



Pennant Walters

Mynydd y Glyn Wind Farm

Draft Environmental Statement

Appendix 11A: Phase 1 Geoenvironmental Desk Study



This report was prepared by WSP Environment & Infrastructure Solutions UK Limited (formerly known as Wood Environment & Infrastructure Solutions UK Limited), company registration number 02190074, which is carrying out these services as a subcontractor and/or agent to Wood Group UK Limited

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Document revisions

No.	Details	Date
1	First Draft	Oct 2022
2	Final Report	October 2022

Executive summary

Purpose of this report

This report has been produced to support a Draft Environmental Statement prepared in relation to the proposed development of a wind farm on land at Mynydd y Glyn. The Proposed Development comprises up to seven turbines, with associated infrastructure and a link to the transmission grid. The report has been prepared using publicly available information provided by third parties.

For the purposes of this report, the term “the Site” has been used to refer to the total land area encompassed by the Proposed Development application boundary. Within the Site, there are three elements, comprising the:

- wind Farm development;
- access Road; and
- grid Connection Corridor, to accommodate above ground overhead line infrastructure.

Only the above ground section of the Grid Connection Corridor within the Site boundary is considered as part of this assessment. A high level assessment of the underground Grid Connection Corridor outside the Site boundary is included in **Chapter 11: Ground Conditions** of the Draft Environmental Statement.

Background

The Proposed Development Site is a plateau with steep valley sides between Pontypridd and Porth, South Wales. Bedrock has been identified to be at shallow depth across the site, comprising Coal Measures strata, with thin intermittent cover of peaty soil. No significant historical development has been identified on the Site, with the predominant agricultural land use. Areas of forestry are present offsite on the valley slopes.

Historical mining activity has been identified beneath the Site and the wider area, including recorded and suspected unrecorded underground mining. The recorded undermining beneath the Site is related to historical activities in the surrounding valleys, and areas of potential mining risk have been identified.

Conclusions

Contamination

The Site is primarily used for agriculture, mainly sheep grazing. Minor contamination sources have been identified as residual mine waste / spoil (considered to be limited in extent) and current and former agricultural activities, which can present a potential sporadic and localised and / or diffuse source of contamination. The mining history of the site also means that there is potential for mine gas to be present.

The risks to human health from potential contaminants in soils arising from mining waste and agricultural operations are assessed to be very low. In relation to potential metal contamination in mine waste, there is no evidence of vegetation dieback at surface that could indicate large areas of near surface contamination by metals. Future site users, including agricultural workers, wind farm workers and open space users, are unlikely to disturb contaminated soil during normal site usage.

The risk to human health in relation to future site users associated with mine gas is moderate. There are no enclosed spaces on the site currently and the risk to current site users is therefore low, however the Proposed Development will introduce limited enclosed spaces where gas could accumulate. These will be used infrequently, however, the risk level reflects the severity of consequence of a contaminant linkage being realised.

The risks to groundwater from the identified sources are assessed to be very low given the nature of the sources and the likelihood that groundwater in the bedrock aquifer is likely to be at depth and likely to have been impacted by historical mining activities in the wider area.

Risks to surface water are also assessed to be very low, as surface water receptors are either not located near potential sources, or the source, if present, is likely to be of limited extent and unlikely to result in significant degradation of water quality.

Geotechnical

A review of geohazards has identified several potential constraints. These principally relate to former suspected unrecorded shallow coal mining, principally in the northern area of the Site and possible shallow mining beneath the access road. Other constraints include valley side instability, possible weathering of shallow bedrock and the presence of acidic soils either due to the presence of peat (thin surface layer has been confirmed on parts of the site) or sulphate minerals associated with the Coal Measures strata/colliery wastes.

These constraints will require further assessment as part of the detailed design process prior to construction of the Proposed Development, and it is recommended that intrusive ground investigation is undertaken to inform this assessment.

Recommendations

The desk-based assessment has identified some potential contamination constraints associated with the proposed future wind farm use of the site. No ground investigation data is currently available.

The potential land contamination constraints can be mitigated through targeted ground investigation to include gas monitoring where buildings / enclosed spaces are to be constructed. The investigation could also be used to confirm the presence/absence of contamination in shallow soils (e.g., by metals and hydrocarbons), in areas where development is proposed, method statements including procedures for encountering unexpected contamination, Environmental Management Plans, and health and safety plans for the works. The findings of these investigations and soil testing should inform the detailed design of the Proposed Development and the design of

any required remedial measures. It is recommended that this report and all previous reports be thoroughly consulted and incorporated where required into the package of information for the Site for any ground works.

Regarding the identified potential geohazards, it is recommended that liaison with the Coal Authority is undertaken to clarify the seam stratigraphy and layout beneath the site and any associated hazards re-assessed. Abandonment Plans for the recorded workings in the No 2 Rhondda Rider seam and also for the shallow spine roads should be obtained. A Surface Hazards Incident Report should be obtained for the remedial works identified in the Coal Authority information reviewed for this desk study. The additional data would inform the design of any intrusive ground investigation.

A programme of intrusive investigation works with associated testing and monitoring for gas and groundwater should be undertaken at the proposed turbine and substation locations, and where mine related features occur beneath access/internal roads.

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Annex B	Coal Mining Risk Assessment
Annex C	Peat Probing Factual Report
Annex D	Risk Assessment Methodology

1. Introduction

Background

This report presents a Phase 1 Geo-environmental desk study at Mynydd y Glyn in Rhondda Cynon Taf where Pennant Walters is seeking planning permission for the construction and operation of a wind farm and associated infrastructure.

For the purposes of this report, the term “the Site” has been used to refer to the total land area encompassed by the Wind Farm development site application boundary, which includes an access road and the above ground section of the grid connection.

The main constituents of the Proposed Development are summarised below:

Wind Farm development:

- Up to seven wind turbines.
- A substation with associated cabling;
- Temporary construction compounds and site office;
- Crane pads;
- Site access road and internal access tracks;

Grid connection:

- Grid connection corridor to link the substation to the existing distribution network. The Grid Connection is understood to comprise a combination of above ground infrastructure within the site and below ground infrastructure where it extends off site to the east. Only the proportion within the Site boundary is considered as part of this report. A high level assessment of the below ground section of the route is included in **Chapter 11: Ground Conditions** of the Draft Environmental Statement.

The Proposed Development requires environmental impact assessment (EIA) because it falls under paragraph 3(i) (“Installations for the harnessing of wind power for energy production (wind farms)” of Schedule 2 of the EIA Regulations and exceeds its thresholds for both site area and hub height.

As the installed generating capacity of the Proposed Development would exceed 10 megawatts (MW), it qualifies as a Development of National Significance (DNS) according to the criteria set out in Regulation 4A of The Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales) (Amendment) Regulations 2016.

Purpose of the Report

The purpose of this report is to inform the Ground Conditions chapter (**Chapter 11**) of the Draft Environmental Statement. With reference to Planning Policy Wales¹, the report will assist in determining whether the Site is suitable for its proposed use.

¹ Welsh Government (2021) Planning Policy Wales, Edition 11, February 2021. [online]. Available at: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf. [Accessed January 2022].

Scope of work

The scope of work comprises a Phase 1 Geo-environmental Desk Study and includes the following:

- Identification and review of selected contemporary information including geological, environmental, hydrological, and hydrogeological data, where available, for the Site and its surroundings.
- Review of historical mapping for the Site and its surroundings to determine the historical land uses and to identify potential contaminative activities.
- A walkover of the key elements of the Site (conducted in 2022) to identify potential evidence of contamination and verify selected desk study information, including potential mining related features identified from aerial imagery.
- Development of a Conceptual Model (CM) and a Tier 1: Preliminary Risk Assessment, to assess the status of any potential contamination and identify any potentially significant contaminant linkages that require further consideration in line with current guidance including Land Contamination Risk Management (LCRM) guidance published by the Environment Agency.
- Identification of information gaps, geo-environmental development constraints and any requirements for further assessment.

Sources of information

The following sources of information were reviewed during the preparation of this desk study:

- Landmark Envirocheck Report, Reference 26008076, 31st August 2021 (Annex A – to be provided on request) – Main Site area;
- Landmark Envirocheck Report, Reference 852604, 03rd October 2022, (Annex A – to be provided on request) – Additional area outside original Site boundary to accommodate the above ground Grid Connection corridor;
- British Geological Survey (BGS) 1:50 000 Geological Sheet 248, Pontypridd, Solid, 1963 and Drift, 1975;
- BGS WMS layers (superficial, bedrock, mass movement, detailed geology);
- British Geological Survey, The Geology of the South Wales Coalfield, Part 6, The country around Pontypridd and Maesteg, Explanation of One inch Geological Sheet 248, Third Edition, 1964;
- Coal Authority Interactive Map viewer, <http://mapapps2.bgs.ac.uk/coalauthority/home.html>, accessed October 2022;
- Coal Authority WMS layers;
- Consultants Coal Mining Report (CCMR), Mynydd Y Glyn, Rhondda Cynon Taf, The Coal Authority, Reference 51002644897001, 03 September 2021 (Annex B) – Wind Farm Site area;
- Consultants Coal Mining Report (CCMR), Mynydd y Glyn North, Rhondda Cynon Taf, The Coal Authority, Report Ref. 51003317546001, dated 11 October 2022 – access road (presented in Annex B);
- Consultants Coal Mining Report (CCMR) Mynydd y Glyn South, Rhondda Cynon Taf, The Coal Authority, Report Ref. 51003317529001, dated 11 October 2022 – additional area south east Wind Farm site (presented in Annex B);
- Site walkover on 11 October 2022;

- Wood²; Mynydd Y Glyn Wind Farm, Peat Depth Survey Report, Technical Note, November 2021;
- Mynydd y Glyn, Coal Mining Risk Assessment, Wood, Ref. 42864-WOOD-XX-XX-RP-OG-0002_S0_P01.1, October 2022;
- Multi Agency Geographic Information for the Countryside (MAGIC) interactive map, www.magic.gov.uk, accessed October 2022;
- NRW interactive map viewer, <https://naturalresources.wales/evidence-and-data/maps/browse-map-of-data-about-the-natural-environment/?lang=en>, accessed October 2022;.
- Flood Risk Assessment Wales Map, <https://naturalresourceswales.gov.uk/flooding/check-your-flood-risk-on-a-map-flood-risk-assessment-wales-map/?lang=en>, accessed October 2022;
- BGS, GeoIndex, <http://mapapps2.bgs.ac.uk/geoindex/home.html>, accessed October 2022;
- BGS, Geology of Britain Viewer, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>, accessed October 2022;
- Wood; Mynydd y Glyn Wind Farm Environmental Impact Assessment Scoping Report (Ref. 42864_WOOD-XX-XX-RP-O-0001_A_C01, September 2021);
- Hyder, Mynydd y Glyn Wind Farm, Scoping Report, Ref 0001-UA005281-UE31-01, June 2014.

Additional Envirocheck data and Consultants Coal Mining Reports were obtained due to amendments to the extent and layout of the proposed development area.

Geotechnical Classification of Structures

In line with BS EN 1997:1 (Eurocode 7 Geotechnical Design) it is anticipated that the proposed structures will be classified as follows:

- Wind turbine generator and foundation – Category 3.
- Substation – Category 2.
- Access tracks, hardstanding, compounds – Category 2.

The turbines and associated foundations are anticipated to be Category 3 structures due to their large size and loading conditions, which incorporate dynamic loading and lateral loads with high overturning forces.

Limitations

The conclusions reached and advice given in this report are based in part upon information and/or documents that have been prepared by third parties. In view of this, we accept no responsibility or liability of any kind in relation to such third party information and no representation, warranty or undertaking of any kind, express or implied, is made with respect to the completeness, accuracy, or adequacy of such third party information. In preparing this report we have assumed that all information provided is complete, accurate and not misleading.

² Now WSP Environment and Infrastructure Solutions UK Ltd

2. Site details and environmental context

2.1 Site details

Site Location	<p>The Wind Farm development site is situated on an upland plateau in the Rhondda valley, approximately 600 m south of the village of Porth. The Site is within Rhondda Cynon Taf County Borough Council administrative boundary. The Site is accessed via a gated track from the north west.</p> <p>The site location is shown on Figure 11A.1.</p>
Grid Reference	The grid reference for the approximate centre of the site is 303380 189383.
Site Address	The Site is accessed from the north west via an existing track from Trebanog, which connects to the A4233, Trebanog Road.
Site Description	<p>The Wind Farm development site is located on the summit and upper slopes of a steep sided hill, Mynydd-y-Glyn and covers an area of approximately 182 ha. The elevation of the hill which is the subject of the Proposed Development is in excess of approximately 300 m OD. It predominantly comprises a mix of semi-improved and improved grassland with a small area of woodland towards the southern boundary. Field boundaries are generally indistinct, with isolated lengths of stone wall present. Several public rights of way cross the site, together with an overhead electricity transmission line.</p> <p>The Wind Farm development site is bounded on all sides by open ground, with local areas of forestry on the valley slopes. The western section which includes the proposed access road, crosses a scarp which defines an area of former quarry.</p>
Boundaries (Land uses and relevant features)	The Site is bounded by a mix of stone walls and post/wire fencing in varying condition. Details of adjacent land use are provided below.
North	Terraced valley slope as pasture/rough grassland.
East	Predominantly grazing/rough grassland with areas of forestry further afield. Disused quarry adjacent to north eastern corner.
South	Predominantly grazing, with some small areas of woodland/forestry.
West	Predominantly grazing, with some areas of forestry.
Site Walkover	<p>A site visit was carried out on 11 October 2022 by a Wood Geoenvironmental Engineer. Key features identified during this walkover are noted below:</p> <ul style="list-style-type: none"> • The suspected mine entries identified from Google Earth (see below) were noted to be shallow features (shallow depressions); • Several depressions on the eastern valley slope were likely to be associated with springs for small watercourses, and were associated with reeds/rushes; • No significant indications of slope instability were noted, within the Site other than the documented area on the north eastern boundary (see Chapter 4); • No areas of mine spoil or disposal were noted within the Site; • No existing structures or relict historical structures were identified.

Current Site Activities	Current site activities within the boundary of the Proposed Development Site are limited to agricultural land use. The area is used for sheep grazing, predominantly in improved or semi-improved moorland.
Services	An above ground electricity transmission line crosses the site, oriented north west to south east. No records of service information were reviewed as part of this assessment.
Proposed Development	<p>The aspects of the Proposed Development are summarised in Section 1 above. More detail on each aspect is presented below:</p> <ul style="list-style-type: none"> ● Wind turbines: up to seven turbines with a maximum hub height of 136m and a maximum tip height of 155 m. Proposed locations have been selected, which may require some minor amendment based on any identified constraints. Foundations will depend on the findings of intrusive investigation, but may comprise gravity foundations bearing directly onto bedrock, where it is encountered intact. ● Crane pads: an area of hardstanding adjacent to each turbine as a lay down area for construction and future maintenance activities. Crane pads will comprise an area of hardstanding located adjacent to each wind turbine. The area is subject to Contractor design but is anticipated to be approximately 2 500 m². ● Temporary contractors compounds. ● Electrical substation and transformer housing with associated cabling: Anticipated to comprise a single storey structure with shallow foundations underground cables will link the turbines to each other and to the on-site substation. Cables will be laid in trenches typically 750 mm deep and 450 mm wide. ● Site access road and internal tracks. Main access will comprise construction of a new access from the A4233 to the west. Internal access tracks will be required between the proposed infrastructure. ● Grid Connection: above ground within Site, below ground where it extends off-site to the east. Only above ground section within Site considered as part of this assessment.

The proposed Wind Farm development layout is shown below and in **Figure 11A.2**.

2.2 Environmental context

Topography	<p>The topography of the Site is a plateau with two summits, with steep terraced valley sides to the north and north west, and more uniform sloped valley sides to the east and south. Two summits are present in the central part of the Site at 377 m OD in the north west and 375 m OD in the south east. The area which includes both summits is relatively flat, descending more steeply below 350 m OD.</p> <p>The topography of the Site is influenced by the structural geology as discussed in more detail below.</p>
Hydrology and drainage	<p>The site lies between the Afon Rhondda Fawr valley to the north, Nant Muchudd to the south west and Nant Gelliwion to the south east, and is in the catchment of Afon Rhondda Fawr and Nant Muchudd. The NRW data set indicates that there are no Main Rivers within the site boundary; Rhondda Fawr is classified as a Main River. Both Nant Muchudd and Afon Rhondda Fawr have an overall status of Good.</p> <p>The Site is intersected by a number of tributaries of Afon Rhondda Fawr and Nant Muchudd; Nant Gelliwion is a tributary of Rhondda Fawr. The main tributary rises to the south of the southern</p>

summit and flows eastwards across the site boundary. Several minor watercourses cross the western area which includes the access road.

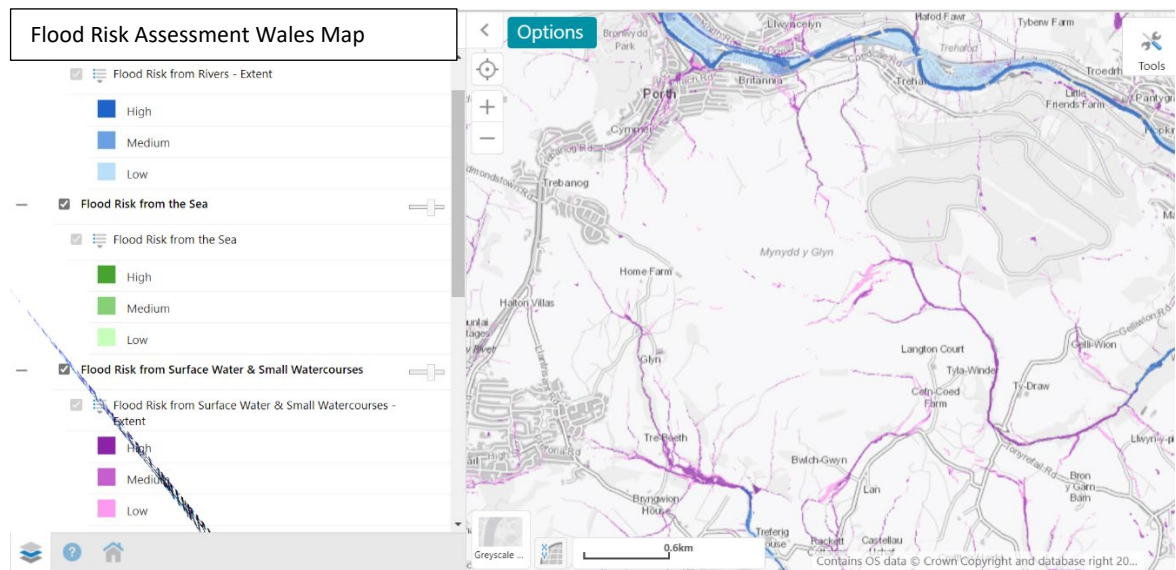
There are no licensed surface water abstractions on the Site.

No licensed discharge consents are recorded on the Envirocheck report within the Site.

Flood risk

Limited potential for flooding has been identified on the Site. With respect to flood risk from rivers and sea, the Site lies within Flood Zone 1. The Envirocheck Report indicates that the Site is defined as having limited potential for groundwater flooding.

The Flood Risk Assessment Wales Map shows a number of localised areas of flood risk from surface water and small surface water courses which run off the plateau area and cross the lower western area. None of the proposed turbine locations area located in identified flood risk areas.



Environmental designations

Small areas of local ancient and semi-natural woodland/plantation on ancient woodland are located on the valley slopes outside the Site boundary.

The Magic and NRW websites were examined to identify whether any environmental designations applied to the Site. None of the following designations have been identified on site: RAMSAR, SSSI, SAC, SPA, AONB, National Nature Reserve, Local Nature Reserve, National Park. A SSSI is adjacent to the south of the western area which includes the access road, identified as Rhos Tonyrefail SSSI as shown in the Envirocheck report.

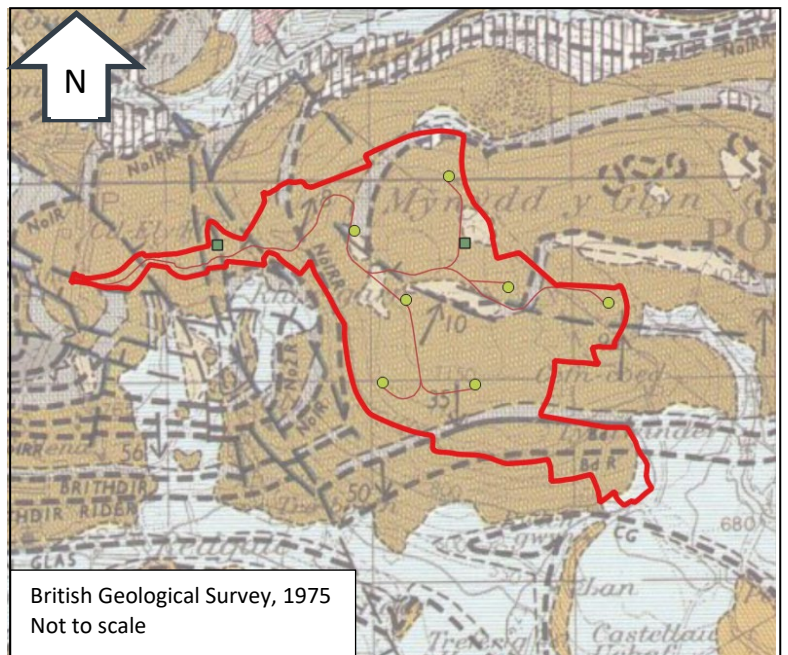
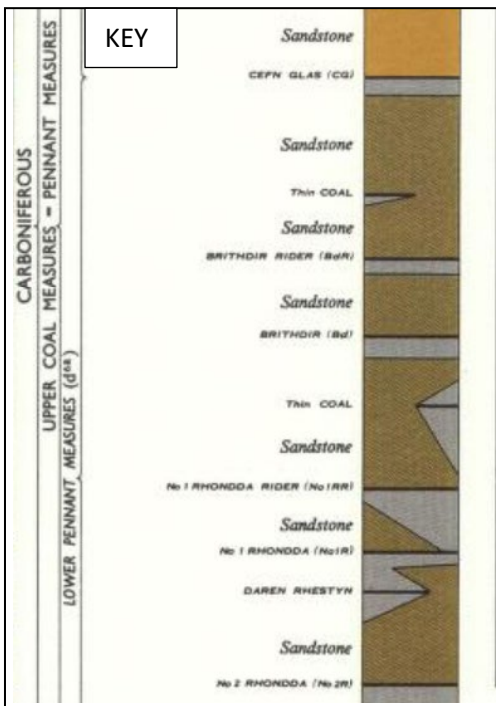
Environmental sensitivity

The site has no significant environmentally sensitive areas within it.

2.3 Ground conditions

Geology (BGS map and WMS layers, memoir and Geolindex)

The ground conditions have been derived from a combination of published information, BGS 1:50,000 scale mapping on Geolindex, and the Envirocheck report together with information from the site walkover. An extract from BGS sheet 1:63 360 Pontypridd Sheet 248 is included below and summarised in the following text.



Strata	Comments
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Made ground

None noted to be present on published mapping or electronic data.

Made ground may be present associated with local disposal of spoil related to historic mining activities; if present, this is anticipated to be minor in occurrence, possibly associated with small scale 'trials' on the valley slopes. Potentially infilled land is identified in the Envirocheck report adjacent to but outside the northern boundary of the site, which appears to be associated with historical quarrying activity. One of the locations is in an area of quarrying identified from OS mapping as discussed below, which may extend across the western area of the Site.

