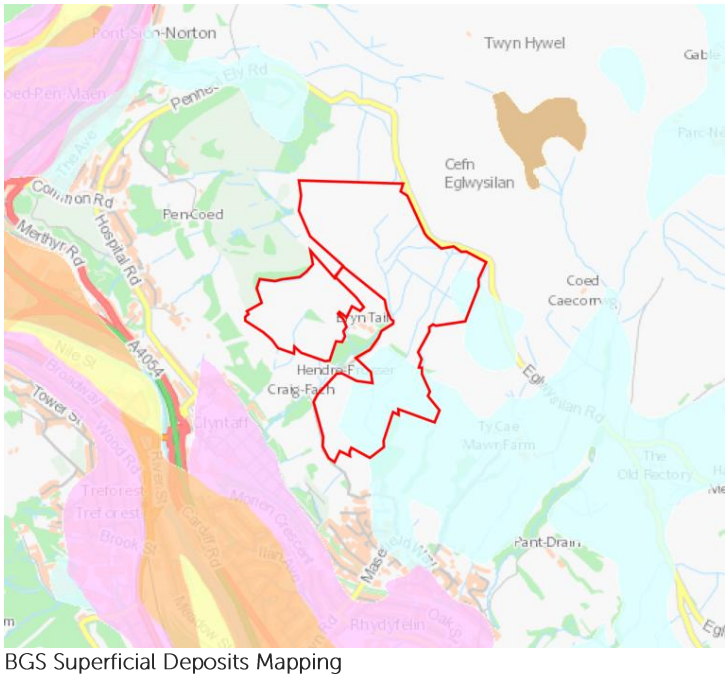
It is considered that Made Ground is most likely to be present close to the Farm Steadings adjacent to the site, albeit limited in extent.

Superficial Deposits

The geological maps indicated that bedrock is at/near surface across the majority of the Site.

The geological maps indicate that superficial deposits will be present locally in the south east and north east of the Site, with these comprising of cohesive Glacial Till. Descriptions of the Glacial Till deposits are unavailable in the available borehole records but would be anticipated to be firm to stiff clay.

It is noted that 'peaty soils' are noted locally at the top of the hillside, close to Eglwysilan Road, this is not unexpected given the landscape. It is expected that these deposits will be very thin, localised pockets.

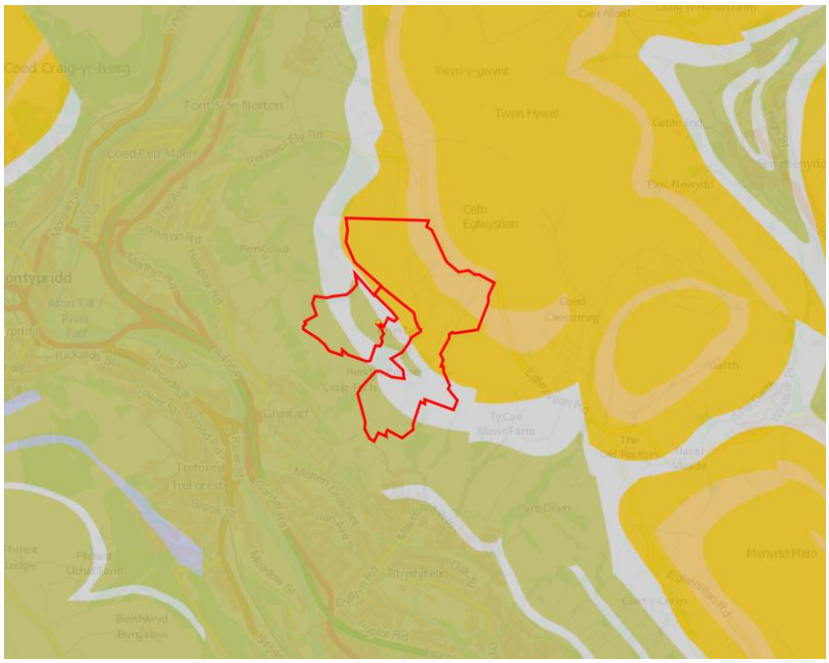


BGS Superficial Deposits Mapping

Solid Geology

The geological map evidence indicates that the north of the site is underlain by a series of sedimentary bedrock deposits of the Hughes Sandstone Member of Carboniferous Age. These

deposits comprise of thin bands of mudstones/siltstones/sandstones with interbeds of seatearths and mainly thin coals seams.