Superficial Deposits

Thin or absent beneath the majority of the site. Four areas of peat noted around the plateau crest. Glacial Till (diamicton), present on the valley sides around the flanks of the plateau, extending into the south eastern corner of the site.

Glacial Till typically comprises gravelly sandy clay. One of the mapped peat areas is close to the proposed location of Turbine T1. See also results of peat probing survey in Section 2.6.

Bedrock:

Upper Coal Measures (Carboniferous Age) Brithdir Member overlying Rhondda Member.

Lack of drift cover infers rockhead at shallow depth. Strata dip is variable indicating folded strata – see below. The Rhondda Member is described as green-grey lithic arenites (Pennant sandstones), with thin mudstone/siltstone and seatearth interbeds and mainly thin coals. It extends from the base of the No 2 Rhondda coal to the base of the Brithdir coal seam. It is noted to be up to 320 m thick. The Brithdir Member is described as green-grey lithic arenites (Pennant sandstones), with conglomerate lenses at bases of units and thin mudstone/siltstone and seatearth interbeds and mainly thin coals. It extends from the base of the Brithdir coal to the Cefn Glas coal above, overlain by the Hughes Member.

An area of landslip is shown straddling the north eastern Site boundary, to the north of Turbine T2. Additional larger areas are shown on the lower valley side further to the north. An area of spoil is noted immediately to the north east of the site.

Mining – published mapping

Several coal seam outcrops are shown beneath the Site, with the outcrop pattern defined by the topography, amended by faulting.

The Brithdir Rider seam is the shallowest named seam which is shown to underlie the Site, outcropping beneath the southern area. The underlying Brithdir seam is shown to outcrop in the southern area and also in the northern and central areas around the summits of Mynydd y Glyn. The No 1 Rhondda Rider and No 1 Rhondda seams outcrop beneath the western area and around the Site on the valley sides. The No 2 Rhondda seam outcrops outside the Site boundary. Seam dips range from 8° to the north to 35° to the south. A schematic section is included in the Coal Mining Risk Assessment (Annex B).

The stratigraphic sequence on Sheet 248 indicates an intermittent thin coal between the No 1 Rhondda Rider and the Brithdir seam. The BGS Memoir for Sheet 248 indicates that the No 1 Rhondda is closely overlain by a thin coal on the valley slopes to the west of the Site.

The Sheet Memoir also notes that the No 1 Rhondda Rider has extensive outcrops around the flanks of Mynydd y Glyn and is overlain by one of the principal sandstones of the Pennant, which is approximately 60 m to 75 m thick. The Memoir indicates that the No 2 Rhondda is the most important coal of the group and was worked extensively in the Southern Rhondda area. The Brithdir seam is noted to be degraded in this area and only locally worked. The Brithdir Rider is also thin and has only been worked sporadically and never on a commercial scale; it is approximately 45 m to 60 m above the Brithdir, with predominantly sandstone between. The Memoir indicates that it underlies the highest point of Mynydd Glyn, but this is not shown on the published mapping.

Several faults are shown crossing the Site or in the vicinity. The predominant orientation is broadly north west to south east.

Historical borehole records (BGS)

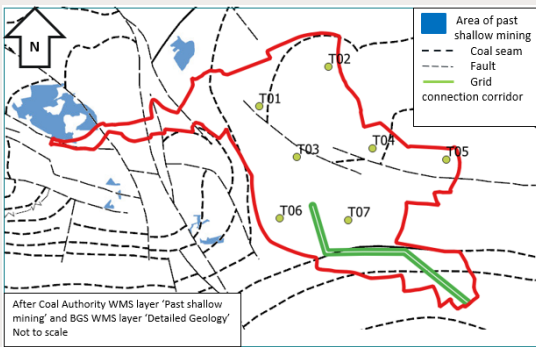
No previous ground investigation data has been identified for any of the existing developments or structures on Site.

Limited existing borehole data has been identified on the BGS website for the Site and immediate surrounding area to inform a preliminary ground model. The following existing records been identified and viewed, all of the locations but one are clustered in the central area of the Site, but are of limited relevance:

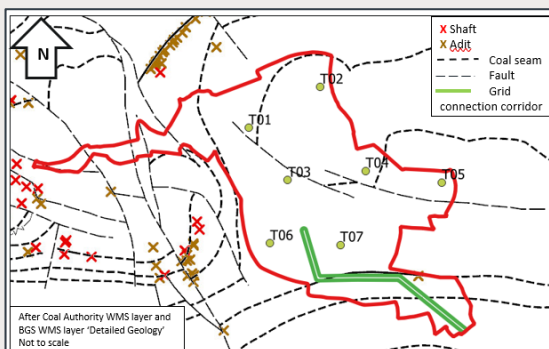
- ST08NW14: Cymmer Colliery No 16 BH – underground borehole from the Lower Five Feet to prove Upper Five Feet coal seam. Borehole commenced at 229 m bgl;
- ST08NW15: Cymmer Colliery No 17 BH - underground borehole from the Lower Five Feet to prove Upper Five Feet coal seam. Borehole commenced at 212 m bgl;
- ST08NW16: Cymmer Colliery No 18 BH - underground borehole from the Lower Five Feet to prove Upper Five Feet coal seam. Borehole commenced at 213 m bgl.

- ST08NW/87 and 88 – shallow boreholes (BH56 and BH56A) from 1980. Encountered firm to stiff CLAY (Glacial Till) to a depth of 0.2 m to 0.4 m bgl overlying bedrock which comprised very strong SANDSTONE.

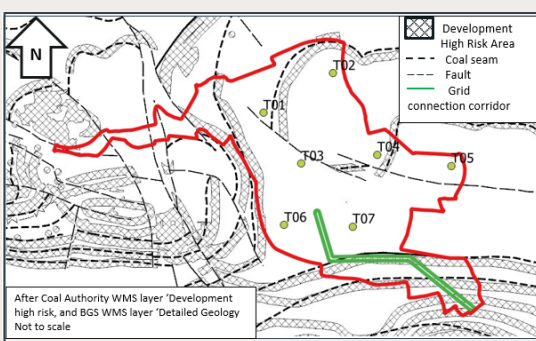
Mining – coal
Coal Authority Interactive Viewer, WMS layers and Envirocheck Report



Recorded Shallow Mining (Source: Coal Authority WMS layer)



Mine Entries (Source: Coal Authority WMS layer)



Development High Risk Areas (Source: Coal Authority WMS layer)

The Coal Authority Interactive Mapping tool shows the Site to be within a Coal Mining Reporting Area within an area which may be affected by coal mining. Layers within the viewer were examined to identify mining related aspects, which are summarised below. Historical mining features are also shown on the historical maps included with the Envirocheck in Annex A (to be provided on request).

Coal outcrops shown on the Interactive Viewer/WMS data are generally spatially consistent with those on the geological map, although seams are not identified by name.

Past shallow mining is noted around the Site, encroaching very slightly into the western end of the Site along the access track.

The Coal Authority WMS layer indicates that a mine entry is located on the south eastern Site boundary. It is identified as an adit, with a bearing of 187°, and is not indicated to have been treated. It is close to the southern outcrop of the Brithdir seam, and is inferred to have worked this seam to the south. The CCMR indicates that there no probable unrecorded shallow coal workings beneath the Site.

Several linear areas of the Site are shown to be a Development High Risk Area, which are associated with the seam outcrops.

No fissures and breaklines are identified within the Site boundary although a number of faults are shown crossing the Site, particularly beneath the wester area. The layout of the faults is broadly consistent with the published BGS mapping.

The Envirocheck report records a large number of BGS Recorded Mineral Sites in the vicinity of the Site. One of the locations is in the south eastern area and is associated with the shaft noted above; it is identified as Cefn-Coed and is noted to be underground for coal and to have a status of 'ceased'. The locations outside the site are to the north and west and are noted as deep coal workings or sandstone opencast (quarry), all of which are recorded as having a status of 'ceased'. The quarry adjacent to the western area of the site is noted as a sandstone quarry.

Mining - Consultants Coal Mining Reports and Coal Mining Risk Assessment (Appendix B)

Three Consultants Coal Mining Reports (CCMR) were obtained from the Coal Authority: the separate reports accommodate amendments/additions to the site area being considered. These are included in Annex B.

The CCMRs identify seven named seams which outcrop within the Site as follows:

- No 1 Rhondda;

- Tillery Brithdir;
- Tillery Rider No 1;
- Tillery Rider No 2;
- Brithdir Rider Group;
- Glyngwilyn;
- Daren Ddu.

It is noted that the seam stratigraphy/nomenclature is different from that on the published BGS information and includes two seams from the Hughes Member which are not shown on published mapping to be present off site to the south. This leads to confusion regarding the arrangement/location of recorded worked seams based on the Coal Authority information provided.

The CCMR indicates past underground mining has been recorded in a large number of seams beneath the Site, with the last date of working being 1986. The shallowest recorded worked seam is present in the western Site area beneath the access road is the No 2 Rhondda Rider at 7 m bgl, with a recorded worked thickness of 1.05 m. An area of past shallow working is shown encroaching into the western end of the access road; it is assumed that this is associated with the No 2 Rhondda Rider seam as noted above. The shallowest recorded worked seam beneath the majority of the Site area is identified as the No 1 Rhondda, which has a minimum recorded depth of 104 m bgl at its shallowest. The extraction thickness of this seam is noted to be 0.6 m to 0.7 m.

Additional recorded worked seams are identified beneath the Site at depths of between 109 m and 778 m bgl. The seams generally dip at a shallow angle of <math><10^{\circ}</math> towards the north/north east.

Additional recorded worked seams beneath the Site according to the CCMR are listed as follows:

- No 3 Rhondda;
- Hafod;
- 6 Foot Bottom Leaf;
- Four Foot;
- Upper Nine Foot;
- Bute;
- Yard;
- Upper 7 Foot;
- Lower Nine Foot.

Three spine roadways are noted to be present beneath the Site at shallow depth, but no information regarding their location is provided.

There is one remediated site within the Site boundary, which is noted to be within an area of previous interest. The CCMR notes that the site is close to where the Coal Authority has investigated and where necessary remediated mine entries and/or shallow coal mine workings following specific reported hazards. No specific information is identified regarding location or scope.

The CCMR notes that there are no probable unrecorded shallow workings within the Site.

The CCMR indicates that there is one recorded mine entry on Site. This is in the south eastern corner, close to the Grid Connection Corridor and is noted to be an adit with no record of treatment.

There are no recorded subsidence related claims within the Site.

There is no recorded mine gas or mine water treatment schemes within 500 m of the Site.

Aerial imagery from 2000 to 2021 shows features within the north and north western areas of the Site. These may represent localised mining/trials in shallow seams/outcrops in this area. From the BGS mapping, the features are close to the outcrops of the Brithdir and possibly No 1 Rhondda Rider seam. These are most clearly noted on the 2021 imagery and are discussed in more detail in the Coal Mining Risk Assessment (Annex B).

Other extractive industries

No extractive industries are identified on the Site in the Envirocheck report. There are BGS recorded mineral sites on the valley slopes below the Site for both coal and sandstone; all are noted to be ceased.

The BGS Memoir notes that the Upper Carboniferous sandstones have been extensively quarried, particularly the Pennant Measures.

Natural ground hazards

The Envirocheck Report notes the following ground related hazards:

- ▶ Collapsible ground – No to very low hazard.
- ▶ Compressible ground – no or high hazard – the high hazard is assumed to be associated with the occurrence of peat.
- ▶ Ground dissolution – no hazard.
- ▶ Landslide – very low to high.
- ▶ Running sand – no to very low hazard.
- ▶ Shrinking/swelling clay – no to very low hazard.

Radon is of lower to intermediate probability, which requires no or basic radon protection measures respectively.

Hydrogeology

The local Glacial Till is classified as a Secondary Undifferentiated aquifer.

Bedrock is classified as a Secondary A Aquifer and is a designated Water Framework Directive (WFD) groundwater body. It achieved Good quantitative status and Poor chemical status in the 2016 WFD classification.

There are no licensed groundwater abstractions on the Site identified in the Envirocheck report.

The Envirocheck report indicates no discharge consents within the Site.

Hydrogeological sensitivity

The groundwater vulnerability of the bedrock and superficial deposits is categorised as High in the north and south and Medium in the centre, south east and south west of the Site.

The site is not within a Source Protection Zone (SPZ).

Groundwater sensitivity

Groundwater beneath the Site is considered to be of low sensitivity. It is likely to have been impacted by former coal mining activities. In addition, there are no abstractions or SPZs defined in the vicinity of the site.

2.4 Other regulatory database information

Activity	On Site	0 to 250 m	Details
Waste management / transfer / treatment facilities / disposal	N	N	N/A
Landfill	N	N	N/A
Site handling hazardous or explosive substances	N	N	N/A
Pollution incidents / other	1	1	One recorded pollution incident within the Site, however the location description does not match the site so it may be mis-located. The incident is identified at a Business Park in 1995, for which the pollutant was diesel. It was categorised as a Category 3 minor incident.
Unexploded Ordnance and Bomb Strike	NA	NA	Not assessed.
Current land use	Y	Y	<p>The Envirocheck report does not identify any contemporary industrial land uses on Site; limited use is identified from the vicinity in the form of livestock farming, a tank and slurry beds immediately to the west at Rhiw-garn-fawr. Limited historical features are identified from the vicinity of the Site as follows:</p> <ul style="list-style-type: none"> - A disused refuse tip is noted 67 m to the north west of the Site, associated with historical quarrying activities - Disused quarries; - Mining infrastructure (shafts).

2.5 Site history

A summary of the historical development of the Site is presented below. This is based on historical Ordnance Survey (OS) mapping, supplemented by publicly available aerial imagery on Google Earth. Where relevant, interpretation of the maps is supported by information obtained from discussions with the client and other stakeholders, together with any previous reports available for the Site.

Site Area and Immediate Vicinity:

1884/1885: The Site is shown to be open space comprising predominantly rough grassland, with several field boundaries apparent. An excavation, possibly a quarry is located outside the Site boundary to the north east. Several scarps and possible areas of spoil are shown on the western area which is crossed by the proposed access track. A spring is shown in the north eastern area of the Site. Additional springs are shown on the valley sides around the Site.

Glyn Colliery is shown to have been present in the valley to the west of the Site with associated shafts and levels.

1901: No significant changes within the Site. The feature to the north east is shown to be 'Old Quarries'. The scarp faces on/adjacent to the western area is identified as Quarries.

Old trial levels are shown on the valley side to the north west of the Site towards Cymmer and several quarries are also present on this valley slope.

1921: A coal level is shown in the south eastern area of the Site in the vicinity of the Grid Connection Corridor. No other significant changes noted. Additional springs or risings are shown within the Site.

1947/53: No significant changes noted. A feature is shown on an aerial image from 1948 in the western Site area; it is not identifiable from the imagery.

1965: Coal level in the south eastern area noted to be disused. Large area of spoil associated with quarry off site to the north east.

1971/74: No significant changes on site. A large area of spoil is shown immediately to the east of the Site, presumably related to quarrying operations in the wider area.

1990/93: No significant changes on site. Area of spoil no longer shown to the east.

1999, 2006, 2021: No significant changes on site.

Google Earth imagery between 2001 and 2021 was examined. No significant changes are noted during this period, however, specific features related to potential mining area discussed in **Section 2.3** above.

2.6 Previous work at the site

Report Reference	Comments
Mynydd y Glyn Wind Farm – Peat Depth Survey Report, Technical Note. Wood, 2021	<p>A Phase 1 peat depth survey undertaken on a 100 m by 100 m grid of points, with peat depth measurement taken at each point was completed in 2021. Soils were indicated to comprise very acid loamy upland soil with a wet peaty surface on the summit plateau and locally free draining acid loamy soil over rock on the slopes at the edges of the Site. (Cranfield Soil and Agrifood Institute Soilscales Map).</p> <p>A total of 183 peat probes were taken across the Site as defined at the time. The recorded thickness of potential peat material ranged from 0 m to >4.10 m, with a calculated mean depth of 0.13 m; only nine locations recorded a potential peat depth of 0.4 m or greater, which is the depth defined by the Welsh Government as that which defines true peat and is therefore considered to be very localised in occurrence. The survey indicated that the Site is generally not underlain by peat, however, a localised peat bog is present to the west of the summit of Mynydd y Glyn ranging from 2.4 m to >4.1 m. All of</p>

Report Reference	Comments
	<p>the proposed turbine locations are within areas where the depth of peat was <0.4 m.</p> <p>It was recommended that the peat depths were confirmed by intrusive ground investigation. A Phase 2 peat survey was recommended following the design freeze of the proposed wind farm layout and will be undertaken prior to submission of the application for development consent to inform the Final ES.</p> <p>The peat probing report is included as Annex C.</p>

3. Preliminary environmental risk assessment

3.1 Conceptual Model

The Site has a relatively simple ground model comprising shallow soil/peat and local superficial deposits comprising Glacial Till overlying bedrock at shallow depth, which is classed as a Secondary A aquifer. The peat is not considered to be sufficiently thick to be a significant constraint to development of the wind farm.

Mining has taken place beneath the Site and in the wider area. Localised shallow mining is documented beneath the western site area which includes the access track. Additional mining beneath the northern and south eastern areas of the Site is suspected to have taken place based on visual evidence from aerial imagery. A number of seams are noted to outcrop beneath Site, although there is significant variation in the seam nomenclature/stratigraphy between the published BGS mapping and the information provided by the Coal Authority. Groundwater quality on the site and in the surrounding area is likely to be impacted by the historical mining and landfilling activities.

A number of small watercourses flow from the plateau either to Afon Rhondda Fawr or Nant Muchudd.

No significant potential sources of contamination have been identified on the Site. Limited potential sources include former and current farm areas and localised spoil associated with mining; these are likely to be sporadic in occurrence and localised or diffuse in nature.

No offsite sources of potential contamination with potential to significantly affect the land quality on the Site have been identified. This is based on the Site being at a higher elevation than the identified sources (including offsite farm buildings) which reduces the likelihood of onsite migration. Offsite sources are therefore not considered further in the risk assessment.

3.2 Potential contamination sources

A review of the site history and environmental setting has identified limited potential contaminant sources on the Site and in the surrounding area, as summarised below in **Table 3.1**. The list of contaminants has been established through a review of Annexe 3 in the Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66: 2008 Volume 2.

The main potential source is diffuse impact associated with agricultural land use. Farm operations are a potential source of ground and groundwater contamination arising from the use of pesticides, sheep dip, agricultural chemicals, and fuels.

Former mine workings are a potential source of toxic and explosive gas. The Coal Authority Report notes no recorded mine gas from the vicinity of the Site. Whilst the turbines are not associated with significant enclosed spaces, it has been considered for the proposed built environment, particularly the substation building and for construction working in excavations. Proximity to mine entries would increase this potential risk.

Mining features including suspected mine waste (spoil) disposal areas are shown on Figure 11A.3. Potential agricultural sources are not shown on this figure as no specific locations for these have been identified through the desk based review or the site walkover.

Table 3.1 Current and historical contamination sources

No	Source	Likely Contaminants	Location	Source to be considered further
1	Residual mine waste - localised	Metals	Localised across Site	Yes
2	Historical farm operations, predominantly around buildings	Hydrocarbons (fuels and oils), pesticides, agricultural chemicals, sheep dip	Current and former farm buildings	Yes
3	Mine Gas	Carbon dioxide, methane	Coal seams and mine entries across Site	Yes

3.3 Potential receptors and exposure pathways

The potential receptors and associated pathways that have been identified are shown in **Table 3.2**.

Table 3.2 Pathways and receptors

Receptors	Potential Pathways
Current site users – site workers (agricultural workers, operatives/maintenance workers), public open space users	Dermal contact, ingestion (including of contaminated potable water), inhalation of dusts, vapours, fibres and accumulates gases
Future site users – site workers (agricultural workers, operatives/maintenance workers), public open space users	Dermal contact, ingestion (including of contaminated potable water), inhalation of dusts, vapours, fibres and accumulates gases
Current buildings and services	Direct contact, ingress, and accumulation of gases
Future buildings and services*	Direct contact, ingress and accumulation of gases
Controlled water; Surface water – Nant Muchudd, Afon Rhondda Fawr**	Surface water runoff, baseflow migration
Controlled water: Groundwater – Secondary A aquifer (Coal Measures), Secondary (undifferentiated) aquifer (Glacial Till)**	Leaching, groundwater migration

*The risk assessment assumes that there will be no mains water supply to the Proposed Development and that if temporary water supply is provided to cabins during construction that this will not be via underground pipes.

**The risks to current and future controlled waters are not likely to change due to the Proposed Development and the risk assessment for these receptors therefore reflects the current and future scenario post development.

3.4 Exclusion from risk assessment

Redevelopment/construction workers

The conceptual model does not consider risks to construction/ site maintenance workers on the basis that risks to workers will be dealt with under the Health and Safety at Work Act (1974) and regulations made under the Act. Site-specific contamination data obtained from all site investigations should be included in the pre-construction information (requirement of Construction Design and management Regulations 2015) for the proposed works, to enable any contractors to address potential risk from contamination as necessary in their risk assessments and method statements. Moreover, as the exact details of the method adopted are not currently known, it is not considered appropriate to provide a wide ranging and speculative risk assessment for redevelopment workers.

Invasive species

Invasive species (such as Japanese knot weed and giant hogweed) are not considered within the risk assessment for ground contamination.

Unexploded ordnance (UXO)

A UXO assessment has not been carried out as part of this study.

Aggressive ground conditions

Constraints including sulphate and ammonia attack of concrete are considered in the geohazards section.

3.5 Preliminary environmental risk assessment

For land contamination risk to be realised, a 'contaminant linkage' must exist. A contaminant linkage requires the presence of a:

- source of contamination;
- receptor capable of being harmed; and
- pathway capable of exposing a receptor to the contaminant.

A preliminary risk assessment has been undertaken for these potential contaminant linkages to identify potentially unacceptable risks on a qualitative basis. Risk is therefore based on a consideration of both:

- the likelihood of an event (probability – takes into account both the presence of the hazard and receptor and the integrity of the pathway); and
- the severity of the potential consequence (takes into account both the potential severity of the hazard and the sensitivity of the receptor).

Further information on the risk assessment methodology used is given in Annex D. The method of dealing with identified risks and the level of significance of those risks will be a function of site use. The risk assessment is based on the future proposed land use and assumes no control measures to manage the risk (e.g., source removal or capping) have been incorporated in the development.

Table 3.3 Preliminary Risk Assessment

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard (severity)	Likelihood of Occurrence	Risk/Significance
1 Residual Mine Waste (localised)	Metals, sulphates, cyanide	Current site users – site workers, public open space users	Direct contact, inhalation, ingestion	Health Hazard [Mild]	Unlikely No mine waste observed during the site walkover. If present, its extent will be localised with little likelihood of disturbance by visiting public. Site workers will adhere to standard PPE for ground conditions.	Very Low
		Future site users – site workers, public open space users	Direct contact, inhalation, ingestion	Health Hazard [Mild]	Unlikely No mine waste observed during the site walkover. If present, its extent will be localised with little likelihood of disturbance by visiting public. Site workers will adhere to standard PPE for ground conditions.	Very Low
		Future buildings and services	Direct contact	Degradation of concrete, impact on in ground services [Mild]	Unlikely Elevated sulphate may be present in mine spoil if present. Concrete will be specified according to ground conditions as described in relevant guidance.	Very low
		Controlled water – surface water	Run off, base flow	Water quality impact [Mild]	Unlikely Potential for runoff and groundwater baseflow to affect watercourses. Coal mine spoil typically exhibits low leachability. Attenuation and dilution likely.	Very Low

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard (severity)	Likelihood of Occurrence	Risk/Significance
		Controlled water – groundwater	Leaching, migration	Water quality impact [Mild]	Unlikely Aquifer is a bedrock aquifer with high vulnerability to pollution. However, water quality is poor due to mining activities throughout the catchment. Mine spoil exhibits low leachability.	Very Low
2 Agricultural operations	Hydrocarbons, pesticide, sheep dip, agricultural chemicals	Current site users – site workers, public open space users	Direct contact, inhalation, ingestion, vapour inhalation	Health Hazard [Mild]	Unlikely Any impact is likely to be highly localised/diffuse and is unlikely to be disturbed during routine site activities. No evidence of sheep dipping activities identified during the site walkover. Limited exposure potential for visitors to site. Site workers to use appropriate PPE for ground conditions encountered.	Very low
	Hydrocarbons, pesticide, sheep dip, agricultural chemicals	Future site users – site workers, public open space users	Direct contact, inhalation, ingestion, vapour inhalation	Health Hazard [Mild]	Unlikely Agricultural chemicals do not normally adversely affect building structures. There will be no water supply pipes.	Very low
	Hydrocarbons, pesticide, sheep dip, agricultural chemicals	Future buildings and services	Direct contact	Degradation of concrete, impact on in ground services [Medium]	Unlikely Agricultural chemicals do not normally adversely affect building structures.	Low
	Hydrocarbons, pesticide, sheep dip, agricultural chemicals	Controlled water – surface water	Run off, base flow	Water quality impact [Mild]	Unlikely Potential for runoff and groundwater baseflow to affect watercourses. Attenuation likely.	Very low

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard (severity)	Likelihood of Occurrence	Risk/Significance
	Hydrocarbons, pesticide, sheep dip, agricultural chemicals	Controlled water – groundwater	Leaching, migration	Water quality impact [Mild]	Unlikely Groundwater likely to be deep beneath the site. May be impacted by mining activities. Non sensitive location.	Very low
3 Mine gas	Carbon dioxide, methane	Current site users – site workers, public open space users	Inhalation	Health Hazard – toxic [Medium]	Unlikely No enclosed spaces present. No preferential pathways identified in areas of proposed infrastructure	Low
	Carbon dioxide, methane	Future site users – site workers, public open space users	Inhalation	Health Hazard – toxic/asphyxiation. Explosion/fire risk [Severe]	Low Limited confined space in proposed development and not routinely occupied. Not located close to identified mine entries	Moderate
	Methane	Future buildings and services	Migration, accumulation	Explosion, fire [Severe]	Low Limited confined space in proposed development. Not located close to identified mine entries	Moderate

4. Geohazards

A review of potential geohazards has been completed, using the information listed in Section 1. The following potential geotechnical constraints have been identified.

- reworked ground/made ground: there is limited potential for made ground to be present on Site. Mine spoil/tipped materials have been identified outside the Site boundary, and may locally encroach onto Site, but are not considered to represent a significant constraint to the Proposed Development. In addition, localised spoil may be present adjacent to suspected/documented mine entries, although no specific areas have been identified;
- mine entries: the Coal Authority data indicates one historical mine entry to be present in the south eastern area of the Site. The associated seam is considered to underlie the southern Site area, which is crossed by the Grid Connection Corridor. A large number of mine entries are noted on the lower valley slopes around the Site. Suspected mine entries have been identified in the north western site area based on aerial imagery. None of the proposed turbine locations are in the vicinity of the mapped adit or the suspected mine entries. Mine entries are not considered to represent a significant constraint as the proposed infrastructure is located outwith the zone of influence as defined by the Coal Authority, although the associated suspected workings are more of a potential constraint. Identified/suspected mine entries including areas of suspected shallow trials are shown on **Figure 11A.3**;
- historical shallow mining: Recorded shallow mining is only locally noted beneath a very small area of the western Site area, beneath the proposed access road, likely associated with the No 1 Rhondda seam based on the BGS seam outcrop (Coal Authority records these workings in No 2 Rhondda Rider seam). The Brithdir seam underlies the north eastern Site area and whilst not documented, there is some evidence of localised mining/trials in this seam; suspected mine entries or areas of shallow trials have been identified on Google Earth on the northern and north western valley slopes, and the seam extends beneath Turbine T2. It is considered unlikely that the surface workings are associated with extensive below ground workings, based on examination during the site visit. In addition, the No 1 Rhondda Rider seam underlies the majority of the site, and there is some limited evidence of ground working in the vicinity of this seam outcrop in the north western area of the Site. Based on the recorded thickness and the relative elevations of the seams and current ground levels, it is anticipated that they will have more than 10 times seam cover, however, considering the sensitivity of the proposed structures and the uncertainty regarding the seam stratigraphy and cover, further assessment of the risk associated with these mining activities by intrusive investigation is recommended prior to construction. In addition, unrecorded workings within the Brithdir seam beneath the southern end of the Grid Connection Corridor are suspected as a mine entry is recorded in this area. Areas of identified mining risk are shown on **Figure 11A.3**;
- historical deep mining: with the exception of the localised area noted above, the No 1 Rhondda seam is inferred to be the shallowest seam with recorded workings to underlie the site. These are anticipated to be at depths greater than 10 times seam cover, and so risks associated with possible unrecorded workings in this seam area considered to be low. There is considered to be sufficient cover to these seams based on a 'rule of thumb' of 10 times seam cover, to mitigate risk of crown hole migration;

- mining – Fault reactivation: Reactivation of faults by deep mining is a known feature of the South Wales coalfield. In addition, lateral spreading/valley cambering of the valley sides has taken place, which has been exacerbated by displacement arising from deep mining. No features associated with fault reactivation have been identified from the Coal Authority report (subsidence/fissures), however an area of mass movement has been identified straddling the northern site boundary. Further information is included in the Coal Mining Risk Assessment in Annex B;
- faults – faults have been recorded on Site. As noted above these may be reactivated by movement associated with mining subsidence and should be avoided when determining locations for wind farm infrastructure. The Coal Authority do not identify any High Risk Development Areas associated with faulting or fissuring on Site, however several faults are identified on published mapping. Fault locations from published BGS mapping are shown on **Figure 11A.3**;
- bedrock: bedrock is anticipated to be present at shallow depth across the Site, with a thin veneer of peat and locally superficial deposits overlying. Where the bedrock is intact, it should provide a suitable founding stratum for the identified infrastructure. It is not known whether bedrock has a weathered upper layer, which may require deepening of foundations. The presence of local drift materials in the central area of the Site may be associated with a requirement for deeper/amended foundation solutions and an assessment of peat stability in these areas of thicker peat should be carried out;
- soil chemistry: any peat is likely to be acidic and sulphate minerals may be present within the Coal Measures strata. This should be assessed to determine the requirements for in-ground concrete structures;
- slope stability: The BGS mapping records evidence of slope instability straddling the northern Site boundary, with further areas to the north on the lower valley slopes. The BGS memoir notes landslips are common in the valleys, and particularly affect the lowest major sandstone above the level of the valley fill. Memoirs for adjacent areas note that most of the movement took place on periglacial conditions during deglaciation, when the support of valley glaciers was removed. It is noted that mass movement does continue, and instability of valley slopes can still present engineering problems. Sheet 248 Memoir indicates that several types of slip can be recognised, although individual slips can combine elements characteristic of the different slip types:
 - ▶ rotational slip: ‘classic’ landslide formed by rotational movement around a curved shear surface. Morphology is a terraced hill slope upon which discrete masses show dips inwards to the back scar;
 - ▶ rock tumbles: this is described as the most common type of landslide. Characterised by the outward fall of well jointed masses of sandstone from near vertical scarps on steep valley sides. Fissures above the scarps are indicative of potential future instability;
 - ▶ bedding-plane slips: movement along bedding planes, therefore confined to dip slopes; and
 - ▶ founder slips: two cases noted. large scale foundering of an entire hill side along planes of weakness provided by minor faults, possibly modified by later movements. Considered to be generally stable during historic times, suggesting that the majority of the movement took place during and shortly after glaciation.
- in addition, such movement can result in fissuring of the scarp faces, which can be affected by mining related movement as noted above. Considering the locations of

the proposed turbine structures on the plateau, the risk from mass movement of the lower valley slopes is considered to be negligible, however this should be confirmed at detailed design stage, particularly for Turbine T2, which is located approximately 230 m from the mapped area to the north. Most of the proposed wind farm infrastructure is located on the undulating plateau, and slope stability is therefore not considered to be a significant constraint for most structures. This should be assessed where steeper gradients are present related to former mining activity or on the flank of the plateau along the Grid Connection corridor;

- historical in-ground structures: No significant historical development has been identified on site, and so residual in ground structures are not considered to represent a significant constraint to the proposed layout;
- peat: potential for landslide/instability. The average peat depth was 0.13 m and only extended to in excess 0.4 m in nine locations; all of the turbine locations were in areas where the peat thickness was less than 0.4 m. Slope gradients are generally greater than 2°, however, considering the thin nature or absence of peat it is not considered to be significant constraint. It is recommended that the peat thickness at the proposed turbine locations is proven by intrusive investigation; and
- existing utilities: an overhead electricity transmission line crosses the Wind Farm site; this will be associated with an easement. Utilities information has not been obtained as part of this study.

5. Conclusions and recommendations

5.1 Conclusions

Contamination

The Site is primarily used for agriculture, mainly sheep grazing. Minor contamination sources have been identified as residual mine waste / spoil (considered to be limited in extent) and current and former agricultural activities, which can present a potential sporadic and localised and / or diffuse source of contamination. The mining history of the site also means that there is potential for mine gas to be present.

The risks to human health from potential contaminants in soils arising from mining waste and agricultural operations are assessed to be very low. In relation to potential metal contamination in mine waste, there is no evidence of vegetation dieback at surface that could indicate large areas of near surface contamination by metals. Future site users, including agricultural workers, wind farm workers and open space users, are unlikely to disturb contaminated soil during normal site usage.

The risk to human health in relation to future site users associated with mine gas is moderate. There are no enclosed spaces on the site currently and the risk to current site users is therefore low, however the Proposed Development will introduce limited enclosed spaces where gas could accumulate. These will be used infrequently, however, the risk level reflects the severity of consequence of a contaminant linkage being realised. The risk can be lowered through further investigation including gas monitoring.

The risks to groundwater from the identified sources are assessed to be very low given the nature of the sources and the likelihood that groundwater in the bedrock aquifer is likely to be at depth and likely to have been impacted by historical mining activities in the wider area.

Risks to surface water are also assessed to be very low, as surface water receptors are either not located near potential sources, or the source, if present, is likely to be of limited extent and unlikely to result in significant degradation of water quality.

As previously discussed, the conceptual model does not consider risks to construction /site maintenance workers on the basis that risks to workers will be dealt with under the Health and Safety at Work Act (1974) and regulations made under the Act. Site-specific contamination data obtained through subsequent assessments of the site should be included in the health and safety file for the proposed works, to enable any contractors to address as necessary in their risk assessments and method statements.

Geotechnical

A review of geohazards has identified a number of potential constraints. These principally relate to former and/or suspected underground coal mining activities. Potential shallow mining related risk has been identified in the following Site areas: northern (unrecorded), southern (unrecorded) and western (recorded – note conflict re. site name). Other constraints include valley side instability, possible weathering of shallow bedrock and the presence of acidic soils either due to the presence of peat (thin surface layer has been confirmed on parts of the site) or sulphate minerals associated with the Coal Measures strata/colliery wastes.

These constraints will require further assessment as part of the detailed design process prior to construction of the Proposed Development, and it is recommended that intrusive ground investigation is undertaken to inform this assessment.

5.2 Recommendations

The desk-based assessment has identified some potential contamination constraints associated with the proposed future wind farm use of the site. No ground investigation data is currently available.

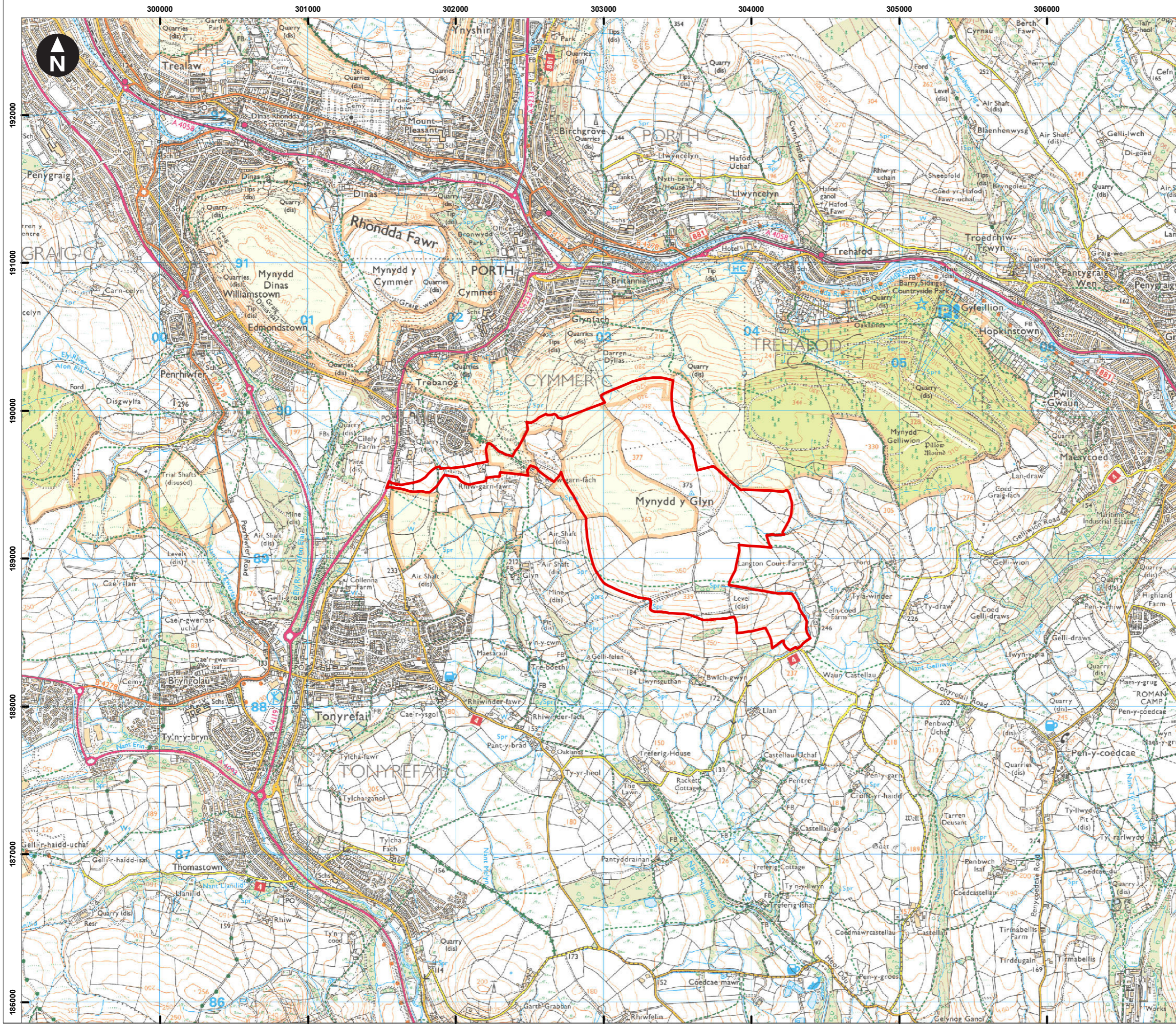
The potential land contamination constraints can be mitigated through targeted ground investigation to include gas monitoring where buildings / enclosed spaces are to be constructed. The investigation could also be used to confirm the presence/absence of contamination in shallow soils (e.g., by metals and hydrocarbons), in areas where development is proposed, method statements including procedures for encountering unexpected contamination, Environmental Management Plans, and health and safety plans for the works. The findings of these investigations and soil testing should inform the detailed design of the Proposed Development and the design of any required remedial measures. It is recommended that this report and all previous reports be thoroughly consulted and incorporated where required into the package of information for the Site for any ground works.

Regarding the identified potential geohazards, it is recommended that liaison with the Coal Authority is undertaken to clarify the seam stratigraphy and layout beneath the site and any associated hazards re-assessed. Abandonment Plans for the recorded workings in the No 2 Rhondda Rider seam and also for the shallow spine roads should be obtained. A Surface Hazards Incident Report should be obtained for the remedial works identified in the CCMR. The additional data would inform the design of any intrusive ground investigation.

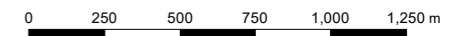
A programme of intrusive investigation works with associated testing and monitoring for gas and groundwater should be undertaken at the proposed turbine and substation locations, and where with mine related features occur beneath access/internal roads.

Figures

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Key
 Site boundary



Scale at A3: 1:25,000

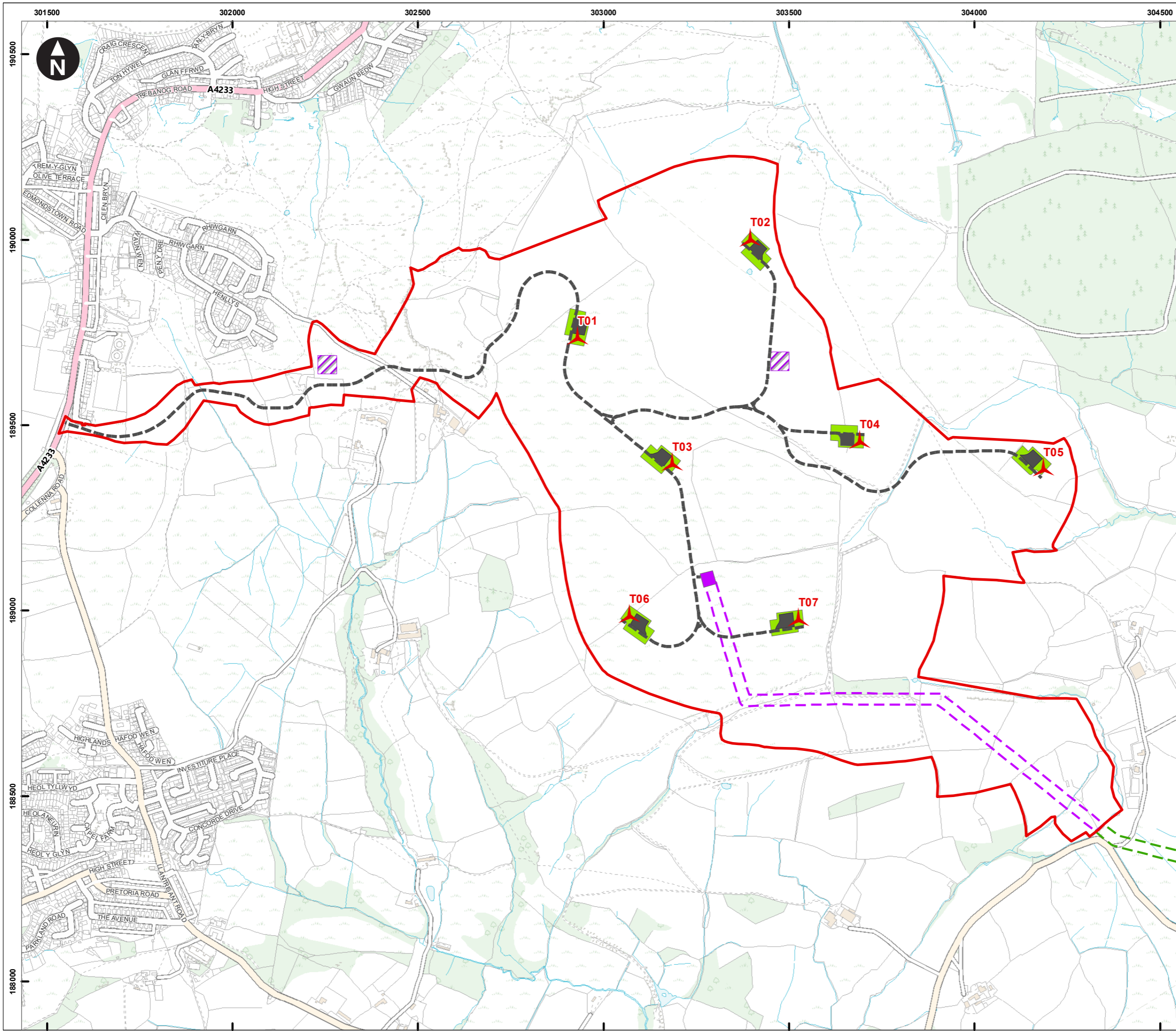
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Mynydd y Glyn Wind Farm
Phase 1 Geoenvironmental Risk Assessment

Figure 11A.1
Site location



October 2022



Key

- Site boundary
- ▲ Proposed turbine location
- Access track
- Construction compound
- Electrical substation
- Proposed grid connection overhead line
- Proposed grid connection underground line
- Crane pad
- Storage area

0 100 200 300 400 500 600 m

Scale at A3: 1:10,000
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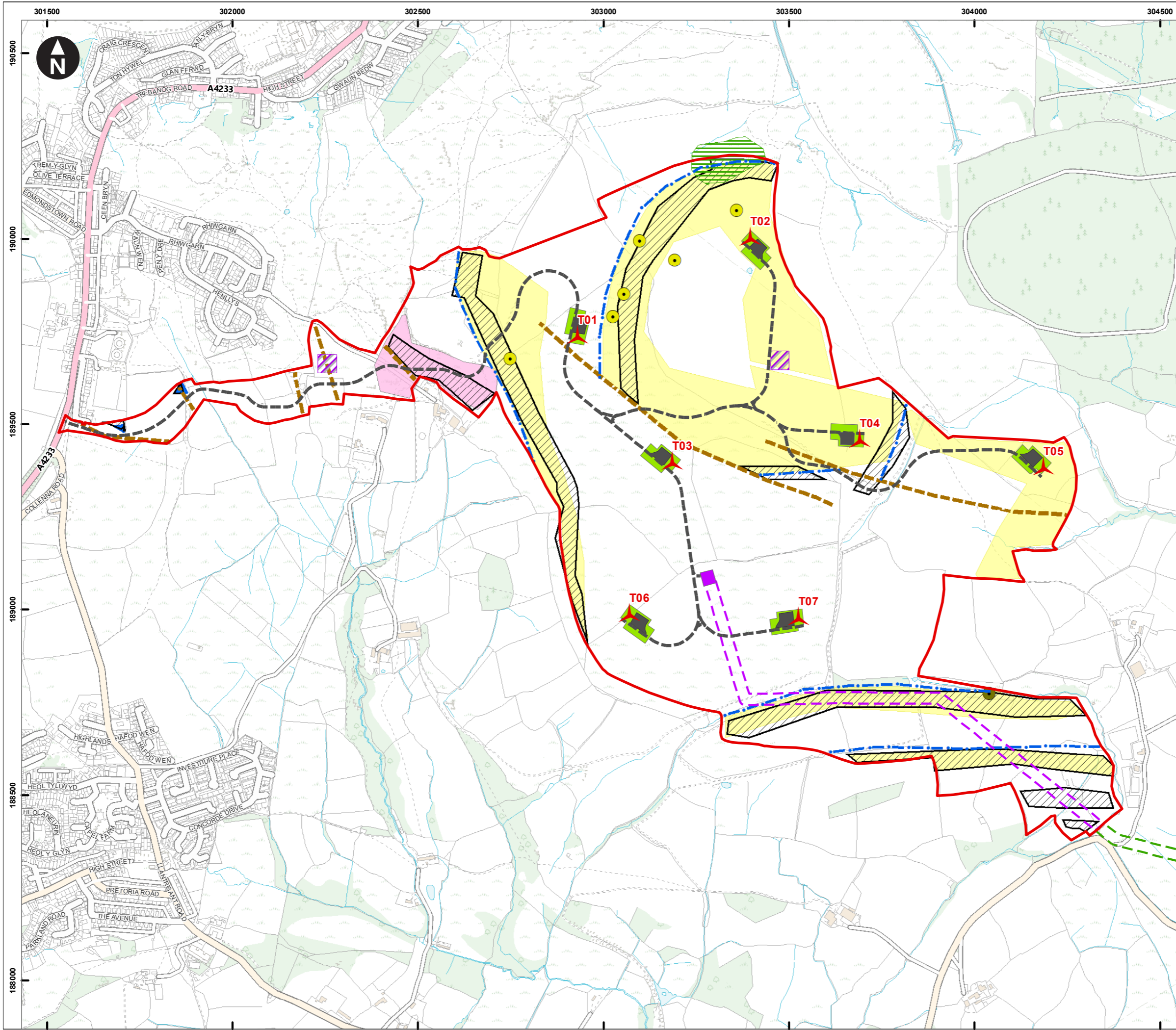
**Pennant Walters
Mynydd y Glyn Wind Farm
Phase 1 Geoenvironmental Risk Assessment**