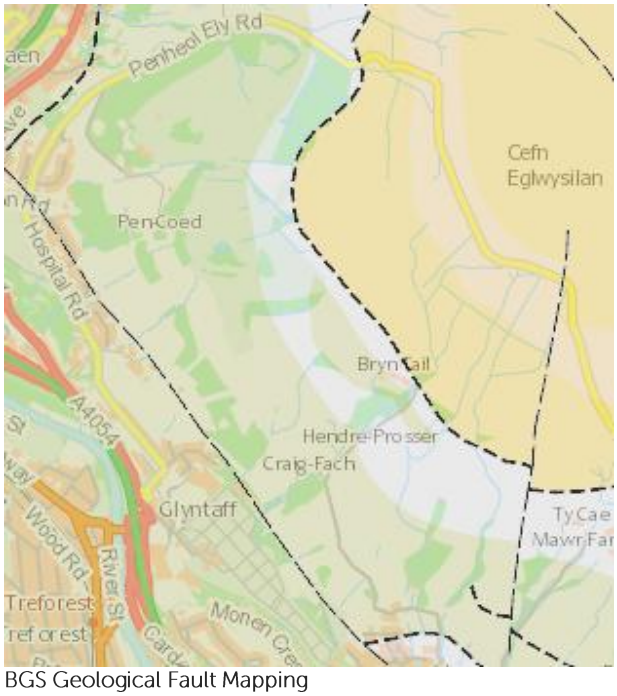


BGS Bedrock Deposits Mapping

The geological maps indicate that the south of the site is underlain by the Brithdir Member of Carboniferous Age consisting prominently of sandstone, locally indicated to comprise of mudstones/siltstones/sandstones.

It is noted that the Hughes (Cefn Glas) Coal sits between the Brithdir and Hughes Members.

The overall South Wales Coalfield is anecdotally noted to be an elongate synclinal structure (a term which means that the rocks are folded), which is divided by a major fault system, the Neath Disturbance, which crosses from NE to SW of the South Wales Coal Fields. These faults disrupt the rocks.



BGS Geological Fault Mapping

A geological fault is indicated to be present close to the western boundary of the site.

Historic BGS borehole records indicate the bedrock to comprise of cyclic sequences of sandstones, mudstones, siltstones and coal seams, typical of the Carboniferous Coal Measures. However, it should be noted that there was limited historic information.

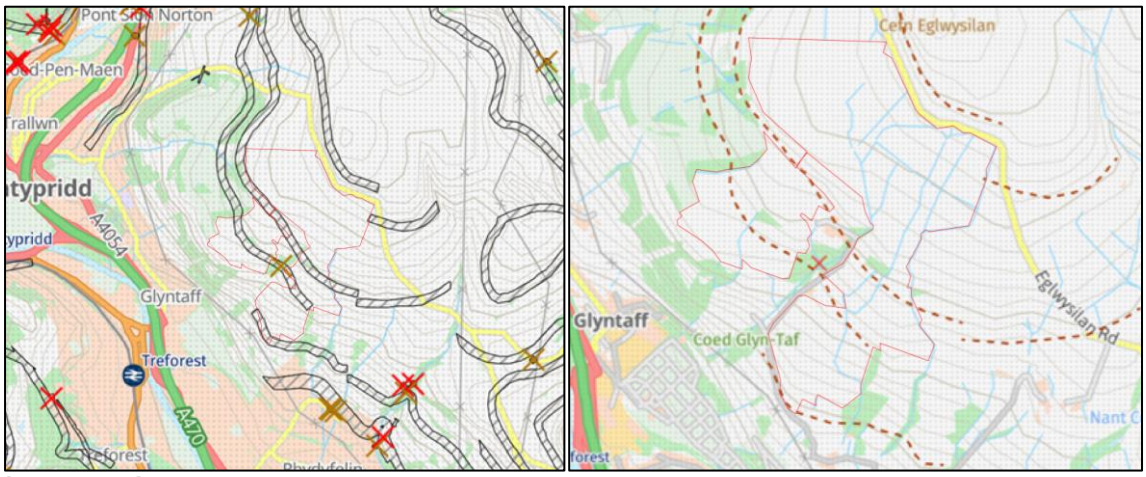
4.2 Mining

The site is located in a prominent mining area and therefore to understand the potential risk posed by underground coal mining activities across the overall site, a series of research was undertaken.

Firstly, reference was made to The Coal Authority Interactive Viewer. This has shown that the site and the surrounding area is located within a 'Coal Authority Reporting Area' and that parts of the site lie within a 'High-Risk Development Area' (as shown by the thin hatched areas in figure below). The 'High-Risk Development Area' is indicated to be due to the presence of outcrops.

Although identified as a Development High Risk Areas due to the presence of coal outcrops, no shallow coal mine workings or probable shallow coal mine workings are recorded on site.