**Figure 11A.2
Site layout**

October 2022



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Key

- Site boundary
- ▲ Proposed turbine location
- Access track
- Construction compound
- Electrical substation
- Proposed grid connection overhead line
- Proposed grid connection underground line
- Crane pad
- Storage area
- Fault
- Seam
- Coal Authority development high risk area
- Mass movement
- Mine entry
- Suspected mine entry
- Recorded shallow workings
- Suspected shallow coal seam
- Suspected spoil area from OS maps

0 100 200 300 400 500 600 m

Scale at A3: 1:10,000
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**Pennant Walters
Mynydd y Glyn Wind Farm
Phase 1 Geoenvironmental Risk Assessment**

**Figure 11A.3
Potential geohazards**

Annex A

Envirocheck Report - due to file size, to be provided on request

Annex B

Coal Mining Risk Assessment



Pennant Walters

Mynydd Glyn Wind Farm

Draft Environmental Statement

Appendix 11A: Phase 1 Geoenvironmental Desk Study
Annex B - Coal Mining Risk Assessment



This report was prepared by WSP Environment & Infrastructure Solutions UK Limited (formerly known as Wood Environment & Infrastructure Solutions UK Limited), company registration number 02190074, which is carrying out these services as a subcontractor and/or agent to Wood Group UK Limited

October 2022

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Document revisions

No.	Details	Date
1	Draft	Oct 2022
2	Final Report	October 2022

Executive summary

Purpose of this report

This Coal Mining Risk Assessment (CMRA) has been produced for the purpose of assessing the risks associated with historical coal mining at the site of a proposed wind farm development at Mynydd y Glyn, as well as the recommended mitigating actions. The report has been produced to accompany an application for planning consent for the development. The Proposed Development comprises up to seven turbines, with associated infrastructure and a link to the transmission grid. The CMRA has been prepared using publicly available information provided by the Coal Authority (CA) and other third parties.

This report forms an appendix to the Phase 1 Geoenvironmental Desk Study Report prepared by Wood in October 2022¹, which should be read in conjunction with this report.

Background

The Proposed Development is on an undulating plateau with steep valley sides to the margins between Porth and Pontypridd, South Wales. A proposed access road extends off the plateau to the west.

Bedrock has been identified at shallow depth across the site, comprising Coal Measures strata, with thin intermittent cover of peaty soil and local superficial materials. Historical development on the site has been limited, with the predominant land use being agricultural. Areas of forestry are present on the valley slopes.

Historical recorded mining activity has been identified beneath and in the vicinity of the Site, including localised shallow and historical disposal of colliery spoil on the valley sides around the flanks of the Site. Suspected historical mining beneath the Site at shallower depth has also been identified. The Site is undermined at depth as a result of historical activities of collieries in the surrounding valleys, and areas of potential mining risk have been identified.

Mining Hazards

The report has identified a number of mining hazards on the site, as follows:

- known abandoned mineworkings at depth;
- possible shallow unrecorded workings;
- shallow spine roads;
- historical remedial works;
- geological faulting;
- unstable ground; and
- potentially untreated historical mine entries (adits).

¹ Wood (2022) Mynydd y Glyn Wind Farm, Phase 1 Geoenvironmental Desk Study (Ref. 42864-WOOD-XX-XX-RP-OC-0003_S0_P01.1), October 2022.

Each of the hazards above may pose a potential risk to the Proposed Development, depending on the Site layout, the principal risks being subsidence risk and unsuitable foundation conditions in specific areas.

The mitigation proposed is to carry out intrusive ground investigation to gather more information on the hazards and to ascertain whether further mitigation (such as mineworkings consolidation, relocation of structures or alternative foundation solutions) is required.

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Appendix A	Drawings
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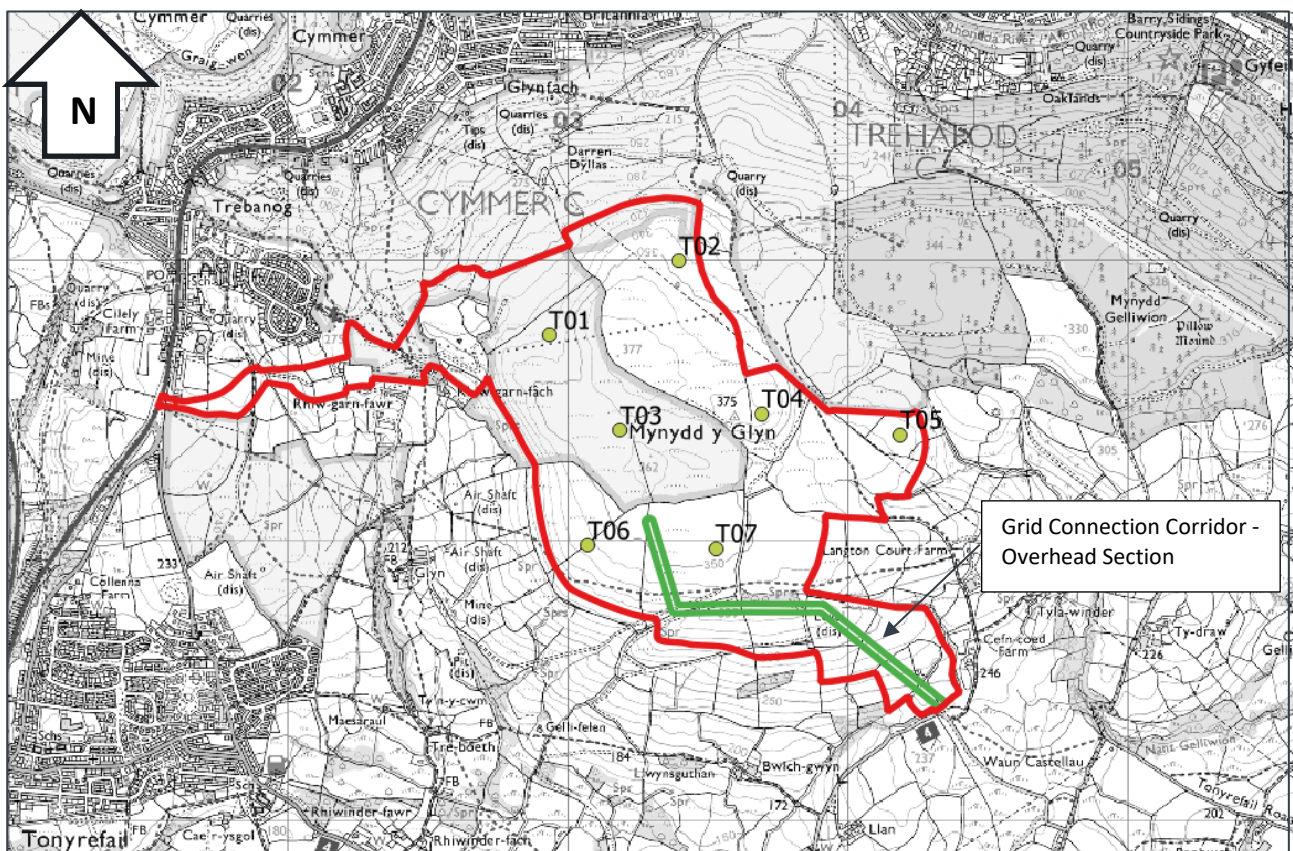
1. Introduction

1.1 Background

Pennant Walters is seeking permission to develop a wind farm on Mynydd y Glyn. The Site is currently predominantly a mix of semi-improved and improved grassland.

The location and layout of the Site is shown on **Figure 1** below, together with the proposed turbine locations and grid connection corridor within the Site.

Figure 1: Site Layout



A Scoping Report for the site (Reference 42864-WOOD-XX-XX-RP-O-0001_A-C01), prepared by Wood² identified that the Site has a history of coal mining. It is therefore necessary to prepare a detailed Coal Mining Risk Assessment (CMRA) to support an Environmental Statement (ES) prepared by Wood to accompany the planning application for the wind farm development.

In line with BS EN 1997:1³, it is anticipated that the proposed wind turbine generators and foundations are Category 3 structures, due to their large size and loading conditions which incorporates dynamic loading and lateral loads with high overturning forces.

² Now WSP Environment and Infrastructure Solutions UK Ltd

³ BSI (2004): BS EN 1997-1: Eurocode 7: Geotechnical design – Part 1: General rules

The CMRA is to be prepared in accordance with Coal Authority (CA) guidance⁴ with reference to CIRIA's abandoned mine workings manual⁵.

1.2 Site Location

The Site of the Proposed Development is situated on an upland plateau in the Rhondda valley, approximately 600 m south of the village of Porth. The Site is within Rhondda Cynon Taf County Borough Council's (RCTCBC) administrative boundary. The Grid Reference for the approximate centre of the Site is 303510 189280. The Site is currently accessed via a gated track from the north west.

1.3 Site Description

The Site is located on the summit and upper slopes of a steep sided hill, Mynydd y Glyn, and covers an area of approximately 182 ha. The elevation of the Proposed Development is generally in excess of approximately 300 m AOD. Two summits are present in the central part of the Site at 377 m AOD in the north west and 375 m AOD in the south east. The area which includes both summits is relatively flat, descending more steeply on the flanks below 350 m AOD. It predominantly comprises a mix of semi-improved and improved grassland with a small area of woodland towards the southern boundary. Field boundaries are generally indistinct, with isolated lengths of stone wall present. Several public rights of way cross the Site, together with an overhead electricity transmission line.

The Site is bounded on all sides by open ground, with local areas of forestry on the valley slopes. The area of the Site which includes the proposed access road crosses predominantly agricultural land and a scarp which defines an area of former quarry activity.

1.4 Proposed Development

It is proposed to construct and operate a wind farm comprising the following:

- up to seven wind turbines;
- a sub-station and associated cabling;
- a temporary construction compound and site office;
- crane pads;
- access track; and
- grid Connection Corridor – combination of an overhead section within the Site boundary and underground section outside the Site boundary to the east (the underground section is not considered as part of this assessment, however a high level assessment of this section of the corridor is included in **Chapter 11** of the Draft ES).

The proposed layout of the wind farm is included in **Figure 1**.

It is envisaged that the Site will have an operational life of 30 years, although this could potentially be extended (which would be subject to a new planning application).

⁴ <https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments>

⁵ Parry D.N, Chiverell C.P (2019): CIRIA C785D Abandoned Mine Workings Manual

At this stage, it is envisaged that wind turbine foundations would bear directly onto rock, where rockhead is suitably shallow, subject to the presence of any shallow weathered zone and other ground related constraints such as filled/restored ground.

1.5 Sources of Information

The following sources of information have been consulted in the preparation of the CMRA:

- Wood (2022) Mynydd y Glyn Wind Farm, Phase 1 Geoenvironmental Desk Study (Ref. 42864-WOOD-XX-XX-RP-OG-0003_S0_P01.1);
- British Geological Survey (BGS) GeoIndex online mapping, including online geological maps and historical borehole logs <https://mapapps2.bgs.ac.uk/geoindex/home.html> (accessed in October 2022) and associated WMS data;
- BGS Sheet 248, Pontypridd, Solid edition, 1:63 360 scale, 1963, Drift edition, 1:50 000 scale, 1975;
- BGS Geology of the South Wales Coalfield, Part 6, The country around Pontypridd, Explanation of One-inch Geological Sheet 248, Third Edition, 1964;
- British Geological Survey Geology of the South Wales Coalfield, Part II, the country around Abergavenny, Memoir for 1:50 000 geological sheet 232, Third Edition, 1989;
- CIRIA C758D (2019): Abandoned Mine Workings Manual;
- Coal Authority Interactive Map Viewer <https://mapapps2.bgs.ac.uk/coalauthority/home.html> (accessed in October 2021) and associated WMS data;
- Consultants Coal Mining Report (CCMR), Mynydd Y Glyn, Rhondda Cynon Taf, The Coal Authority, Report Ref. 51002644897001, dated 03rd September 2021 - Wind Farm site (presented in **Appendix B**);
- Consultants Coal Mining Report (CCMR), Mynydd y Glyn North, Rhondda Cynon Taf, The Coal Authority, Report Ref. 51003317546001, dated 11th October 2022 – access road (presented in **Appendix B**);
- Consultants Coal Mining Report (CCMR) Mynydd y Glyn South, Rhondda Cynon Taf, The Coal Authority, Report Ref. 51003317529001, dated 11th October 2022 – additional area south east Wind Farm site (presented in **Appendix B**);
- Landmark, Envirocheck Report No. 26008076, dated 31st August 2021 – Wind Farm Site area (Presented as Annex A to the Wood 2022 Phase 1 Geoenvironmental Desk Study);
- Landmark Envirocheck Report No 852604, 03rd October 2022 – access road (Presented as Annex A to the Wood 2022 Phase 1 Geoenvironmental Desk Study); and
- Wood, September 2021, Mynydd y Glyn Wind Farm, Environmental Impact Assessment Scoping Report (Ref. 42864-WOOD-XX-XX-RP-O-0001_A_C01).

As listed above, two additional Consultants Coal Mining Reports were obtained: one which covers the south eastern areas of the Site and the other which covers the area which includes the access road.

1.6 Limitations

The conclusions reached and advice provided in this report are based in part upon information and/or documents that have been prepared by third parties. In view of this, we accept no responsibility or liability of any kind in relation to such third-party information and no representation, warranty or undertaking of any kind, express or implied, is made with respect to the completeness, accuracy or adequacy of such third-party information. In preparing this report we have assumed that all information provided is complete, accurate and not misleading.

2. Geological Information

2.1 Introduction

It is noted that there is discrepancy between the seam names and seam layout adopted by the BGS and the Coal Authority. The BGS nomenclature and layout has been used in this report except where its information is quoted from the CCMR where the Coal Authority nomenclature is used for consistency with the information provided.

2.2 Geological Mapping

The BGS geological mapping indicates that superficial deposits are largely thin or absent beneath the Site. Four areas of Peat of Quaternary Age are shown, one of which is shown to be in close proximity to Turbine T1. Glacial Till (diamicton) is shown to be present on the valley sides on the flanks of the plateau, locally encroaching into the south eastern area of the Site at the end of the Grid Connection Corridor.

Bedrock is shown to comprise Upper Coal Measures strata of Carboniferous Age. These predominantly comprise sandstone units of the Rhondda Member, with the Brithdir Member shown to outcrop on the higher ground of the site and in the southern area. Subsidiary units of mudstone, siltstone and sandstone of the Rhondda Member are also present as thin layers within the predominantly sandstone sequence. The distribution of the strata units is controlled by a combination of topography and geological structure as described below.

The Rhondda Member is described as comprising green-grey lithic arenites (Pennant sandstones), with thin mudstone/siltstone and seatearth interbeds and mainly thin coals. It extends from the base of the No 2 Rhondda coal seam to the base of the Brithdir coal seam. It is noted to be up to 320 m thick.

The Brithdir Member is described as comprising green-grey lithic arenites (Pennant sandstones), with conglomerate lenses at bases of units and thin mudstone/siltstone and seatearth interbeds and mainly thin coals. It extends from the base of the Brithdir coal seam to the Cefn Glas coal seam above.

The bedrock strata beneath the northern half of the site are shown to be sub horizontal with a dip northwards at relatively shallow angles of 8° to 10°; strata beneath the southern half are shown to dip southwards at much steeper angles at 35° to 50°. The dip of the strata in the vicinity of the Site are a result of folding associated with the Pontypridd Anticline, the axis of which passes through the Site in an east-west orientation. Thus the outcrop of the Brithdir Member beneath the northern area of the site is related to the topography, being present above approximately 320 m OD, whilst in the south, the outcrop is a result of the steep dip of the strata, compared with the shallower valley slope.

An area of landslip is shown straddling the northern boundary of the Site, to the north of Turbine T2. Additional larger landslip areas are shown on the lower valley side to the north of the Site. An area of spoil is shown on the base map immediately to the north east of the Site.

Several coal seam outcrops are shown beneath the Site area, with the outcrop pattern defined by the topography, amended by faulting. The Brithdir Rider seam is the shallowest named seam beneath the site and is shown to outcrop in the southern area, where it is interpreted to underlie the Site adjacent to the southern boundary. The BGS Memoir for Sheet 248 notes that the Brithdir Rider and its associated sandstone also forms the topographic high of Mynydd-y-Glyn, which is assumed to be the peak to the east of the Site where mapping shows it to outcrop. The memoir

indicates that the Brithdir Rider is a thin seam and has only been worked sporadically and never on a commercial scale. The underlying Brithdir seam is shown to outcrop in the southern area where it underlies the Brithdir Rider seam and also in the northern and central areas around the summits of Mynydd y Glyn. The BGS memoir indicates that the Brithdir seam is approximately 0.6 m to 0.7 m thick but to be a degraded poor quality coal in this area and only locally worked in a few trials. The Brithdir and Brithdir Rider seams are approximately 45 m to 60 m apart vertically with predominantly sandstone between.

The No 1 Rhondda Rider seam outcrops beneath the western valley side of the Site and on the valley sides to the north outside the Site boundary. The stratigraphic sequence on Sheet 248 indicates an intermittent thin coal between the No 1 Rhondda Rider and the Brithdir seam. The No 1 Rhondda Rider is the first seam to underlie all of the proposed turbine locations and also underlies the central section of the Site which contains the access road. It is underlain by the No 1 Rhondda seam, which outcrops beneath the western area of the Site and also the western section of the access road. Approximately 40 m to 50 m of strata are present between the No 1 Rhondda and the overlying No 1 Rhondda Rider, predominantly sandstone. The No 2 Rhondda seam underlies the No 1 Rhondda and outcrops lower on the valley slopes/floor to the west and north and underlies the entire Site at greater depth.

The variations in strata dip noted above are reflected in the pattern of outcrops of the mapped coal seams. In the northern half of the Site, the Brithdir seam outcrop broadly follows the topography around the summit of Mynydd y Glyn, shown to outcrop between 320 m and 340 m OD, with the variation a result of the northward dip in this area. The valley slope which forms the northern boundary of the Site is terraced in nature, and the Brithdir outcrop consistent with the base of a terraced section; it is apparent that the terracing is controlled by bedding in the sub-horizontal sandstone units in this area. The southern flank of the Site does not display the same terraced topography, as the dip of the strata on the southern limb of the anticline is steeper than the topographical slope and the coal seam outcrops are generally not influenced by the topography. A schematic section is shown in **Figure 2.1** in **Appendix A**.

The BGS memoir for Sheet 248 indicates that the No 1 Rhondda is closely overlain by a thin coal on the valley slopes to the west of the Site. The No 1 Rhondda Rider is noted to have extensive outcrops around the flanks of Mynydd y Glyn and is overlain by one of the principal sandstones of the Pennant, which is approximately 30 m to 40 m thick in this area. The memoir indicates that the No 2 Rhondda is the most important coal of the group and was worked extensively in the Southern Rhondda area.

There is variation between the seam outcrops beneath the site between the published BGS geological mapping and the Coal Authority reports; this is discussed further in Section 4.4.

Several faults are shown crossing the Site and in the vicinity. The predominant orientation is broadly north west to south east and they are consistent with linear features shown on Google Earth imagery.

Google Earth imagery from 2021 clearly shows the terracing around the north and north western margins of the Site. Comparison with the geological data suggests that this is associated with the Brithdir seam and the overlying sandstone unit, although the imagery and the mapping do not correlate exactly. A secondary slope above the main slope is shown in the northern area of the Site. Small holes, possibly associated with mineworkings/trials are apparent along this alignment in the northern and north western area; there is no indication that they have changed over time between 2000 and 2022 and they are not apparent on the 1945 imagery. Comparison with the topographical mapping indicates that these features are between approximately 340 m and 360 m OD. The features were examined during a Site visit in October 2022 and appeared to comprise shallow excavations.

2.3 Historical Boreholes

Historical borehole records are available within the site according to the BGS GeoIndex database. The details are summarised below:

- ST08NW14: Cymmer Colliery No 16 BH – underground borehole from the Lower Five Feet to prove Upper Five Feet coal seam. Borehole commenced at 229 m bgl;
- ST08NW15: Cymmer Colliery No 17 BH - underground borehole from the Lower Five Feet to prove Upper Five Feet coal seam. Borehole commenced at 212 m bgl;
- ST08NW16: Cymmer Colliery No 18 BH - underground borehole from the Lower Five Feet to prove Upper Five Feet coal seam. Borehole commenced at 213 m bgl; and
- ST08NW/87 and 88 – shallow boreholes (BH56 and BH56A) from 1980. Encountered firm to stiff CLAY (Glacial Till) to a depth of 0.2 m to 0.4 m bgl overlying bedrock which comprised very strong SANDSTONE.

The underground boreholes are not relevant to this study.

2.4 Previous Ground Investigations and Studies

No previous ground investigation information has been identified for the Site. The CCMR for the access road notes site investigation located approximately 10 m to the north east; no additional information is included.

3. Site History

A summary of the historical development of the Site, based on historical OS maps, is presented in Table 3.1 below. The historical maps can be found within the Envirocheck Report, appended to the Phase 1 Geoenvironmental report.