Whilst the Coal Authority Interactive Viewer does not record any mine entries on site, it is noted that an adit recorded to be present approximately 50m from the site boundary, approximately 50m south of Glyn Taff Farm. This adit is recorded as untreated with a bearing of 65°. From review of historical mapping cutting was recorded in the valley between the two halves of the site, which may be the historical adit. This adit also correlates with the 'Old Coal Level' approximately 50m from the site boundary recorded in the historic maps.



Source: The Coal Authority Interactive Viewer.
Hatched areas are considered to be 'High Risk Development Areas' The red crosses represent known mine entries.

The next step was to obtain a site-specific report from The Coal Authority. The following table summarises the main findings of this report which highlights the potential Mining Risks identified on site.

Table 3: Summary of Potential Mining Risk Elements

Potential Mining Risk Element	Identified on the Site of Interest
Mine Entries	None recorded on/within 20m of the site.
Shallow Coal Workings (recorded on/within 30m bgl)	No shallow workings are recorded to be present on site.

Potential Mining Risk Element	Identified on the Site of Interest
Underground Workings & Probable Workings	The CA report notes the proposed development lies could be affected by underground mining in 3 seam(s) of coal between 500m and 700m depth, last worked in 1963. The report also states that any ground movement due to this coal mining activity should have stopped. The CA report stated that the site is in an area where the CA believes there is coal ar or close to the surface which may have been worked at some time in the past.
Workable Coal Seam Outcrops	The Coal Authority Coal Mining Report indicates that the site is in an area where coal is at or close to the surface which may have been worked at some point in the past.
Withdrawal of Support	The site is noted to lie within a geographical area of which a notice entitlement to withdraw support has been published. Notices were issued in 1952. This relates to the CA allowing Licensed operators to remove support in underground workings for the continuation of coal mining. This could result in land subsidence and is considered a key risk to the proposed development to be investigated further.
Mine Gas Sites and Area	Coal Authority report indicates no evidence of any issues related to gas emissions.
Recorded Coal Mining Related Hazards	Coal Authority report indicates no evidence of any issues.
Geological Features (Fissures and Break Lines)	Coal Authority report indicates no evidence of any issues.

To further investigate the mining, a review was undertaken of the British Geological Survey 1;10,000 map (Glamorgan Monmouthshire, Sheet ST08NE & ST09 SW). The map shows that a coal seam, coinciding with the areas of 'Development High Risk' classification, outcrops within the Site, in a north-west to south-easterly direction. The seam is known as the 'Cefn Glas' coal seam, which anecdotal evidence suggests was a thin coal band which was not considered economically viable to mine due to its limited thickness.

Based on the above, it is considered that shallow mine workings are unlikely to be present on site.

4.3 Hydrology

Watercourses

From review of the "Wales Water Watch" government website, it is understood that the nearest monitored surface watercourse to the site is the River Taff located downgradient, approximately 800m southwest of the site.

An unnamed nant (brook) located approximately 130m west and downgradient of the site, flowing in a southeast direction.

In addition to this, there are several drains, issues and springs across the site, and an unnamed burn flowing south, in the west half of the site, which is not unexpected given the steep valley setting.

Water Quality

EA has implemented a monitoring scheme and classification methodology to meet the requirements of the Water Framework Directive. 2007 was the baseline year for the classification of Water Environment, using the new classification scheme. EA uses these results, alongside other information, to set the objectives for improving the environment. The quality ratings for rivers range from Maximum Ecological Potential (EP) to Bad EP; or High to Bad for those watercourses where monitoring data exists.

The Environment Agency have classified the 'River Taff' as being of moderate ecological potential.

4.4 Hydrogeology

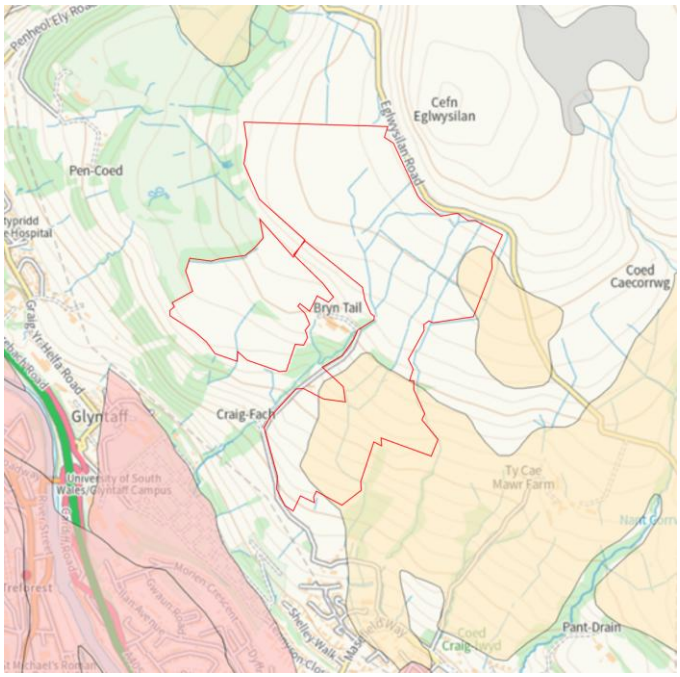
According to the gathered information, bedrock is anticipated on site at/near surface across the majority of the Site. The geological maps indicate that superficial deposits will be present locally in the south east and north east of the Site, with these comprising of cohesive Glacial Till.

Superficial Deposits

From review of the Cyfoeth Naturiol Cymru National Wales Resource, no superficial groundwater body is recorded in the west and north of the site, with a secondary (undifferentiated) groundwater body recorded elsewhere, as shown below.

The Environmental Agency classifies a 'Secondary Undifferentiated' Aquifer as 'been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.'

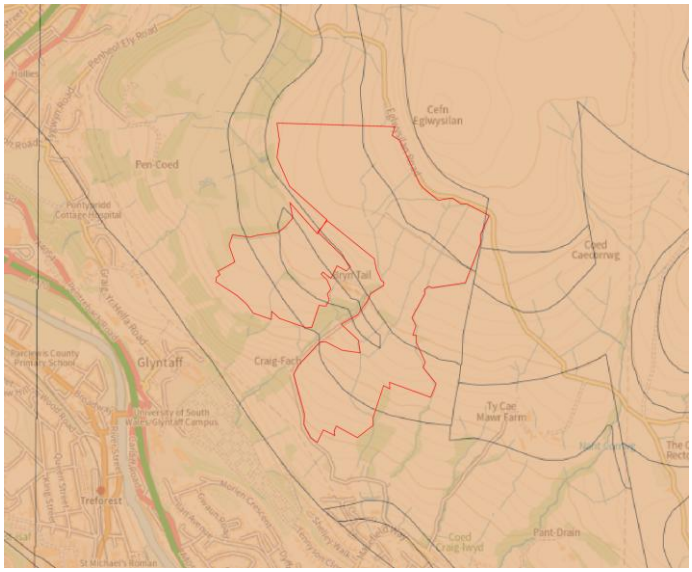
It is considered that the superficial deposits could potentially meet the criteria to be classified as a groundwater body locally, however this will depend on the extent and thickness of these deposits, which is likely to be limited and the 'fines' content of the deposits present.



Solid Geology

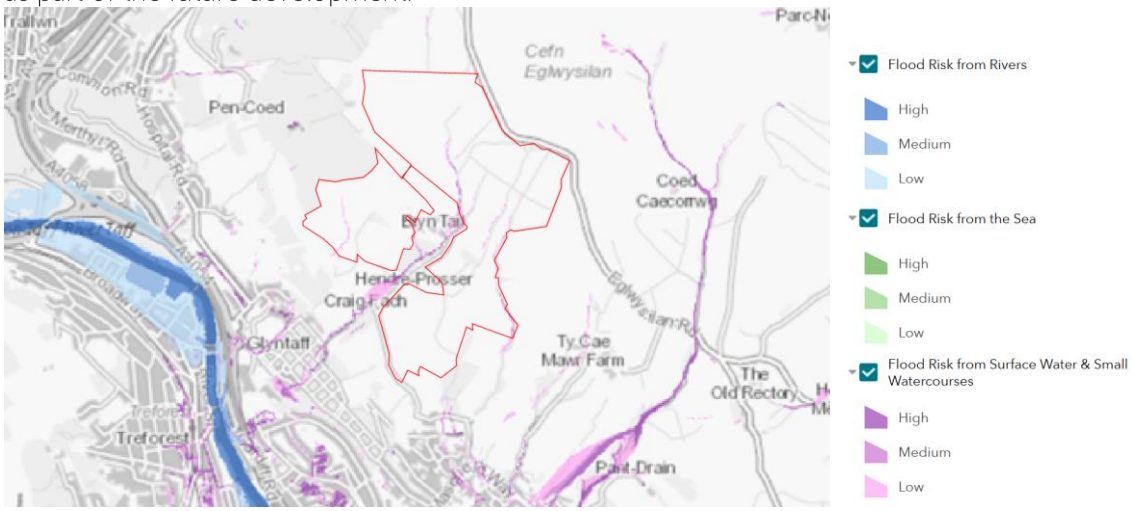
From review of the Cyfoeth Naturiol Cymru National Wales Resource, the site is underlain by a secondary A aquifer.

Based on the above, both the superficial and bedrock aquifers are considered to be groundwater receptors at the site that require long-term protection, in the risk assessment procedure.