Table 3.1 Summary of Site History – Main Site South of Nant Ddu

Map Title	Description
1884/1885	The Site is shown to be open space comprising predominantly rough grassland, with several field boundaries apparent. An excavation, possibly a quarry is located outside the Site boundary to the north east. Several scarps and possible areas of spoil are shown on the western area which is crossed by the proposed access track. A spring is shown in the north eastern area of the Site. Additional springs are shown on the valley sides around the Site. Glyn Colliery is shown to have been present in the valley to the west of the Site with associated shafts and levels. The CCMR indicates that the No 2 and No 3 Rhondda seams were mined from this colliery.
1901	No significant changes within the Site. The feature to the north east is shown to be 'Old Quarries'. The scarp faces on/adjacent to the western area are identified as Quarries. Old trial levels are shown on the valley side to the north west of the Site towards Cymmer and several quarries are also present on this valley slope.
1921	A coal level is shown in the south western area of the Site in the vicinity of the Grid Connection Corridor. Additional springs or risings are shown within the Site. No other changes noted.
1947/53	No significant changes noted. A feature is shown on an aerial image from 1948 in the western site area; it is not identifiable from the imagery.
1965	Coal level in the south eastern area noted to be disused. Large area of spoil associated with quarry off site to the north east.
1971/74	No significant changes on Site. A large area of spoil is shown immediately to the east of the Site, presumably related to quarrying operations in the wider area.
1990/93	No significant changes on Site. Area of spoil no longer shown to the east.
1999/2006/2021	No significant changes on Site.

4. Coal Mining Risks

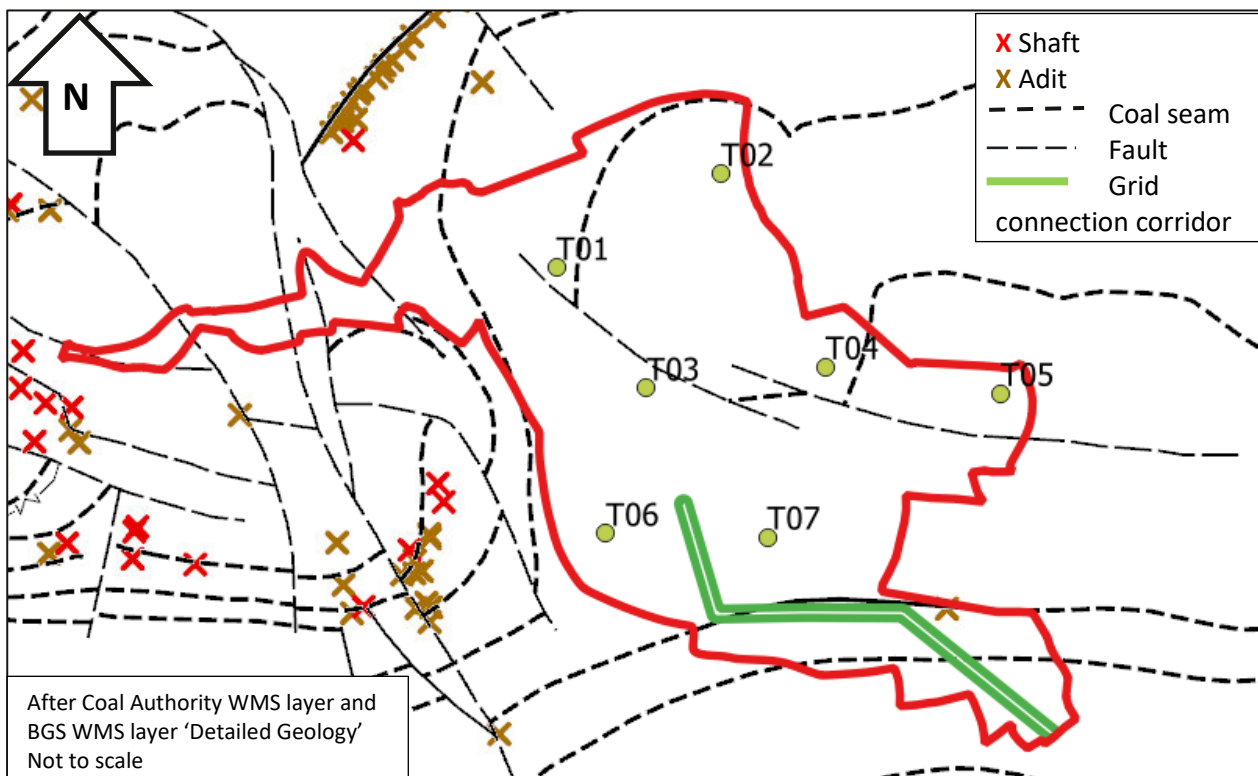
4.1 Introduction

The following section provides a summary of the identified risks to the Proposed Development from mining legacy related hazards.

4.2 Mine Entries

The Coal Authority Consultants Coal Mining Reports (CCMR) indicate that there are no recorded mine entries within 100 m of the Site boundary. One mine entry is noted in the south eastern area of the Site adjacent to the grid connection corridor, which is also shown on the Coal Authority WMS layer. The CCMR indicates that it is an adit (Reference 304188-001), the location of which is consistent with the 'level' shown on the OS maps. The WMS information indicates it to have a bearing of 187°, and not to have been treated. It is close to the outcrop of the Brithdir seam beneath the southern site area and is inferred to have worked this seam to the south; the BGS Memoir notes that this was a level which showed dirty coal and rashings (friable carbonaceous clay) associated with the seam, but gives no indication of the extent of workings. The location of the shaft with respect to the mapped seam outcrops is shown on **Figure 2**; it is also shown on the plan which accompanies the CCMR in **Appendix B**.

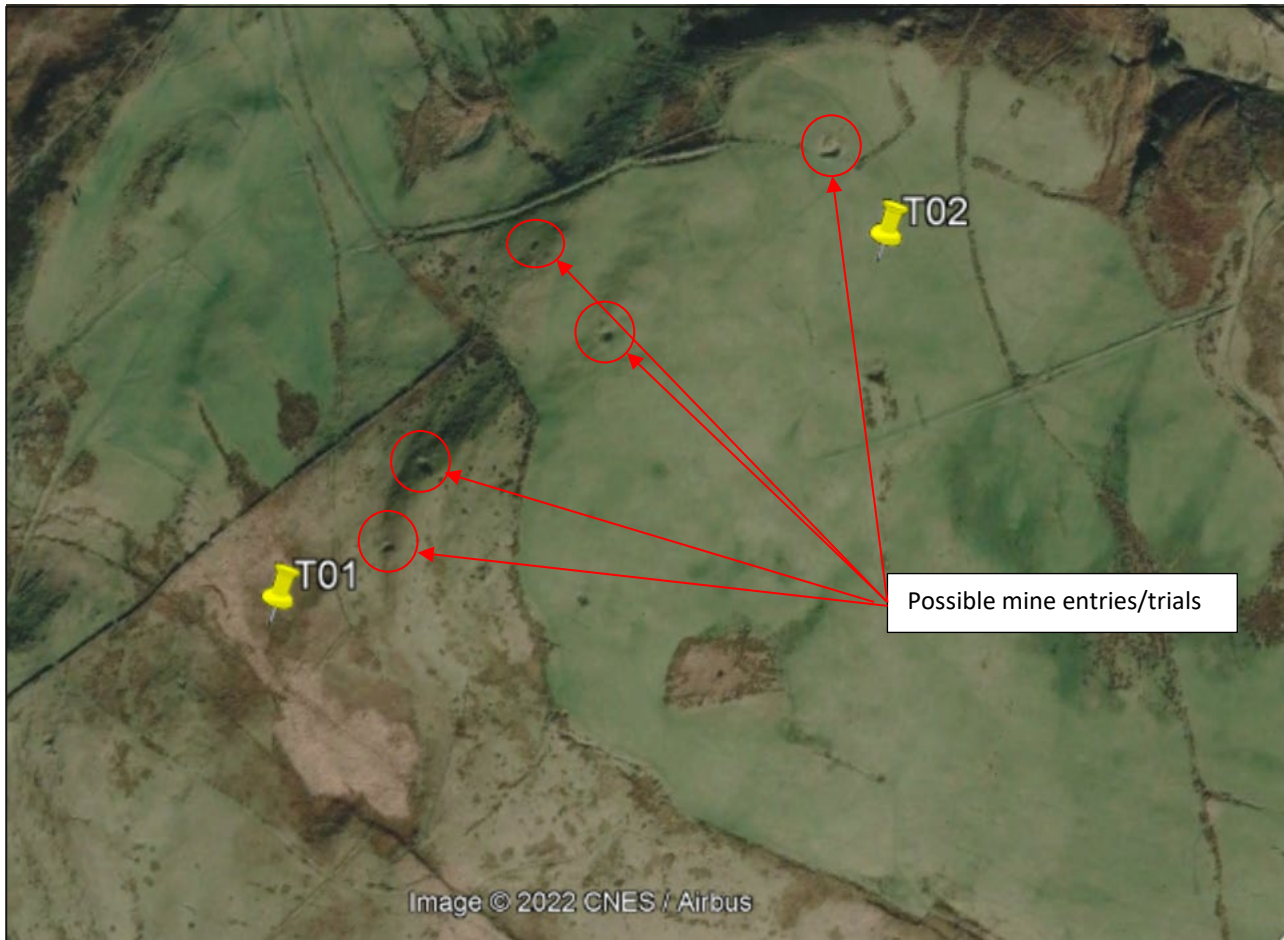
Figure 2: Recorded Mine Entries



From **Figure 2** it is apparent that the mine entries on the valley side outside the Site to the west are consistent with the outcrop of the No 2 Rhondda and to a lesser extent the No 1 Rhondda seams.

As noted above, possible trials or mine entries are identified from Google Earth historical imagery. These are broadly consistent with or above the outcrop of the Brithdir seam as shown in **Figure 3** below, which is an extract from Google Earth 2021 imagery; this date of imagery has been selected as it shows the features most clearly.

Figure 3: Google Earth Imagery 2021 Showing Location of Possible Mine Trials



4.3 Coal Workings

The CCMR indicates that underground coal mining has taken place beneath the Site in 12 seams of coal at depths of between 7 m and 778 m bgl, with the last date of working being 1986 in the 6 Foot Bottom Leaf at 681 m bgl. The shallowest recorded workings are in the No 2 Rhondda Rider, which had an extraction thickness of 105 cm, and was last recorded to have been worked in 1923. The shallowest recorded workings beneath the majority of the Site are in the No 1 Rhondda which has a minimum recorded depth of 104 m bgl and a recorded extraction thickness of 0.6 m to 0.7 m. Seam dips were generally shallow, $<10^\circ$, towards the north or north east, which is consistent with working in the norther area of the Site.

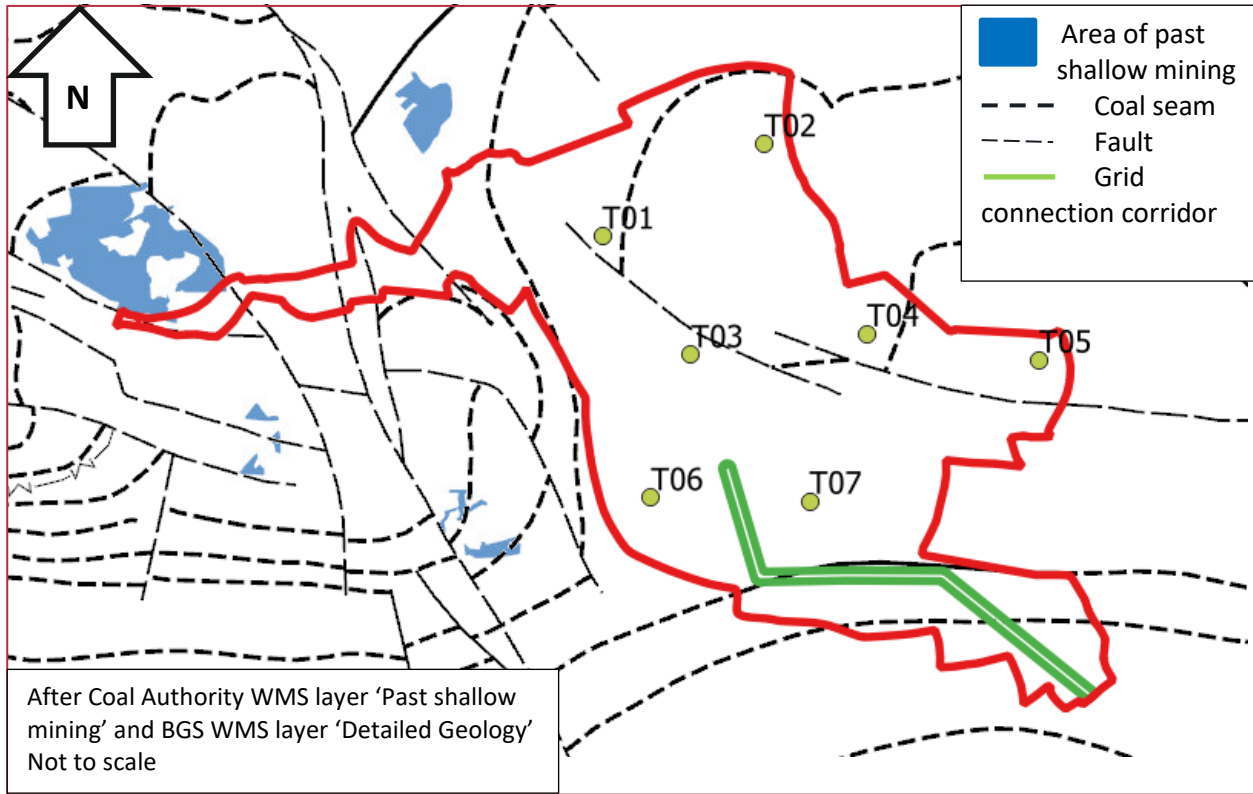
The CCMR indicates that there no probable unrecorded shallow coal workings beneath the Site.

There are no recorded opencast mines within 500 m of the Site.

The Coal Authority Interactive Viewer has been reviewed and identifies several areas of past shallow mining (defined as <30 m bgl) within and around the Site. The recorded past shallow mining encroaches very slightly into the western area, close to where the access road ties in to the A4233; in this location it is anticipated to be associated with the No 2 Rhondda Rider seam, which

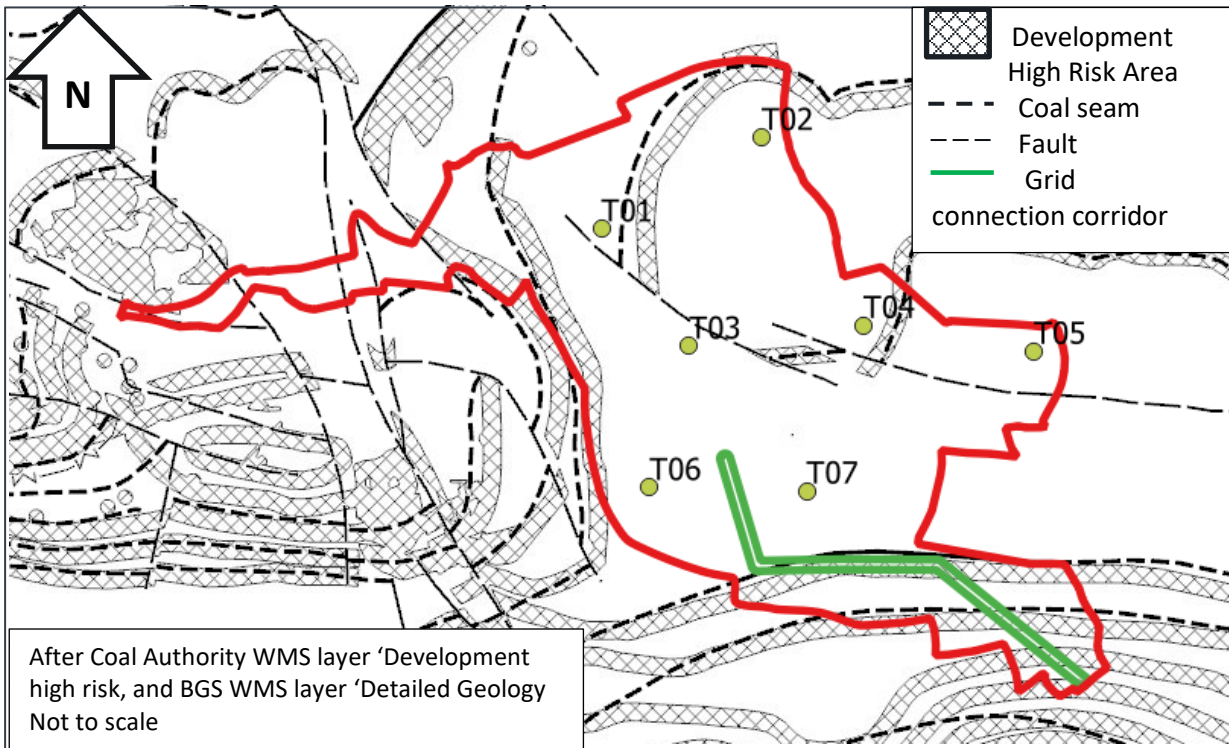
is the only seam to be recorded as having been worked at a depth less than 30 m. This is not consistent with the published BGS mapping which suggests that the No 1 Rhondda seam is the shallowest seam in this location – see discussion of seam names in Section 4.4. Areas of past shallow working are shown on **Figure 4**.

Figure 4: Past Shallow Mineworkings



Several linear areas of the Site are shown to be associated with Development High Risk Areas, which are consistent with the mapped seam outcrops beneath the Site. Two underlie the western area and five underlie the remainder of the Site: one in the north eastern area and four in the southern area including the Grid Connection Corridor. As noted in Section 4.4 below, the seam layout beneath the southern area of the Site differs between the Coal Authority and the published BGS information. Development High Risk Areas as shown on the Coal Authority WMS layer are presented as **Figure 5**.

Figure 5: Development High Risk Areas



Three spine roadways are recorded beneath the site at shallow depth in the CCMR although their locations are not shown, nor the seam they are associated with; it is assumed that they related to one of the worked seams.

4.4 Workable Coal Outcrops

The CCMRs for the different areas identify a number of coal seam outcrops within and adjacent to the Site. Whilst the overall seam pattern is similar between the BGS and the Coal Authority, there are significant variations in the seam nomenclature, which has potential stratigraphical implications and makes interpretation complex,. The seam outcrops from the two sources are summarised in **Table 4.1** and presented in **Figure 6** as screenshots from the sources.

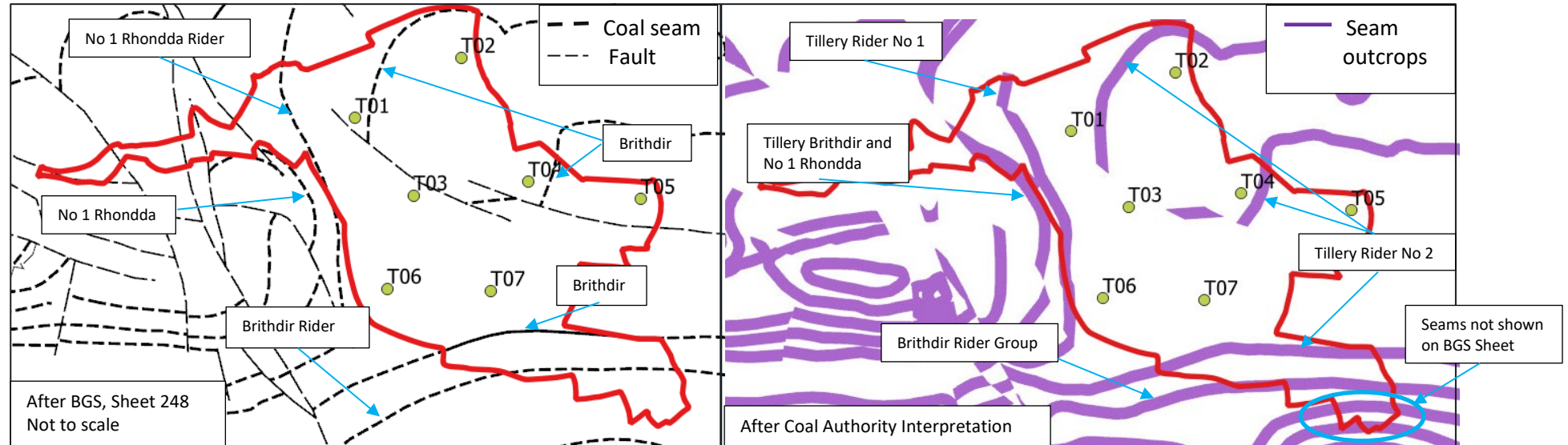
Table 4.1 Comparison of seam names

BGS Sheet 248	Coal Authority	Comments
Daren Ddu	Daren Ddu	
Cefn Glas	Glyngwilyn	CA seam name not on BGS stratigraphic column
Brithdir Rider	Brithdir Rider Group	
Brithdir	Tillery Rider No 2	CA seam name not on BGS stratigraphic column
No 1 Rhondda Rider	Tillery Rider No 1	CA seam name not on BGS stratigraphic column

BGS Sheet 248	Coal Authority	Comments
No 1 Rhondda	No 1 Rhondda and Tillery Brithdir	Two seams shown on CA plan in very close proximity – only single seam shown on Sheet 248

The BGS layout has been amended with the seam names in accordance with the 1:63,360 mapping. Labelling of the Coal Authority layout is more complex as the figures which accompany the reports do not identify the seams, however, they have been interpreted from the details presented in the 'Outcrops' table in each CCMR obtained.

Figure 6: Seam Outcrop Comparison



It is noted that from elsewhere in the South Wales coalfield, the Brithdir seam is also known as the Tillery seam. In addition, the memoir for an adjacent geological sheet indicates the Tillery Rider No. 2 is the local name for the Cefn Glas seam. The Cefn Glas and Daren Ddu seams are within the Hughes Member; this is not shown on the BGS sheet to be present within the Site area; both seams and the Hughes Member are shown to be present off site to the south.

A number of additional seams subcrop within 50 m of the site, notably the No 2 Rhondda.

For the purposes of this report, the BGS nomenclature has been used in any discussion below, as the mapping assigns the names to specific outcrops. This is compared to the Coal Authority seams for which the layout of names has only been inferred; it is proposed that clarification is sought from the Coal Authority.

4.5 Mine Gas

The CCMR indicates that there are no records of mine gas investigations or remedial works within the Site.

4.6 Recorded Coal Mining Related Hazards

There have been no recorded incidences of damage notices or claims for mining related subsidence being settled on or in close proximity to the Site.

The CCMR indicates that there is a remediated site within the Site. No detail is provided other than it is within an area of previous interest where the Coal Authority has investigated and where necessary remediated mine entries and/or shallow coal mine workings following specific reported hazards. The location is not shown on the accompanying plan, although it includes a reference ID I-352853. The CCMR recommends that a Surface Hazards Incidence Report is obtained.

No Coal Authority managed tips are recorded within 500 m of the Site boundary, however, a number of areas of mineral working associated spoil are identified on historical mapping in the vicinity of the Site.

4.7 Geological Features

The CCMR indicates the presence of faults under or close to the Site and the access road, which is consistent with the published BGS mapping. No fissures are indicated to be present within the Site boundary.

4.8 Surface Mining

No evidence of historical surface mining has been identified and it is not recorded in any of the CCMRs.

5. Hazards and Mitigation Strategies

5.1 Identified Hazards

The study has identified a number of hazards relating to the coal mining legacy of the Site and the surrounding area, as follows:

- recorded shallow abandoned mineworkings and multiple worked seams at greater depths. Discrepancy over seam stratigraphy between data sources;
- possible unrecorded shallow mineworkings;
- shallow roadways;
- historical remedial works;
- geological faulting;
- unstable ground; and
- potential untreated mine entries (adits).

Figure 5.1 provides a visual summary of the identified hazards, in relation to the proposed layout of the development; this is presented in **Appendix A**, and is summarised in **Table 5.1** below. It is noted that the depths to the seams indicated in **Table 5.1** are indicative only as they are based on interpolation of geological and topographical data and as a result may be subject to significant variation. In addition, the discrepancies over seam stratigraphy makes assessment of hazards more complex.

Table 5.1 Summary of Mining Hazards affecting proposed Wind Farm structures

Wind Farm Structures	Mining Hazards Identified
Turbine 1	Close to outcrop of Brithdir seam but not shown to be underlain by it – associated Development High Risk area lies to the east. Shallowest seam to underlie the turbine is the No 1 Rhondda Rider anticipated at approximately 30 to 40 m bgl. Adjacent to mapped fault oriented north-west to south-east.
Turbine 2	Underlain by the Brithdir seam: no recorded workings identified however, evidence of mine activity consistent with seam outcrop; appears to be shallow on site. Estimated <25 m cover to the Brithdir seam.
Turbine 3	Close to outcrop of Brithdir seam but not shown to be underlain by it – associated Development High Risk area lies to the east. Shallowest seam to underlie the turbine is the No 1 Rhondda Rider, estimated 40 to 50 m of cover. Adjacent to mapped fault oriented north-west to south-east.
Turbine 4	Underlain by the Brithdir seam: no recorded workings identified. Estimated 15 to 25 m of cover. No recorded workings and low risk of unrecorded workings from data reviewed.
Turbine 5	Shallowest named seam to underlie the location is the No 1 Rhondda Rider. Estimated <25 m of cover. No recorded workings and no suspected workings from data review.

Wind Farm Structures	Mining Hazards Identified
Turbine 6	Shallowest named seam to underlie the location is the No 1 Rhondda Rider. Estimated 50 to 60 m of cover. No recorded workings and no suspected workings from data review.
Turbine 7	Shallowest named seam to underlie the location is the No 1 Rhondda Rider. Estimated 55 to 65 m of cover. No recorded workings and no suspected workings from data review.
Access Road	Crosses the outcrop of the No 1 Rhondda and No 1 Rhondda Rider coal seams, both of which are defined as Development High Risk Areas. Shallow recorded workings only locally shown to be present on Coal Authority Interactive Viewer associated with the No 1 Rhondda seam which outcrops to the north west (Coal Authority note these workings in No 2 Rhondda Rider seam). Strata highly faulted so seam depth prediction not reliable.
Grid Connection Corridor (on site)	Crosses outcrop of a number of seams – number varies depending upon data source used. Close to mine entry and suspected associated workings in Brithdir seam.

Shallow abandoned mineworkings

Shallow abandoned mineworkings can present a significant risk to property and infrastructure as the collapse of such workings can cause subsidence at the surface, in the form of crown holes. It is generally considered that a solid rock cover of 10 times the seam thickness is required above abandoned mineworkings to minimise the risk of subsidence at the ground surface, although the number of recorded worked seams at depth beneath the Site may result in a more complex subsidence pattern.

The pattern of recorded working in the No 1 and No 2 Rhondda seams is consistent with the historical evidence of mineworking identified from OS mapping. This shows a number of former collieries and related features on the western and northern valley sides below the Site, which is consistent with the sub horizontal seams in this area. In the southern area, there is little evidence of historical mining activity as the seams did not outcrop in this area, as a result of folding of the strata. The Brithdir seam which does outcrop is not noted to have been widely worked.

There is past shallow working beneath the access road at a minimum of 7 m bgl; based on the BGS seam layout, this is likely to be associated with the No 1 Rhondda Rider, whilst the Coal Authority notes the workings to be in the Rhondda No 2 seam. It is anticipated that this correlates with the area of mapped past shallow working shown in **Figure 4**, noting the discrepancy in seam names.

In addition, there is some evidence to suggest that some working has taken place in the northern and south eastern areas of the Site. Suspected mine entries have been identified from aerial imagery on the northern valley slope, which suggests some working of or trials in the Brithdir seam have taken place. Based on the Site visit, these appear to be shallow features from visual inspection from ground level. Based on the relative positions of the features and the proposed turbine locations, it is considered that this most likely affects turbine T2. This is most clearly shown on **Figures 7** and **8**, which are oblique views of the north western slope, with the relevant turbine locations also plotted.

Figure 7 shows the suspected mine activity/trials relative to the topography of the northern slope. Four of the features are located on the terraces on the northern valley slope, with the fifth slightly higher on the slope.

Figure 7: Oblique View of Suspected Mine Activity from North West

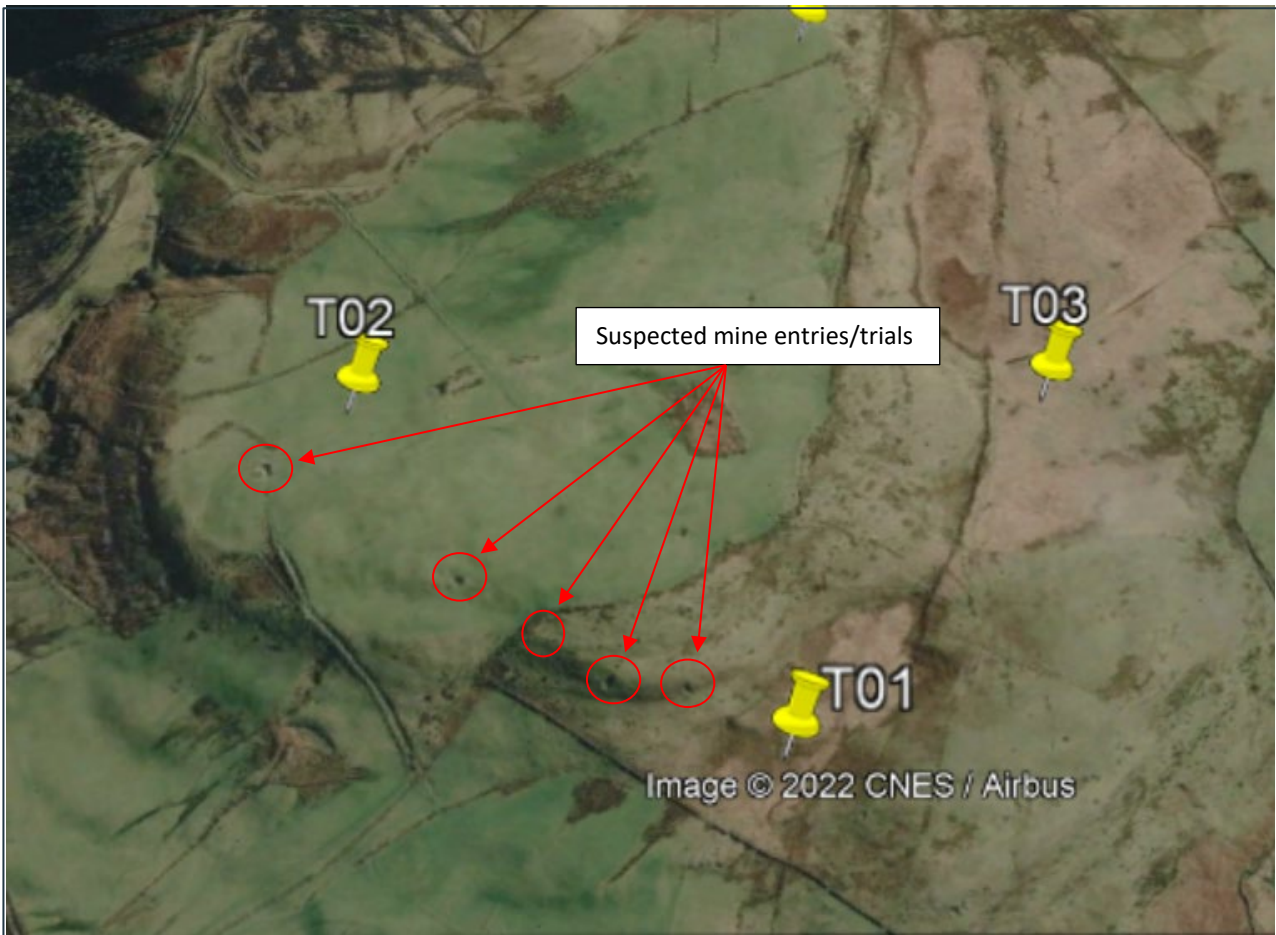
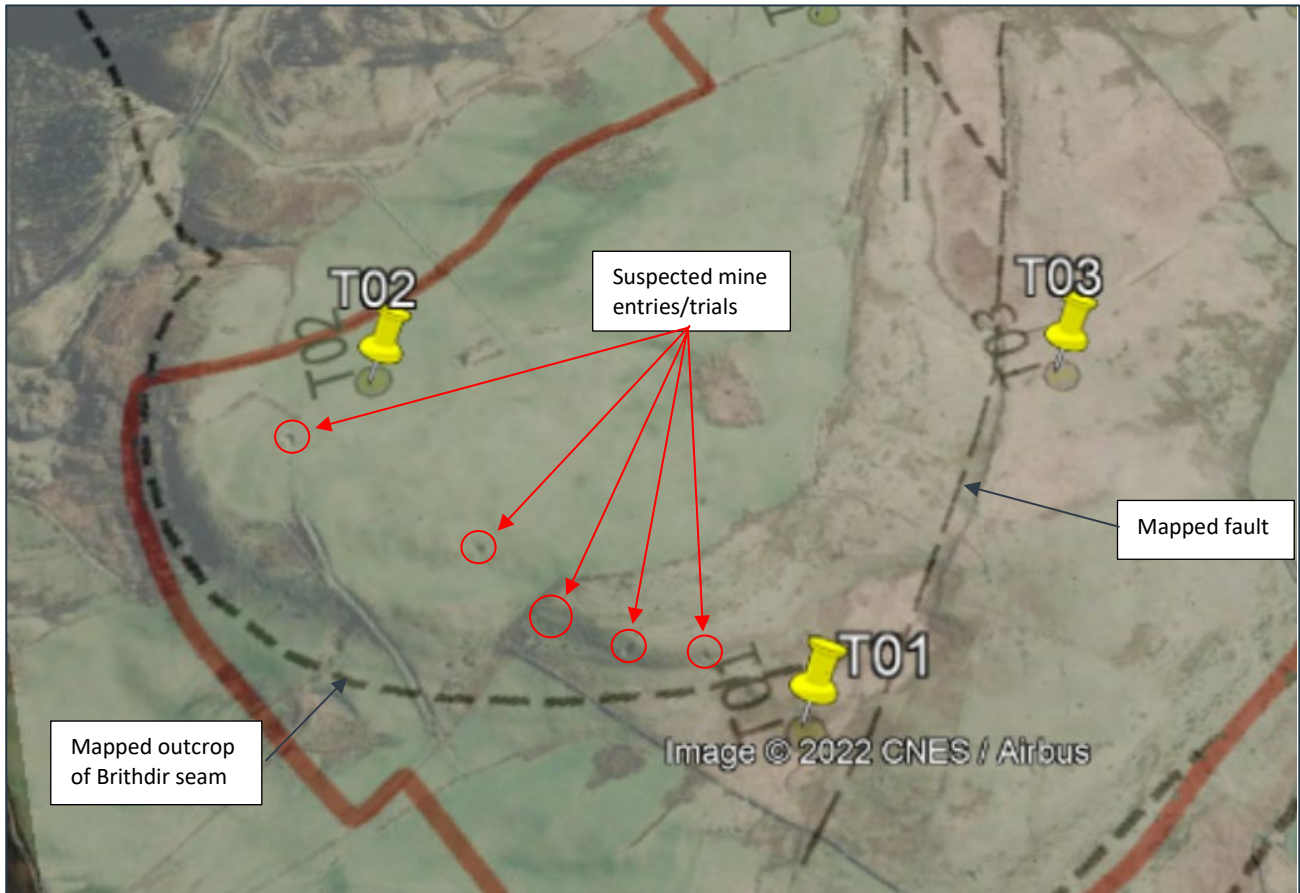


Figure 8 shows the same view but with the BGS WMS layer 'Detailed Geology' overlain on the topography; as a result, some of the definition of the aerial image is lost, however, it provides additional context for the interpreted mining regime.

Figure 8: NW Oblique View with BGS Mapping Overlaid



The location of T1 and T2 relative to the outcrop and the suspected mining activity are clearly shown on **Figure 8**, which informs the hazards identified in **Table 5.1**. Whilst the likelihood of significant workings in the Brithdir seam associated with these features is low, given the sensitivity of the proposed structures, further investigation work is considered to be appropriate.

The mine entry in the south western area is indicative of historic working/trials in this area of the Site which is in the vicinity of the Grid Connection Corridor.

Geological Fissuring and Faulting

No fissuring has been identified within the Site although a number of faults are noted on published geological mapping. Turbines T1 and T3 are located closest to mapped fault locations as shown on **Figure 7**; the mapped alignment is consistent with a linear feature on the ground.

The published geological information indicates a small area of mass movement on the valley side below and approximately 170 m to the north of T2; this appears to be associated with an area of historical quarrying. The feature is apparent on an oblique image from Google Earth as shown on **Figure 9**, where the scarp/terrace feature is much more clearly defined and steeper than the rest of the northern and north western slope.

Figure 9: NE Oblique View showing Mass Movement



The location of this feature on Google Earth overlaps with that plotted on BGS mapping but it slightly different as shown on **Figure 9**.

Figure 10: NE Oblique View Showing Mass Movement including BGS Mapped Areas



The geological memoir indicates that landslips are common in the valleys, and particularly affect the lowest major sandstone above the level of the valley fill. The Geological Memoir for an adjacent area (Sheet 232) notes that most of the movement took place during de-glaciation, when the support of valley glaciers was removed. In the Rhondda Fawr valley, the memoir indicates that most of the slips are associated with the No 1 and No 2 Rhondda sandstone units and are mostly defined as rick tumbles, with some rotational element near the back scar. Examination of aerial imagery on Google Earth between 2001 and 2021 has not identified any apparent change in the morphology of the slope in this area. Given that the turbines are on the upper valley slope and the mapped instability is located in an area of historical quarrying, the risk within the proposed design life (30 years) of the Proposed Development is considered to be low; in addition, the imagery above indicates that the movement appears to be linked to the terraced nature of the northern valley slope.

Subsidence Claims

None recorded within the site in the CCMR.

Areas of Former Tipping

None identified within the site in the CCMR.

Untreated Mine Entries

One recorded mine entry is located in the south eastern area of the site. There is no record of it having been treated. It is not located close to any of the proposed turbines, but the orientation is beneath the Grid Connection Corridor – it is considered to be sufficiently far from the corridor that it

should not represent a constraint. In addition, suspected mine activity is noted in the northern area of the site; these are not located close to any of the proposed infrastructure.

5.2 Mitigation Strategies

Several potential ground related hazards to the Proposed Development have been identified from the review of information discussed above. **Figure 5.1** and **Table 5.1** indicate the relevant proposed wind farm infrastructure which has the potential to interact with the suspected mining hazards.

Detailed liaison should be undertaken with the Coal Authority to confirm the stratigraphy/seam nomenclature beneath the site. In addition, information should be obtained with respect to the shallow roadways identified via Mine Abandonment Plans and also the remediation, by way of a Surface Hazards Incident Report. This would allow a more definitive assessment of risk.

In order to mitigate the hazards above, with respect to the design and construction of the proposed wind farm development, more information is required on the ground conditions beneath the site and the associated mining legacy hazards. Therefore, intrusive ground investigation will be required where wind turbines or associated wind farm infrastructure is proposed in areas affected by the hazards.

It is recommended that pre-construction intrusive investigation works are undertaken to confirm the status of the shallow Coal Measures strata and the cover material to the suspected seams. This will inform the requirement for any mitigation measures, such as consolidation of mineworkings, treatment of mine entries, design of alternative foundation solutions, or local re-siting of infrastructure to avoid identified hazard areas.

It would be necessary to apply for a Permit to Enter or Disturb Coal Mines from the Coal Authority, prior to undertaking any intrusive ground investigation works.

6. Conclusions and Recommendations

6.1 Conclusion

The assessment above has indicated that the geological conditions are different beneath the northern and southern areas of the Site, as a result of variations in the geological structure.

The Coal Mining Risk Assessment has identified several potential hazards, relating to historical coal mining and associated activities on and beneath the Site. In order to gain further information on these hazards, and to inform the design of any necessary mitigation works to allow the design and construction of the Proposed Development to proceed, some additional information/clarification is proposed together with intrusive investigation.

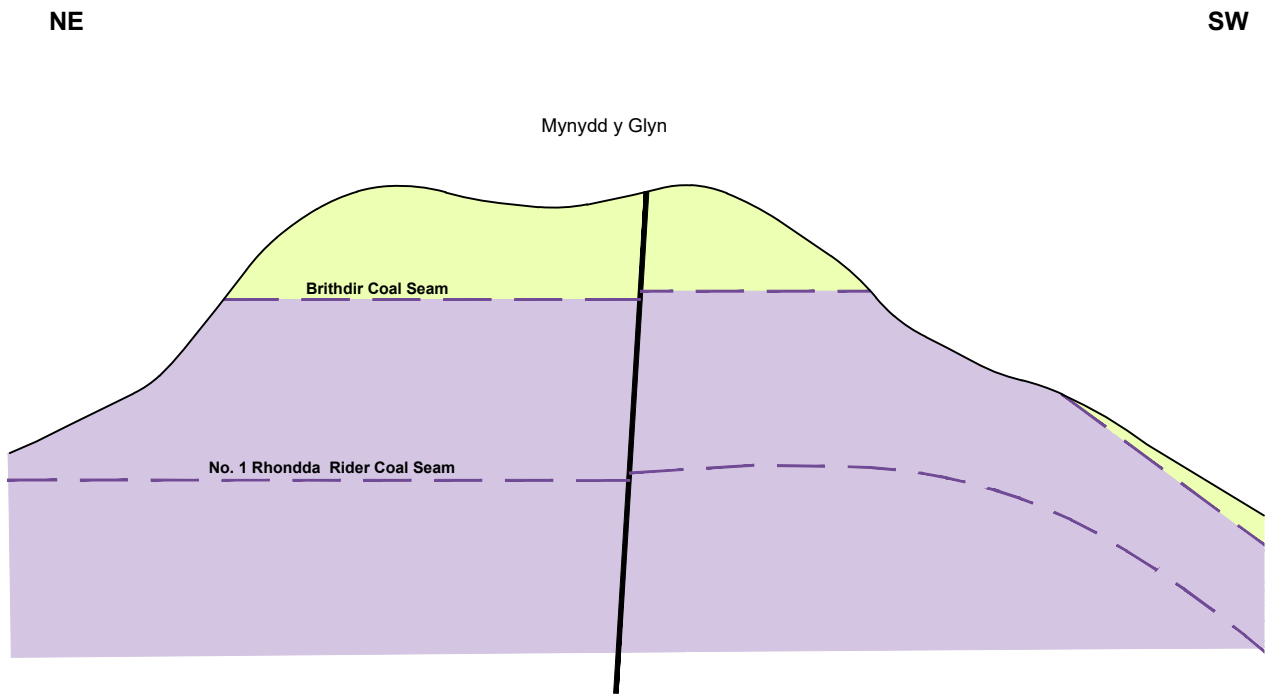
6.2 Recommendations

The following works are recommended:

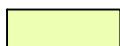



- liaison with Coal Authority re seam stratigraphy/nomenclature and to obtain Mine Abandonment Plans for the recorded shallow mine workings/roadways. Obtain Surface Hazards Incident Report.
- design and implement a programme of intrusive ground investigation. The scope of the investigation will be informed by the proposed layout of the Wind farm and the identified hazards but is likely to include the following:
 - ▶ rotary drilling to confirm the depth and condition of the Brithdir seam beneath Turbine 2 and the No 1 Rhondda Rider seam beneath the other turbine locations, or to prove sufficient thickness of intact rock as part of investigation for foundation design. Whilst the mining related risk is considered to be low based on the information reviewed, intrusive works are considered appropriate as the proposed structures are Category 3 structures and there is some uncertainty regarding the mining situation;
 - ▶ rotary drilling to identify and confirm the status of coal seams in the Development High Risk Areas on the access road;
 - ▶ any required investigations to address geoenvironmental hazards identified in the Phase 1 Desk Study;
 - ▶ *in situ* geotechnical testing, geotechnical and chemical laboratory testing of soil and groundwater samples; and
 - ▶ assess findings and provide preliminary options for mitigation of hazards.