4.5 Flooding

The Environmental Agency Flood map indicates that there are some localised areas of low risk from "Surface Water & Small Watercourses", linked to various small Valley springs. There is no risk from river flooding. It is recommended that a specialist flood risk assessment is undertaken as part of the future development.



4.6 Radon

The UK Radon Map indicates that some of the site lies within an elevated potential radon area where approximately 3-5% and 10-30% of homes are estimated to be at or above the Action Level. Albeit, the end use of the proposed site is considered to be relatively insensitive to Radon and therefore risk is deemed to be low. If future proposal include the construction of any buildings associated with the solar farm, we would advise that full Radon Protection measures are included within the design of the buildings.

4.7 Unexploded Ordnance

Unexploded Ordnance (UXO) continues to pose a risk to construction across the UK. Sites located in areas that were strategic targets during wartime are likely to be at the highest risk, in addition to former military land.

Reference was made to the Zetica bomb risk maps Zetica bomb risk that indicate that the site is low risk from Unexploded Ordnance.

However it is noted that the maps identify a target approximately 500m northwest of the site. This feature is considered to be an anomaly as it is denoted as a 'dock'. Comment has been requested from Zetica.

5.0 Conceptual Site Model and Environmental Assessment

5.1 General

This section is concerned with an assessment of the environmental conditions at the site, and development of a Conceptual Site Model, based on the available documentary information.

UK legislation relating to land contamination is Part II A of the Environmental Protection Act. This legislation provides a definition of contaminated land as "Land posing significant risk where:

1. Significant harm is being caused, or there is a significant possibility of such harm being caused to the health of living organisms or other interference with the ecological systems of which they form a part (in the case of man this includes harm to property); or
2. Pollution of controlled waters is being or is likely to be caused."

The legislation was amended with the introduction of the Contaminated Land (Scotland) Regulations, 2005. The amended regulations removed the reference to 'Controlled Waters' and substituted the term 'Water Environment'. The regulations also introduced various tests of significance of pollution to the Water Environment.

It is current good practice to adopt the principals of risk assessment. Thus, the potential or actual presence of measurable levels of contaminants across a site does not automatically imply that a problem exists, since the potential for harm to occur requires the following:

- Source of contamination;
- Target (receptor) which may be harmed; and,
- Pathway linking sources to targets.

Using the above methodology, only if all three elements (source, pathway and receptor) are identified, is a potential risk deemed to exist.

5.2 Conceptual Site Model

The Conceptual Site Model illustrates potential sources of contamination, migration pathways and likely receptors on and in the vicinity of the site, taking into account both the existing and the proposed site use.

The model has been derived from the documentary information collated during the Stage 1 study. The individual elements of the conceptual model are presented in the following section. The proposed development is of a commercial nature, and the site has been assessed with this end use in mind.

5.3 Potential Sources of Contamination

The historical map evidence has shown limited history development of the site, with this comprising of agricultural land since the earliest available mapping (1885). Limited changes are noted, with these being restricted to changes in field boundaries, access roads/cart tracks, and the addition of overhead electric power cables in the 1940s.

There is evidence of industrial activities in the surrounding area, predominantly quarrying and mining activities, scattered across the surrounding area. It is evident that Aber Valley was a key industrial hub for Coal Mining in the early to middle of the 19th Century.

In this respect, consideration is given to the following:

On-site Sources of Contamination

Made Ground

It is anticipated that there is the potential for Made Ground deposits to be present on site relating to the access roads/cart tracks, and the addition of overhead electric power cables, albeit the depth and extent across the site are anticipated to be limited. The nature of any Made Ground is unknown and considered to represent a potential source of contamination.

With regards to the above, the following potential issues are noted:

- Made Ground may comprise deposits of heavy metals, organic or inorganic contamination including asbestos; and,
- Buried organic materials such as organic silts or timber may biodegrade to produce potentially toxic and/or combustible gases.

Off-site Sources of Contamination

Mineral Extraction (Coal)

The site is within an area of historical mining, with an adit identified in the central divide of the site. In this respect, the following issues were noted:

- A variety of heavy metals may be present in solid wastes e.g. mining spoils, ores or slags;
- Heavy metals in mine run-off;
- Residual ores or process wastes may contain a variety of inorganic contaminants e.g. sulphates or sulphides;
- Where coke plants were operated, waste tars etc were sometimes deposited in mineshafts;
- Toxic, asphyxiant gases may be present in mineshafts, faults, workings and spoil deposits (e.g. methane, carbon monoxide, carbon dioxide, and hydrogen sulphide), either naturally occurring or due to subsurface combustion of colliery wastes; and,
- Coal-mining activities may give rise to potentially combustible ground due to the presence of dust and coal residues.