Drawings

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Key

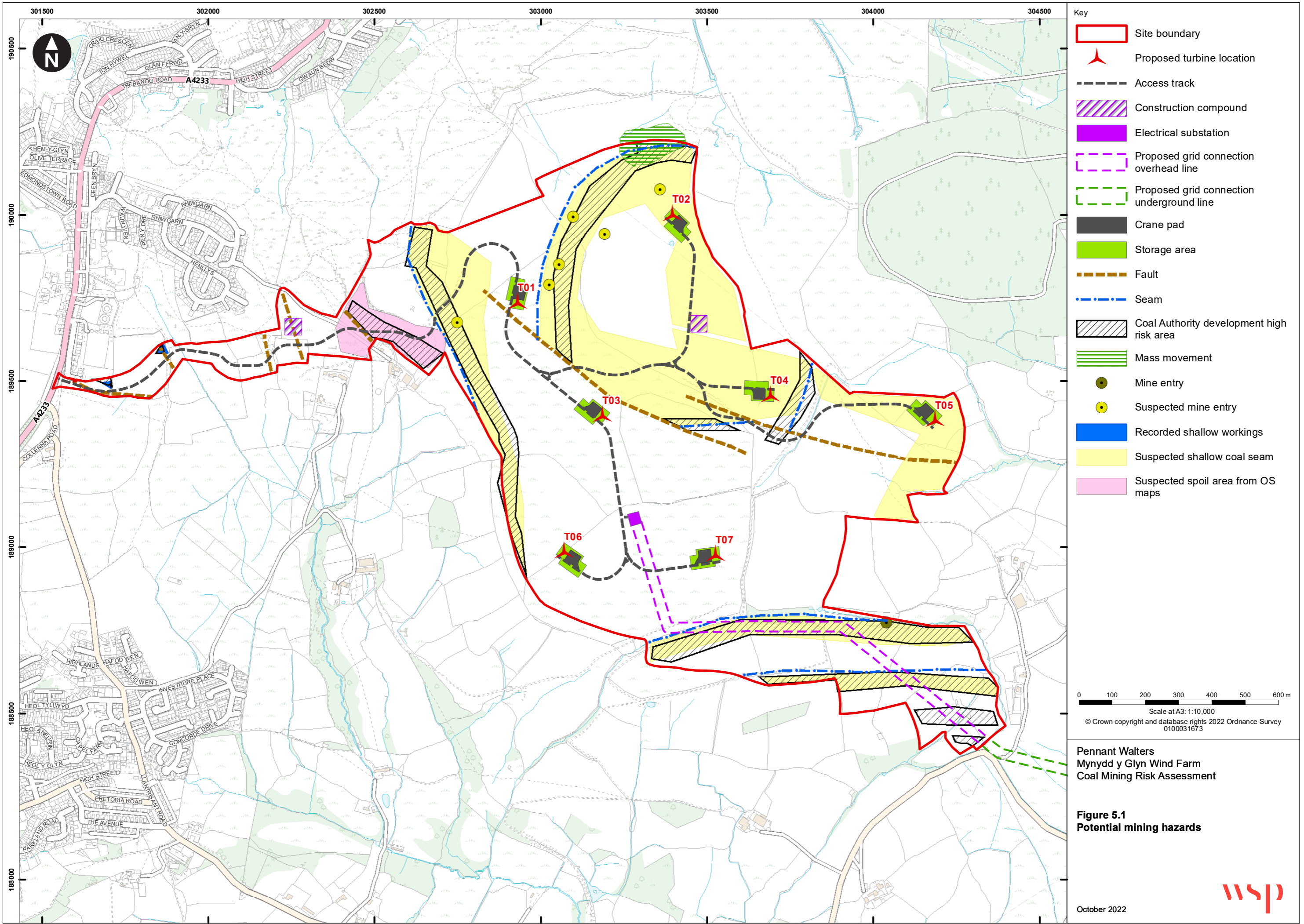
-  Brithdir Member
-  Rhondda Member
-  Coal seam
-  Fault

Pennant Walters
Mynydd Carn y Cefn Wind Farm
Coal Mining Risk Assessment

Figure 2.1
Schematic cross section

October 2022







Consultants Coal Mining Reports

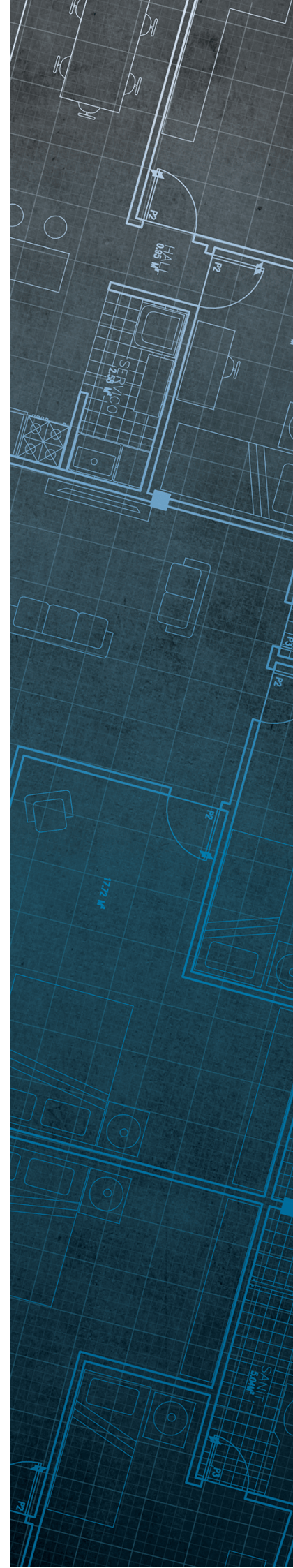


The Coal
Authority

Consultants Coal Mining Report

Mynydd Y Glyn
Rhondda Cynon Taff

Date of enquiry:	31 August 2021
Date enquiry received:	31 August 2021
Issue date:	3 September 2021
Our reference:	51002644897001
Your reference:	284249843_2



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

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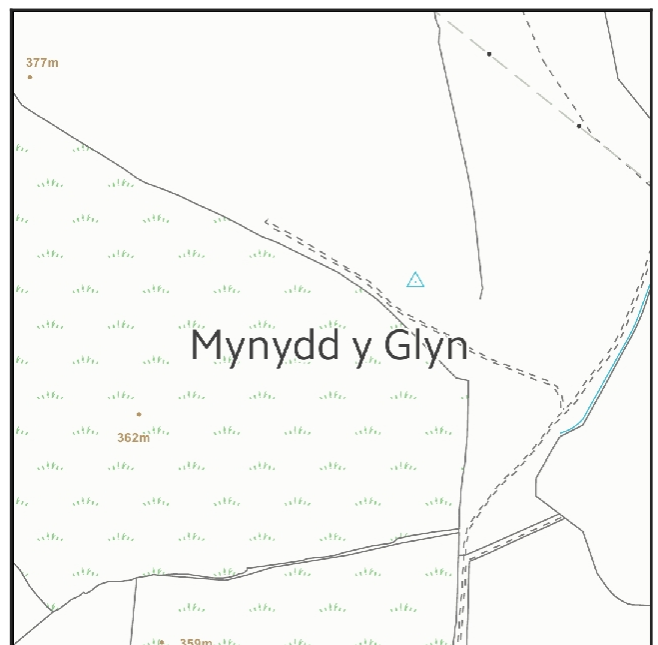
www.groundstability.com

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Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
TREBANOG LEVEL	NO.1 RHONDDA	Coal	41G0	104	North-West	8.1	North-East	70	1925
GLYN	NO.2 RHONDDA	Coal	41F3	109	Beneath Property	14.0	North-West	75	1903
unnamed	NO.3 RHONDDA	Coal	4574	113	Beneath Property	29.1	South	80	1903
unnamed	NO.1 RHONDDA	Coal	41G2	134	Beneath Property	3.4	North-East	60	1861
unnamed	NO.1 RHONDDA	Coal	41G4	134	Beneath Property	3.1	North-East	60	1856
unnamed	NO.3 RHONDDA	Coal	41D6	143	West	1.9	North-West	100	1900
unnamed	NO.2 RHONDDA	Coal	41F1	160	South-West	2.5	South-East	75	1900
CYMMER	NO.2 RHONDDA	Coal	41F0	163	Beneath Property	9.3	North	75	1906
COEDCAE	NO.3 RHONDDA	Coal	41D1	168	Beneath Property	11.3	North	100	1900
unnamed	NO.1 RHONDDA	Coal	41G3	173	Beneath Property	3.1	North	60	1863
COEDCAE	NO.3 RHONDDA	Coal	41CR	175	Beneath Property	8.6	North	90	1888
GLYN	NO.3 RHONDDA	Coal	41D5	176	Beneath Property	2.1	North-West	81	1900
unnamed	NO.2 RHONDDA	Coal	41F2	184	Beneath Property	4.8	East	75	1915
unnamed	NO.2 RHONDDA	Coal	41F7	197	Beneath Property	4.3	North-East	90	1859
CYMMER	HAFOD	Coal	41E8	200	Beneath Property	6.8	North	85	1930
unnamed	NO.3 RHONDDA	Coal	41CS	200	South	0.0	East	100	1888
unnamed	NO.3 RHONDDA	Coal	41D4	203	Beneath Property	2.7	North	81	1900
GLYN	NO.3 RHONDDA	Coal	41D3	216	Beneath Property	1.8	North-East	81	1900
CYMMER	NO.3 RHONDDA	Coal	41D2	224	Beneath Property	10.0	N/A	85	1900
CYMMER	NO.2 RHONDDA	Coal	41F6	238	South-West	4.3	North-East	90	1909
unnamed	HAFOD	Coal	40BU	240	Beneath Property	6.8	North	70	1890
unnamed	HAFOD	Coal	41EA	242	Beneath Property	4.8	North	85	1946

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	NO.3 RHONDDA	Coal	457L	251	South	7.8	North	80	1902
CYMMER	NO.3 RHONDDA	Coal	41CL	272	Beneath Property	3.5	North-East	100	1873
COEDCAE	HAFOD	Coal	41E9	282	Beneath Property	4.3	North	100	1900
COEDCAE	NO.3 RHONDDA	Coal	41CK	295	Beneath Property	3.2	North-East	100	1873
COEDCAE	NO.3 RHONDDA	Coal	41CX	303	East	2.7	North-East	90	1875
CYMMER	HAFOD	Coal	40BP	310	Beneath Property	3.7	North-East	85	1903
CYMMER	HAFOD	Coal	41ED	321	Beneath Property	5.5	North	85	1915
LEWIS	HAFOD	Coal	40BT	322	Beneath Property	1.6	North	70	1913
COEDCAE	HAFOD	Coal	40BO	339	Beneath Property	3.9	North-East	80	1900
COEDCAE	HAFOD	Coal	40BV	341	East	4.1	North	80	1900
CYMMER	6FT BOTTOM LEAF	Coal	41DW	443	Beneath Property	4.3	North	260	1926
CYMMER	FOUR FOOT	Coal	41E1	445	Beneath Property	8.4	East	100	1938
LEWIS	FOUR FOOT	Coal	41E5	476	Beneath Property	3.9	South-East	125	1946
LEWIS MERTHYR	FOUR FOOT	Coal	40AY	478	Beneath Property	3.0	North-East	100	1947
unnamed	6FT BOTTOM LEAF	Coal	41DV	479	North-West	6.2	North	260	1915
CYMMER	6FT BOTTOM LEAF	Coal	41DX	486	Beneath Property	4.7	East	270	1899
CYMMER	FOUR FOOT	Coal	40AZ	487	North	1.6	North-East	120	1947
CYMMER	6FT BOTTOM LEAF	Coal	409C	489	Beneath Property	1.9	North-East	270	1909
LEWIS	FOUR FOOT	Coal	41EA	490	Beneath Property	2.2	North-East	125	1946
CYMMER	FOUR FOOT	Coal	70EW	491	Beneath Property	3.4	North-East	120	1937
CYMMER	FOUR FOOT	Coal	40AW	493	South-West	3.4	North-East	120	1937
LEWIS MERTHYR	FOUR FOOT	Coal	40AX	494	Beneath Property	7.5	North	145	1947
LEWIS	FOUR FOOT	Coal	40B4	496	Beneath Property	2.8	East	120	1938
LEWIS MERTHYR	FOUR FOOT	Coal	40B0	496	North	3.2	North-East	145	1947

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
LEWIS	FOUR FOOT	Coal	40AI	498	East	3.1	North	105	1935
LEWIS	6FT BOTTOM LEAF	Coal	409Q	501	East	3.3	North	270	1891
CYMMER	FOUR FOOT	Coal	40AU	504	Beneath Property	3.4	North-East	120	1907
LEWIS MERTHYR	UPPER NINE FOOT	Coal	407J	507	Beneath Property	2.3	North-East	200	1928
LEWIS	6FT BOTTOM LEAF	Coal	41DY	507	Beneath Property	2.6	South-East	270	1896
CYMMER	UPPER NINE FOOT	Coal	41DQ	508	Beneath Property	1.7	East	200	1934
LEWIS MERTHYR	6FT BOTTOM LEAF	Coal	409B	508	Beneath Property	2.6	North-East	270	1900
unnamed	BUTE	Coal	41DL	508	North-West	6.5	North	262	1938
unnamed	FIVE FOOT	Coal	400Z	514	Beneath Property	8.1	North	140	1930
CYMMER	UPPER NINE FOOT	Coal	41DR	515	Beneath Property	4.5	South-East	200	1930
LEWIS MERTHYR	UPPER NINE FOOT	Coal	70EO	516	North	2.3	North-East	200	1925
LEWIS	6FT BOTTOM LEAF	Coal	408L	517	Beneath Property	1.8	South-East	270	1891
unnamed	YARD	Coal	41D9	519	Beneath Property	5.7	North-East	220	1925
CYMMER	UPPER NINE FOOT	Coal	41DS	522	Beneath Property	3.6	South-East	200	1938
LEWIS	FOUR FOOT	Coal	41E6	523	Beneath Property	8.7	South-West	125	1946
LEWIS MERTHYR	UPPER NINE FOOT	Coal	41DT	524	Beneath Property	0.0	East	200	1937
unnamed	YARD	Coal	41DC	527	Beneath Property	11.7	North	274	1936
LEWIS MERTHYR	UPPER NINE FOOT	Coal	70EN	529	Beneath Property	2.3	North-East	200	1965
CYMMER	BUTE	Coal	404G	530	North-West	1.2	North-East	200	1925
CYMMER	BUTE	Coal	41DK	532	Beneath Property	2.4	East	262	1937
unnamed	LOWER NINE FOOT	Coal	406D	532	North-East	3.5	North	100	1914
LEWIS MERTHYR	UPPER NINE FOOT	Coal	407P	533	Beneath Property	3.3	North-East	200	1953
LEWIS MERTHYR	UPPER NINE FOOT	Coal	70EM	533	Beneath Property	3.3	North-East	200	1953
LEWIS MERTHYR	UPPER NINE FOOT	Coal	407M	533	Beneath Property	3.3	North-East	200	1952

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
TYMAWR	UPPER NINE FOOT	Coal	4081	533	Beneath Property	22.5	West	240	1945
LEWIS MERTHYR	UPPER NINE FOOT	Coal	407O	533	Beneath Property	3.3	North-East	200	1940
LEWIS	FOUR FOOT	Coal	41E7	535	Beneath Property	7.4	South	125	1942
TYMAWR	UPPER NINE FOOT	Coal	4088	537	East	2.4	North	280	1955
LEWIS	FOUR FOOT	Coal	40B5	537	North-East	3.4	West	130	1936
CYMMER	YARD	Coal	403C	538	Beneath Property	3.5	North-East	120	1926
CYMMER	YARD	Coal	41DA	538	Beneath Property	4.0	North-East	220	1925
unnamed	LOWER NINE FOOT	Coal	405I	540	Beneath Property	5.0	North-West	100	1908
unnamed	UPPER NINE FOOT	Coal	408B	540	East	1.2	South	230	1940
unnamed	LOWER NINE FOOT	Coal	405X	541	North	2.5	North-East	100	1907
unnamed	BUTE	Coal	404U	543	Beneath Property	3.7	South	230	1926
unnamed	FIVE FOOT	Coal	4010	544	Beneath Property	4.5	East	140	1916
CYMMER	BUTE	Coal	404E	545	Beneath Property	3.1	South-East	200	1936
CYMMER	BUTE	Coal	404K	546	Beneath Property	2.0	North	200	1913
CYMMER	BUTE	Coal	404D	547	Beneath Property	2.5	North-East	200	1938
LEWIS MERTHYR	UPPER NINE FOOT	Coal	41DU	548	Beneath Property	0.0	East	200	1941
unnamed	BUTE	Coal	41DH	549	Beneath Property	2.0	North	259	1927
unnamed	UPPER SEVEN FOOT	Coal	401S	551	Beneath Property	4.3	North	120	1910
CYMMER	UPPER NINE FOOT	Coal	70EP	551	North-West	2.3	North-East	200	1966
unnamed	BUTE	Coal	4051	552	East	3.9	North	160	1915
unnamed	LOWER NINE FOOT	Coal	405J	554	North	0.0	East	100	1907
unnamed	LOWER NINE FOOT	Coal	406A	555	North-East	2.8	North-East	100	1904
CYMMER	BUTE	Coal	404F	556	North-West	3.4	South-West	200	1933
unnamed	LOWER NINE FOOT	Coal	405W	558	North	1.3	North-East	100	1909
unnamed	BUTE	Coal	404J	558	North	1.6	East	200	1913

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	LOWER NINE FOOT	Coal	4060	559	North	1.8	North	100	1904
unnamed	BUTE	Coal	4052	560	North	3.0	North-East	80	1915
unnamed	LOWER NINE FOOT	Coal	406B	560	North	3.5	North	100	1905
CYMMER	FIVE FOOT	Coal	4012	564	Beneath Property	3.5	North-East	140	1901
unnamed	BUTE	Coal	4053	565	North-East	1.0	N/A	80	1915
unnamed	YARD	Coal	41DB	568	Beneath Property	9.2	North-East	274	1936
CYMMER	UPPER SEVEN FOOT	Coal	401R	570	North	3.2	North-East	130	1913
unnamed	YARD	Coal	4026	571	Beneath Property	4.7	East	200	1925
unnamed	YARD	Coal	41DD	574	Beneath Property	2.6	North	274	1930
unnamed	YARD	Coal	403E	579	Beneath Property	1.5	North-East	120	1933
unnamed	YARD	Coal	4025	580	North-East	1.3	West	200	1930
unnamed	YARD	Coal	402L	582	East	1.9	North-West	100	1915
unnamed	BUTE	Coal	41DI	584	Beneath Property	3.7	South	259	1927
unnamed	YARD	Coal	403F	587	North	1.1	West	120	1924
unnamed	YARD	Coal	403D	590	North	2.2	North-East	120	1926
unnamed	FIVE FOOT	Coal	401B	592	Beneath Property	8.8	North	200	1926
unnamed	BUTE	Coal	41DJ	594	Beneath Property	7.8	South	259	1927
unnamed	FIVE FOOT	Coal	400X	594	Beneath Property	2.1	South	200	1914
unnamed	YARD	Coal	41DE	595	Beneath Property	16.2	South	222	1939
unnamed	FIVE FOOT	Coal	400W	601	Beneath Property	2.4	North	200	1908
unnamed	YARD	Coal	4029	603	Beneath Property	8.7	North	200	1930
unnamed	YARD	Coal	414E	603	Beneath Property	4.0	North	222	1929
unnamed	FIVE FOOT	Coal	400Y	603	Beneath Property	21.2	South	200	1915
unnamed	YARD	Coal	4027	604	Beneath Property	8.3	South	200	1923
unnamed	YARD	Coal	4028	604	Beneath Property	21.4	North	200	1923

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	FIVE FOOT	Coal	4011	606	Beneath Property	1.1	North	140	1908
unnamed	FIVE FOOT	Coal	4019	608	Beneath Property	0.5	North	140	1902
unnamed	FIVE FOOT	Coal	4016	609	East	2.5	North-East	140	1902
unnamed	YARD	Coal	4029	614	Beneath Property	5.9	South	200	1930
unnamed	YARD	Coal	402B	619	East	21.4	North	200	1931
unnamed	YARD	Coal	402A	629	North-East	1.8	West	200	1928
unnamed	FIVE FOOT GELLIDEG	Coal	400C	629	North-West	2.1	South-West	130	1938
unnamed	FIVE FOOT	Coal	401A	630	Beneath Property	8.8	South-East	140	1923
unnamed	FIVE FOOT	Coal	401C	640	North-East	1.0	East	140	1902
unnamed	FIVE FOOT GELLIDEG	Coal	400B	644	North-West	1.6	South-West	130	1938
unnamed	FIVE FOOT	Coal	401L	647	East	8.8	North	140	1923
unnamed	FIVE FOOT GELLIDEG	Coal	4009	647	North-West	2.3	South-West	130	1934
unnamed	FIVE FOOT GELLIDEG	Coal	400D	652	North	0.0	East	130	1932
CWMNEOL	6FT BOTTOM LEAF	Coal	455D	751	South	4.2	South-West	135	1982
CWMNEOL	6FT BOTTOM LEAF	Coal	455E	760	South-East	9.1	South	135	1986
CWMNEOL	6FT BOTTOM LEAF	Coal	454B	760	South	12.8	South	135	1985
CWMNEOL	6FT BOTTOM LEAF	Coal	454A	764	South	5.5	South-West	135	1981
CWMNEOL	6FT BOTTOM LEAF	Coal	4540	803	South	5.7	North	170	1980

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

Distance to spine roadway (m)	Direction to spine roadway
Within	N/A
Within	N/A
Within	N/A

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

SWA2797	SWA3812	SWR1792
SWR2399	SW1951	SWR1103
SWR2414	SWR2419	SWR2803

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
BRITHDIR RIDER GROUP	Coal	Yes	Within	N/A	83
NO.1 RHONDDA	Coal	Yes	44.0	South-West	149
TILLERY BRITHDIR	Coal	Yes	19.6	South-West	135
TILLERY RIDER NO.1	Coal	Yes	37.4	North	74
TILLERY RIDER NO.1	Coal	Yes	Within	N/A	184
TILLERY RIDER NO.1	Coal	Yes	20.5	West	358
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	81
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	84
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	86
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	94
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	99
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	199

Geological faults, fissures and breaklines

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Faults under or close to the property recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

Distance to site remediation (m)	Direction
Within	N/A

See Section 4 for further information.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is in an area where notices to withdraw support were given in 1959, 1979 and 1981.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Remediated sites

The site is within an area of previous interest. It is close to where the Coal Authority has investigated and where necessary remediated mine entries and/or shallow coal mine workings following specific reported hazards.

The site requires further investigation and may influence your risk assessment. We recommend that you order the Coal Authority **Surface Hazards Incident Report**, which will include more information about the hazard.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices





Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

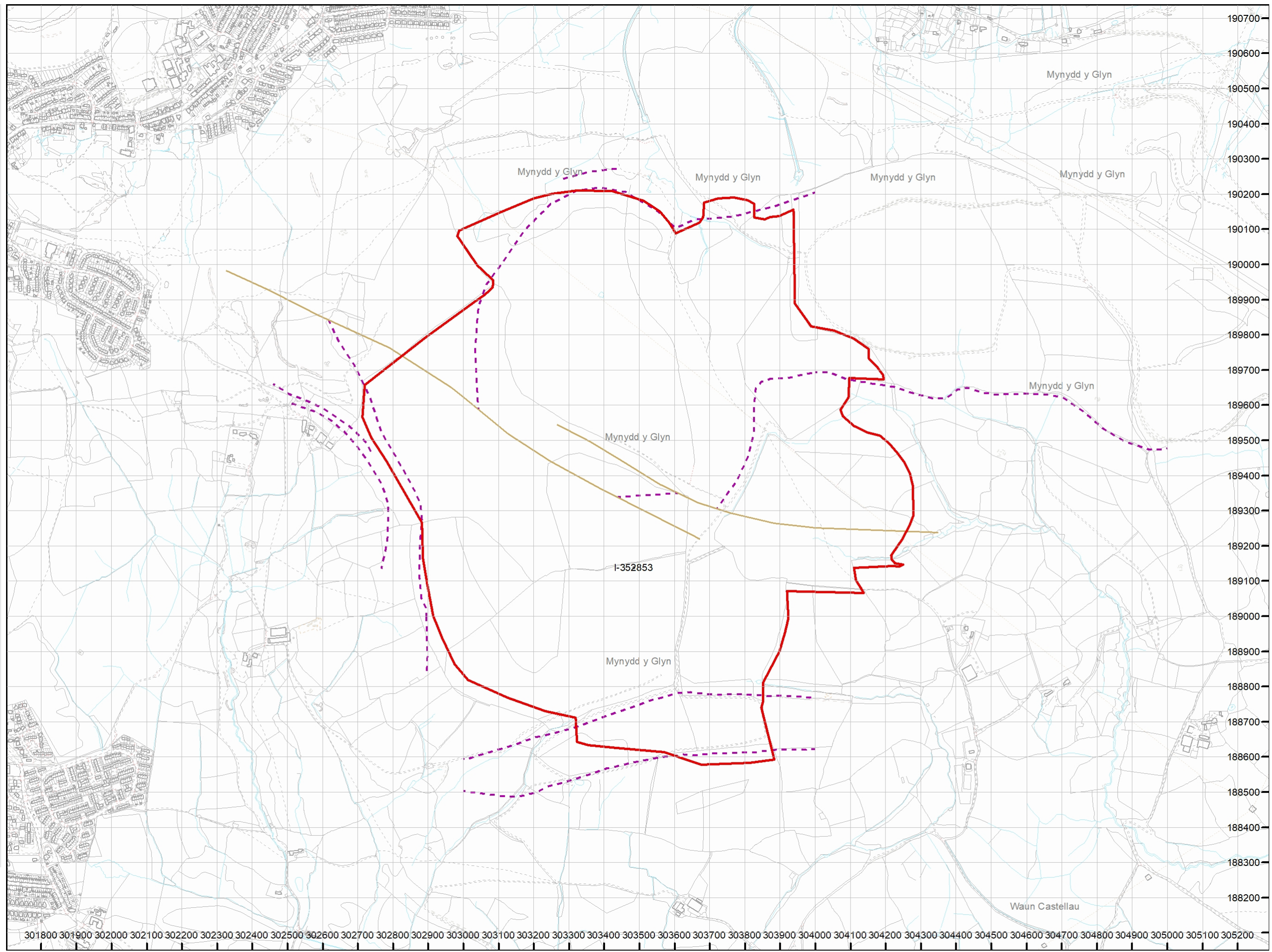
Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

The map highlights any specific surface or subsurface features within or near to the boundary of the site.