Sheep Dip (sheep wash)

From the 1949-1974 mapping, the map shows a "sheep wash" within approximately 150m of the sit boundary. The zone of influence from sheep dipping, is typically relatively limited, however the presence and susceptibility of the groundwater aquifer is unknown.

Sheep dipping was a common practice to protect the animals from parasites like lice, ticks, and scabies (a skin disease caused by mites). The process involved immersing the sheep in a special solution or "dip," which was usually a chemical liquid designed to kill these pests.

Chemical indicators of sheep dipping include arsenic and cyanide.

Sources of Ground Gas

Based on our searches, it is considered that the credible potential sources of ground gas are the following:

- Worked shallow coal measures beneath the site;
- Degradable material present within any Made Ground deposits;
- Infilled Land (Quarries); and,
- Peat

Whilst we have identified potential sources of ground gas, we would not consider the solar farm to be sensitive receptors. The issue is more likely to require consideration if any enclosures are proposed (e.g. base stations/ maintenance huts).

5.4 Potential Receptors

Environmental receptors that could feasibly be adversely affected by potential sources of contamination identified are as follows (taking into account the future use of the site as a commercial development):

- Proposed (commercial) site users;
- Users of surrounding sites;
- Surface watercourses (River Taff);
- Future groundwater resources (Superficial & Bedrock aquifers); and,
- Existing and future buildings and services.

5.5 Potential Pathways

The following potential pathways could bring receptors into contact with the potential sources of contamination:

- Direct dermal contact with contaminated soil or groundwater;
- Ingestion and/or inhalation of contaminated soil, fugitive dust or vapours;
- Leaching of contaminants from soil to groundwater;
- Migration of mobile contaminants in groundwater;
- Migration of mobile contaminants via service trenches; and,
- Migration of ground gases into the building.

5.6 Risk Assessment

The following table contains an assessment of the potential for complete pollutant linkages to exist at the site, based on the potential sources, pathways and receptors identified in the previous sections and assign each a risk rating. Each issue is assigned a risk rating from low, through medium to high. The risk classifications are defined as follows:

- Low Risk - Little chance that the issue is occurring/will occur is posing/will pose a liability or cost for the site owner.
- Medium Risk - It is possible that the issue could arise and could pose a liability or cost for the site owner. Additional information is required.
- High Risk - It is considered likely that the issue is occurring or will occur, with potential liability or cost for the site owner.

The assessment is based on the proposed end use of the site, as such the site has been deemed appropriate to be assessed against a commercial end use.

Table 4: Risk Matrix

Potential Source	Potential Pathway	Potential Receptor	Likelihood of complete linkage being realised
Toxic metalliferous inorganic and organic contaminants present on-site	Direct dermal contact; ingestion and inhalation of contaminated soil and dust	Current and future site users	Low. Contaminants could be present in Made Ground deposits, albeit the extent of Made Ground on site is anticipated to be limited. As the enduse of the proposed development is relatively insensitive to contamination this is considered to be a low risk to the development.
		Users of surrounding sites	Low. Minor risk of exposure to soil during construction. Risks should be controlled by good working practices (i.e. keeping excavations and spoil heaps damped down during prolonged periods of dry weather and securing the construction site).
	Direct contact or vertical/lateral infiltration or leaching from soil.	Surface water receptor (River Taff)	Low. Given the distance to the surface water receptor, and the associated dilution factor, any contaminants found on the site are considered to pose a low risk to the surface water receptor.
		Groundwater future resource superficial and bedrock aquifer)	Low. Whilst superficial groundwater is not anticipated due to the cohesive nature of the superficial deposits, a designated superficial groundwater body beneath the site was identified in the southeast of the site. This considered, the presence and extend of contamination on site are anticipated to be limited.
		Built Environment	Low. Due to the historic land uses close to the site, there is the potential for the presence of aggressive contaminants, which could present a risk to future building materials; however, any risk could be mitigated through design.

Potential Source	Potential Pathway	Potential Receptor	Likelihood of complete linkage being realised
Soil gases generated by: 1) Worked coal seams beneath the site; 2) Infilled land (quarries/ shafts); 3) Peat; and, 4) Radon generating geology.	Migration into proposed buildings via service trenches and other voids within structures.	Current and future site users	Low. It is considered that there is a low to moderate gas generation potential on site from several sources. The greatest risk is likely from gas migration within worked coal seams which are expected to have been worked underneath parts of the site and from radon gas. The greatest risk is likely to arise if any maintenance cabins or other structures are proposed. Risks, if found to be present, should be able to be mitigated through design.
Radon Gas	Risk for radon from underlying soils	Current and future site users	Low. The documentary evidence indicates that parts of the site are located within areas of elevated naturally occurring radon. However, the enduse of the development is considered to be relatively insensitive to Radon Gas. Therefore the risk to the proposed development is considered to be low.
Asbestos within any Made Ground and infill materials	Direct dermal contact or inhalation of contaminated soil and dust	Current and future site users	Low. Any Made Ground may contain asbestos, however the lateral and vertical extent of Made Ground on site is anticipated to be limited.
Organic and inorganic contaminants potentially migrating onto site from historically proximal industries.	Vertical / lateral infiltration or leaching from soil	Site occupants and groundwater	Low. The is the potential for contamination to be surrounding the site. However, given the limited superficial deposits anticipated and the distance from the majority of the nearby potential sources of contamination, the potential risks are considered to be low.

5.7 Summary of Environmental Assessment

The Client is proposing to construct is proposing to construct a solar farm to the east of Pontypridd, South Wales. It is understood that the proposals currently involve the construction of a ground-mounted solar photovoltaic farm, with associated landscaping works, infrastructure and access. As such, the site has been deemed appropriate to be assessed against a commercial end use.

Given the limited historical land uses and the information obtained relating to the subsurface around the site, it is considered that the presence of made ground is generally unlikely; and accordingly, there is generally a low risk of potential historic contamination.

The proposed enduse of the site is relatively insensitive to contamination with an overall low risk rating; thus, indicating that it is considered relatively unlikely that complete pollutant linkages could potentially occur.

There is considered to be several sources on and near to the site which have the potential to be gas generating. The greatest source is likely from within any potentially worked coal seams, underlying the site. Furthermore, the documentary evidence indicates that parts of the site are located within areas of elevated naturally occurring radon. The greatest risk is likely to arise if any maintenance cabins or other structures are proposed. Risks, if found to be present, should be able to be mitigated through design.

In terms of risks to the Water Environment, the superficial and bedrock aquifer has been identified as the groundwater receptor, albeit that the risks are considered to be low, due to absence of source of contamination. The River Taff is considered to be the nearest surface water receptor for assessment, with associated risks being relatively low. This is based on the low risk of potential historic contamination identified. Care will of course be required in the usual manner to ensure that the construction activities do not impact the water environment.

Whilst not directly related to the risk assessment, attention should be drawn to the fact that surplus soils arising from sites of this kind can incur high disposal costs, which can be a significant constraint to development. It would be sensible to assume that any soils being removed/disposed of from site would be subject to the Standard Rate of Landfill Tax, which is set as £126.15 per tonne, effective from 1st April 2025.

Ultimately, it was recommended that intrusive investigation be undertaken to confirm the Conceptual Site Model and the risk rating at this site.

6.0 Geotechnical Considerations

The proposals are for the construction of a ground-mounted solar photovoltaic farm, with associated landscaping works, infrastructure and access. As such, it is considered that the associated loadings will be low.

It is considered that there is potential for a limited Made Ground deposits to be present on site associated with the historic surrounding land uses. Made Ground is generally not considered to represent a suitable bearing stratum for structural foundations, unless it is known to have been carefully selected and placed in a controlled manner. This cannot be said about any Made ground on site.

The geological map evidence indicates that there are limited superficial deposits beneath the site, with Glacial Till recorded in the south of the site. The site is also expected to be underlain by a shallow sedimentary bedrock.

Given the limited anticipated thickness of the natural superficial deposits; and the scale and magnitude of the proposed development, it is considered that foundations will be required to bear on the Glacial Till and on the sedimentary bedrock, with shallow pad and strip foundations.

Based on the mining risk assessment undertaken, the risk relating of mineral instability is considered to be low.

Based on the characteristics of the expected superficial deposits, it is considered that these deposits will be primarily cohesive in nature, with a low resulting permeability, and of limited thickness. This may limit the infiltration potential of the soils on the site.

Given the topography, it is likely that the proposed development will utilise similar elevations and therefore, it is considered unlikely that any significant earthworks will be required to create a level platform to facilitate the development.

Care should be taken when excavating at the boundaries of the site and appropriate measures should be taken to ensure stability of excavations especially when adjacent to roads, utilities, structures and infrastructure. Longer-term excavations might also require support.

Ultimately, it is recommended that an intrusive investigation be undertaken to confirm the expected ground conditions to determine the nature and depth of the Made Ground and superficial deposits, as well as to determine the nature, depth and engineering properties of shallow bedrock and to confirm the presence of work coal seams, underlying the proposed development.

7.0 Conclusions

A Stage 1 Desk Study was undertaken to develop an understanding of the geo-environmental conditions to inform the proposed construction of a solar farm on lands at Glyn Taff Farm, Bryn Tail Lane, Pontypridd. This study is based on the historical development of the site; expected ground conditions; hydrology; hydrogeology; mining and environmental conditions.

The historical map evidence has indicated that the site has predominantly been undeveloped agricultural/upland, typical of a valley landscape. This is with the exception of the industrial activities, predominantly quarrying and mining activities, scattered across the surrounding area. It is evident that Aber Valley was a key industrial hub for Coal Mining in the early to middle of the 19th Century.

The documentary evidence suggests that the no or limited Made Ground would be anticipated at the site. The geological maps indicated that bedrock is at/near surface across the majority of the Site.

Superficial deposits will be present locally in the south east and north east of the Site, with these comprising of cohesive Glacial Till. Descriptions of the Glacial Till deposits are unavailable in the available borehole records but would be anticipated to be firm to stiff clay. Peaty soils are noted locally at the top of the hillside, close to Eglwysilan Road, this is not unexpected given the landscape. It is expected that these deposits will be very thin, localised pockets.

The geological map evidence indicates that the north of the site is underlain by a series of sedimentary bedrock deposits of the Hughes Sandstone Member of Carboniferous Age. These deposits comprise of thin bands of mudstones/siltstones/sandstones with interbeds of seatearths and mainly thin coals seams.

In terms of land contamination, based on the available information and end use of the development, it is considered that the presence of made ground is generally unlikely; and accordingly, there is generally a low risk of potential historic contamination. The proposed enduse of the site is relatively insensitive to contamination with an overall low risk rating; thus, indicating that it is considered relatively unlikely that complete pollutant linkages could potentially occur.

In terms of risks to the Water Environment, the superficial and bedrock aquifer has been identified as the groundwater receptor, albeit that the risks are considered to be low, due to absence of source of contamination. The River Taff is considered to be the nearest surface water receptor for assessment, with associated risks being relatively low. This is based on the low risk of potential historic contamination identified. Care will of course be required in the usual manner to ensure that the construction activities do not impact the water environment.

Whilst not directly related to the risk assessment, attention should be drawn to the fact that surplus soils arising from sites of this kind can incur high disposal costs, which can be a significant constraint to development. It would be sensible to assume that any soils being removed/disposed of from site would be subject to the Standard Rate of Landfill Tax, which is set as £126.15 per tonne, effective from 1st April 2025.

There is considered to be several sources on and near to the site which have the potential to be gas generating. The greatest source is likely from within any potentially worked coal seams, underlying the site. Furthermore, the documentary evidence indicates that parts of the site are located within areas of elevated naturally occurring radon. The greatest risk is likely to arise if any maintenance cabins or other structures are proposed. Risks, if found to be present, should be able to be mitigated through design.

Radon protection measures will be required in areas of enclosed structures. Each such structure should be assessed on a case by case basis to determine if basic or full radon protection measures will be required.

It is not known if the proposed development will include any enclosed working areas or buildings. Should the proposed development include any enclosed working areas or buildings, it would be prudent to monitor the gas levels during a site investigation.

The proposals are for the construction of a ground-mounted solar photovoltaic farm, with associated landscaping works, infrastructure and access. As such, it is considered that the associated loadings will be low.

Ultimately, it is recommended that an intrusive investigation be undertaken to confirm the expected ground conditions to determine the nature and depth of the Made Ground and superficial deposits, as well as to determine the nature, depth and engineering properties of shallow bedrock and to confirm the presence of work coal seams, underlying the proposed development.

Based on the characteristics of the expected superficial deposits, it is considered that these deposits will be primarily cohesive in nature, with a low resulting permeability, and of limited thickness. This may limit the infiltration potential of the soils on the site.

Based on the mining risk assessment undertaken, the risk relating of mineral instability is considered to be low.

Study Limitations

1. The study conducted and this report has been prepared for the sole use and reliance of the client and their advisors. The report shall not be relied upon or transferred to any other parties without written authorisation from Woolgar Hunter. If any unauthorised third party comes into possession of this report, they rely upon it at their own risk and the authors owe them no duty of care and skill;
2. The opinions and advice set out in this report relates specifically to the current site and proposed development as detailed herein. They should not be transferred to other sites or to alternative schemes without prior consultation with Woolgar Hunter;
3. The findings and opinions conveyed herein are based on information obtained from external sources as detailed in the report and which Woolgar Hunter believes are reliable. Nevertheless, Woolgar Hunter cannot guarantee the reliability of such information;
4. This report has been prepared in the light of legislation and best practices, current and applicable at the time of writing; and
5. Woolgar Hunter does not provide legal advice and the advice of lawyers may also be required.
6. This report does not include comment in relation to archaeology, flora and fauna. Separate advice may be required in respect of this matter.

Figures

Appendices

Appendix A: Coal Authority Mining Report (CON29M)

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