Key

- Approximate position of the enquiry boundary shown 
- Outcrop (Conjectured) 
- Geological faults 
- Remediated sites 

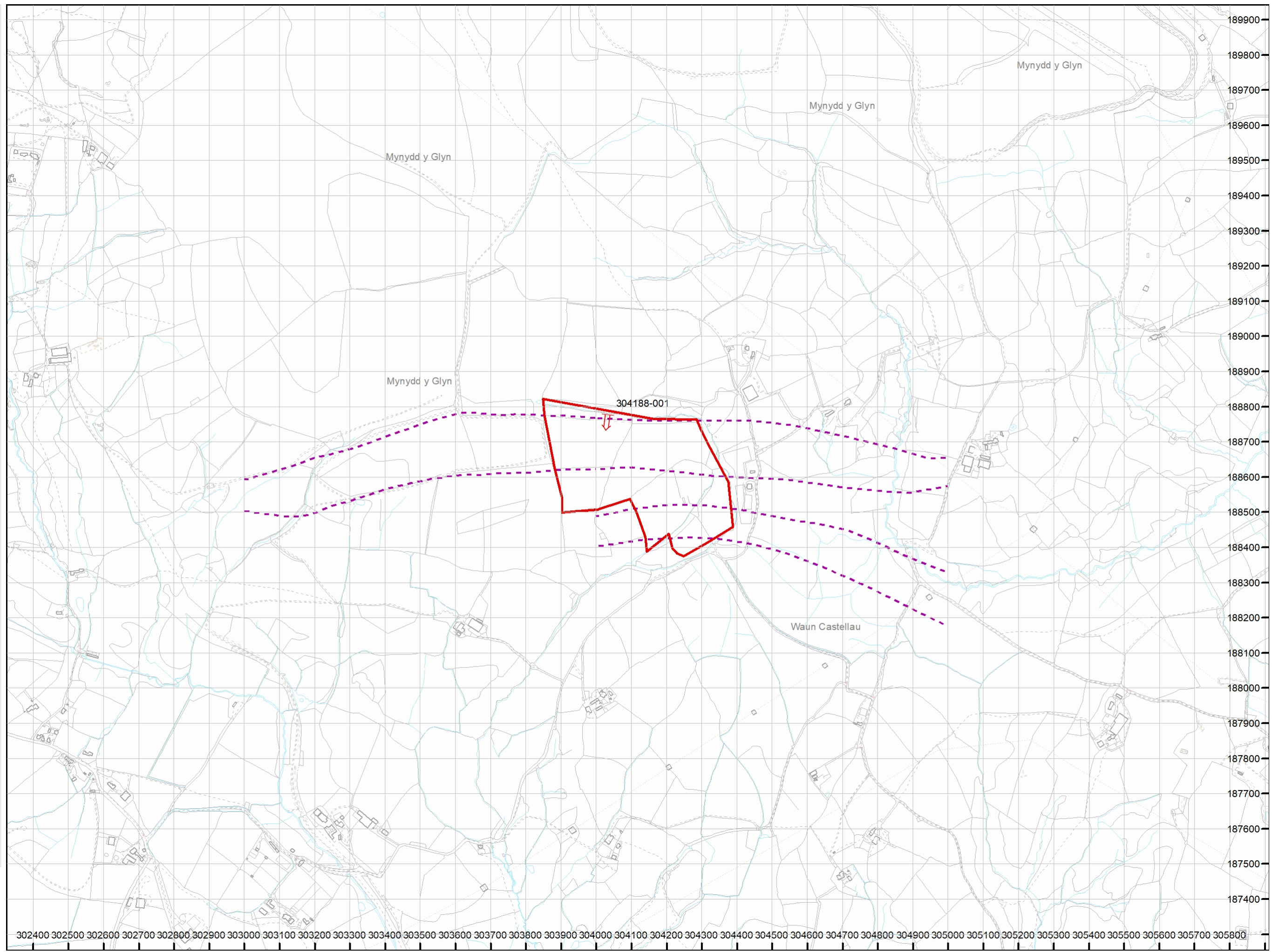


The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Disused adit 
- Outcrop (Conjectured) 

How to contact us
0345 762 6848 (UK)
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www.groundstability.com





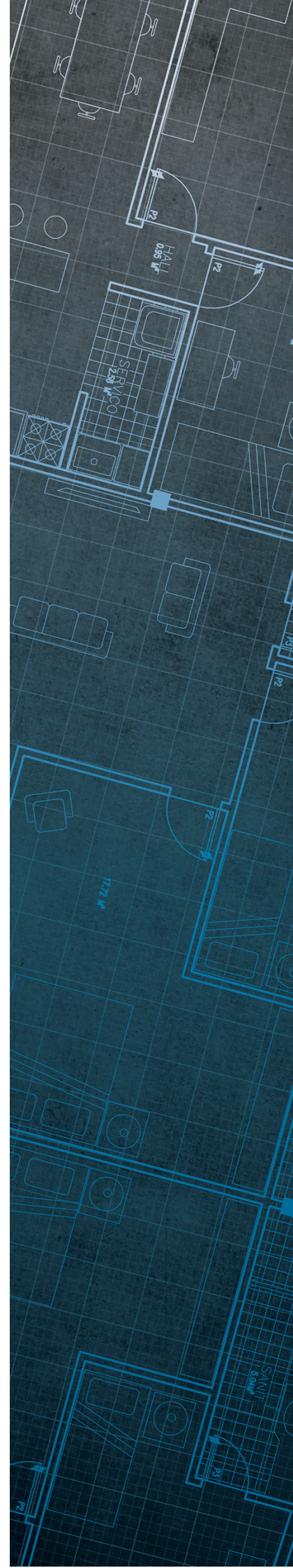
The Coal
Authority

Consultants Coal Mining Report

Mynydd Y Glyn South
Rhondda Cynon Taff

Date of enquiry: 11 October 2022
Date enquiry received: 11 October 2022
Issue date: 11 October 2022

Our reference: 51003317529001
Your reference: 302461254_1



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

NLIS Hub

Enquiry address

Mynydd Y Glyn South
Rhondda Cynon Taff

How to contact us

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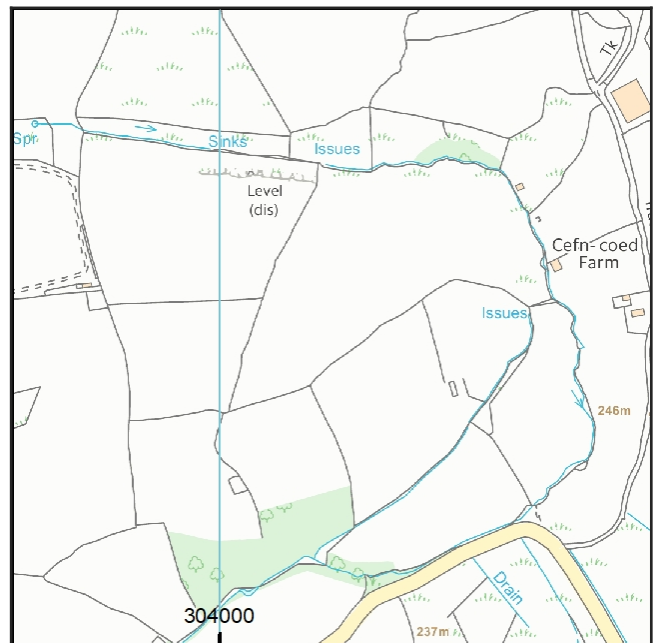
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Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	NO.3 RHONDDA	Coal	457L	227	Beneath Property	7.8	North	80	1902
unnamed	NO.3 RHONDDA	Coal	4574	270	Beneath Property	29.1	South	80	1903
unnamed	NO.3 RHONDDA	Coal	457K	348	North-East	8.4	South-West	140	1914
unnamed	FIVE FOOT	Coal	400Z	555	North	8.1	North	140	1925
unnamed	UPPER NINE FOOT	Coal	452N	663	East	4.9	South	152	1950
CWMNEOL	6FT BOTTOM LEAF	Coal	454B	673	South	12.8	South	135	1985
CWMNEOL	6FT BOTTOM LEAF	Coal	455E	681	Beneath Property	9.1	South	135	1986
unnamed	6FT BOTTOM LEAF	Coal	455C	689	South-East	7.7	South-West	185	1961
CWMNEOL	6FT BOTTOM LEAF	Coal	455D	701	South	4.2	South-West	135	1983
CWMNEOL	6FT BOTTOM LEAF	Coal	4556	702	South	6.1	South-West	180	1983
CWMNEOL	6FT BOTTOM LEAF	Coal	454A	706	South-West	5.5	South-West	135	1982
unnamed	6FT BOTTOM LEAF	Coal	4542	710	South	3.5	South-West	180	1979
unnamed	UPPER NINE FOOT	Coal	452O	711	South-East	7.0	South-West	152	1965
unnamed	UPPER NINE FOOT	Coal	452W	718	South-East	2.3	South-West	145	1965
unnamed	YARD	Coal	4509	732	South-East	6.9	South-West	160	1975
CWMNEOL	FIVE FOOT	Coal	4053	733	East	6.7	South-West	150	1981
unnamed	YARD	Coal	450A	741	South-East	6.1	South-West	160	1973
unnamed	YARD	Coal	450V	759	South-East	4.9	South-West	155	1972
CWMNEOL	FIVE FOOT	Coal	4501	778	South-East	3.8	South-West	190	1986

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
CWMNEOL	6FT BOTTOM LEAF	Coal	4540	778	South-West	5.7	North	170	1980

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Adit	304188-001	304033 188773		Coal	

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

SWA3812	4594	R14535
SWR3827	SWA3225	SWR1793
PO0		

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
BRITHDIR RIDER GROUP	Coal	Yes	Within	N/A	83
BRITHDIR RIDER GROUP	Coal	Yes	Within	N/A	92
DARREN DDU	Coal	Yes	Within	N/A	92
GLYNGWILLYN	Coal	Yes	Within	N/A	97
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	90
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	94

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is in an area where notices to withdraw support were given in 1959 and 1979.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

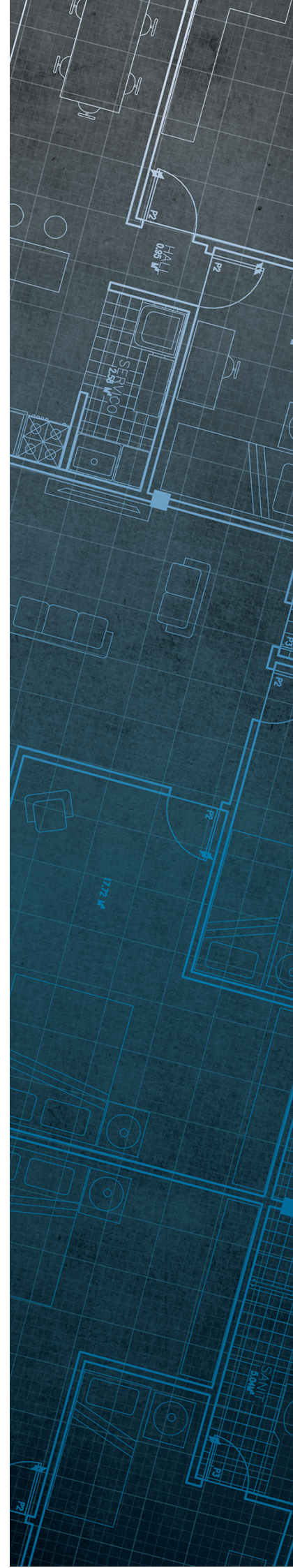


The Coal
Authority

Consultants Coal Mining Report

Mynydd Y Glyn North
Rhondda Cynon Taff

Date of enquiry:	11 October 2022
Date enquiry received:	11 October 2022
Issue date:	11 October 2022
Our reference:	51003317546001
Your reference:	302461216_1



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

NLIS Hub

Enquiry address

Mynydd Y Glyn North
Rhondda Cynon Taff

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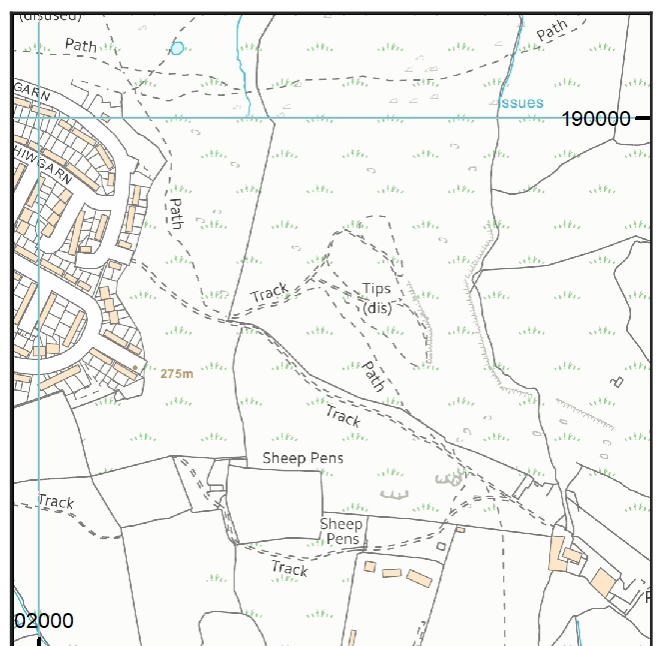
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Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
CILELY	NO.2 RHONDDA RIDER	Coal	41FH	7	Beneath Property	4.2	West	105	1923
unnamed	NO.2 RHONDDA	Coal	41EG	75	Beneath Property	5.8	West	130	1918
DINAS ISHA	NO.3 RHONDDA	Coal	40BW	80	Beneath Property	9.3	North	100	1879
CILELY	NO.3 RHONDDA	Coal	40BX	84	Beneath Property	8.8	North-West	200	1912
CILELY	NO.2 RHONDDA	Coal	41F4	105	Beneath Property	6.7	North-West	130	1914
TREBANOG LEVEL	NO.1 RHONDDA	Coal	41G0	111	Beneath Property	8.1	North-East	70	1925
CILELY	HAFOD	Coal	40BF	122	Beneath Property	10.0	North-West	78	1890
unnamed	NO.2 RHONDDA	Coal	41F1	139	Beneath Property	2.5	South-East	75	1900
unnamed	NO.2 RHONDDA	Coal	41F5	140	North	6.7	North-West	130	1916
GLYN	NO.2 RHONDDA	Coal	41F3	177	South-East	14.0	North-West	75	1895
CYMMER	NO.2 RHONDDA	Coal	41F0	185	Beneath Property	9.3	North	75	1906
CILELY	FOUR FOOT	Coal	408A	201	Beneath Property	8.2	North-West	105	1907
CILELY	HAFOD	Coal	41EB	205	Beneath Property	5.8	North-West	100	1924
unnamed	HAFOD	Coal	40BE	217	Beneath Property	8.1	North	100	1922
CYMMER	NO.2 RHONDDA	Coal	41F6	222	Beneath Property	4.3	North-East	90	1909
GLYN	NO.3 RHONDDA	Coal	41D5	225	Beneath Property	2.1	North-West	81	1900
CYMMER	NO.3 RHONDDA	Coal	41D2	231	Beneath Property	10.0	N/A	85	1900
unnamed	NO.2 RHONDDA	Coal	41F7	233	North-East	4.3	North-East	90	1859
unnamed	NO.3 RHONDDA	Coal	41D4	234	Beneath Property	2.7	North	81	1900
CILELY	6FT BOTTOM LEAF	Coal	408X	267	Beneath Property	20.4	North	180	1909
CILELY	UPPER NINE FOOT	Coal	406Y	277	South-West	8.0	North-West	180	1903
CYMMER	HAFOD	Coal	70EU	279	North-West	2.6	North	85	1912

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
CYMMER	HAFOD	Coal	40BQ	279	North	2.6	North	85	1912
CYMMER	HAFOD	Coal	41E8	282	Beneath Property	6.8	North	85	1928
CILELY	BUTE	Coal	405E	293	Beneath Property	6.7	North-West	100	1905
CYMMER	NO.3 RHONDDA	Coal	41CL	307	Beneath Property	3.5	North-East	100	1873
CILELY	UPPER NINE FOOT	Coal	406Z	334	Beneath Property	0.0	East	180	1909
CYMMER	HAFOD	Coal	40BP	338	Beneath Property	3.7	North-East	85	1903
CYMMER	HAFOD	Coal	41ED	356	East	5.5	North	85	1915
CILELY	YARD	Coal	4036	373	Beneath Property	12.4	North	120	1911
CYMMER	FOUR FOOT	Coal	41E0	378	Beneath Property	3.4	South-West	170	1925
CYMMER	FOUR FOOT	Coal	40AV	379	North	3.4	North-East	120	1929
unnamed	FOUR FOOT	Coal	40A9	380	North	1.6	North-East	100	1928
CYMMER	6FT BOTTOM LEAF	Coal	408Y	395	North	2.7	North	260	1913
unnamed	FIVE FOOT GELLIDEG	Coal	4003	403	South	4.8	South-West	115	1933
unnamed	FIVE FOOT GELLIDEG	Coal	4002	409	South-West	9.9	North	115	1933
unnamed	FIVE FOOT GELLIDEG	Coal	4000	413	South	0.0	East	115	1937
unnamed	FIVE FOOT	Coal	400N	423	Beneath Property	9.2	North	100	1931
RHIWGARN	NO.3 RHONDDA	Coal	41D7	426	South-West	8.4	North-West	100	1912
unnamed	FIVE FOOT GELLIDEG	Coal	4001	427	Beneath Property	10.2	N/A	115	1944
CILELY	LOWER NINE FOOT	Coal	41DN	429	Beneath Property	3.7	North-West	300	1950
CYMMER	UPPER NINE FOOT	Coal	41DO	432	Beneath Property	5.6	North	200	1929
CYMMER	UPPER NINE FOOT	Coal	41DP	432	North-West	0.0	East	200	1926
CILELY	YARD	Coal	41DF	435	Beneath Property	10.6	North-East	173	1948
unnamed	YARD	Coal	4037	436	Beneath Property	13.3	North	120	1945
CYMMER	6FT BOTTOM LEAF	Coal	409D	436	North	1.9	North-East	270	1914
CYMMER	UPPER NINE FOOT	Coal	7000	442	North-West	0.0	East	100	1926

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	FIVE FOOT	Coal	7P2S	445	South	13.3	North	100	1941
CYMMER	UPPER NINE FOOT	Coal	407K	447	North	1.7	North	200	1928
CILELY	NO.3 RHONDDA	Coal	41D8	448	Beneath Property	2.3	North-West	100	1895
unnamed	6FT BOTTOM LEAF	Coal	41DV	451	Beneath Property	6.2	North	260	1915
CILELY	BUTE	Coal	405F	453	Beneath Property	0.0	East	100	1950
unnamed	FIVE FOOT	Coal	400O	454	Beneath Property	15.6	North	100	1940
CILELY	YARD	Coal	41DG	464	Beneath Property	10.5	North-East	173	1948
CYMMER	FOUR FOOT	Coal	41E1	472	Beneath Property	8.4	East	100	1937
unnamed	FIVE FOOT	Coal	7P2R	472	Beneath Property	13.4	North	100	1900
CILELY	BUTE	Coal	41DM	473	Beneath Property	1.6	South-West	150	1948
CYMMER	FOUR FOOT	Coal	70EW	474	Beneath Property	3.4	North-East	120	1937
CYMMER	6FT BOTTOM LEAF	Coal	41DW	488	Beneath Property	4.3	North	260	1926
CYMMER	FOUR FOOT	Coal	40AW	505	North-West	3.4	North-East	120	1937
CYMMER	FOUR FOOT	Coal	40AU	509	North-East	3.4	North-East	120	1907
CYMMER	6FT BOTTOM LEAF	Coal	409C	510	Beneath Property	1.9	North-East	270	1909
LEWIS	FOUR FOOT	Coal	41E5	511	East	3.9	South-East	125	1946
LEWIS MERTHYR	FOUR FOOT	Coal	40AY	513	East	3.0	North-East	100	1947
unnamed	BUTE	Coal	41DL	517	Beneath Property	6.5	North	262	1939
CYMMER	6FT BOTTOM LEAF	Coal	41DX	521	Beneath Property	4.7	East	270	1899
LEWIS	FOUR FOOT	Coal	41E6	523	South-East	8.7	South-West	125	1946
LEWIS	FOUR FOOT	Coal	41EA	523	East	2.2	North-East	125	1946
CYMMER	BUTE	Coal	404G	530	North-West	1.2	North-East	200	1925
unnamed	FIVE FOOT	Coal	400Q	535	North-West	0.5	South-West	150	1902
unnamed	YARD	Coal	41D9	541	Beneath Property	5.7	North-East	220	1925

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
LEWIS MERTHYR	UPPER NINE FOOT	Coal	407J	542	Beneath Property	2.3	North-East	200	1928
CYMMER	UPPER NINE FOOT	Coal	41DQ	543	Beneath Property	1.7	East	200	1934
CYMMER	UPPER NINE FOOT	Coal	41DR	550	East	4.5	South-East	200	1930
CYMMER	UPPER NINE FOOT	Coal	70EP	551	North	2.3	North-East	200	1966
LEWIS MERTHYR	UPPER NINE FOOT	Coal	70EO	551	North-East	2.3	North-East	200	1925
unnamed	FIVE FOOT	Coal	4010	553	Beneath Property	4.5	East	140	1916
CYMMER	UPPER NINE FOOT	Coal	41DS	557	East	3.6	South-East	200	1937
CYMMER	YARD	Coal	403C	562	Beneath Property	3.5	North-East	120	1926
CYMMER	BUTE	Coal	41DK	565	Beneath Property	2.4	East	262	1937
CYMMER	BUTE	Coal	404F	566	North	3.4	South-West	200	1938
unnamed	YARD	Coal	41DC	572	South-East	11.7	North	274	1936
CYMMER	YARD	Coal	41DA	573	Beneath Property	4.0	North-East	220	1925
CYMMER	BUTE	Coal	404E	579	Beneath Property	3.1	South-East	200	1936
CYMMER	BUTE	Coal	404D	582	East	2.5	North-East	200	1936
unnamed	UPPER SEVEN FOOT	Coal	401S	586	North-East	4.3	North	120	1910
CYMMER	FIVE FOOT	Coal	4012	589	Beneath Property	3.5	North-East	140	1901
unnamed	FIVE FOOT	Coal	400Z	605	South-East	8.1	North	140	1930
unnamed	FIVE FOOT GELLIDEG	Coal	400C	629	North-West	2.1	South-West	130	1938
unnamed	FIVE FOOT GELLIDEG	Coal	4009	657	North	2.3	South-West	130	1934
unnamed	FIVE FOOT GELLIDEG	Coal	400B	661	North-West	1.6	South-West	130	1938

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

SWR2587	SWR2581	SWA2797
SWR1792	SWA1025	SW144
SWR2419	SWR2803	SWR2418

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
NO.1 RHONDDA	Coal	Yes	Within	N/A	138
TILLERY BRITHDIR	Coal	Yes	Within	N/A	126
TILLERY RIDER NO.1	Coal	Yes	Within	N/A	153
TILLERY RIDER NO.1	Coal	Yes	Within	N/A	191
TILLERY RIDER NO.2	Coal	Yes	Within	N/A	199

Geological faults, fissures and breaklines

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Faults under or close to the property recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

Distance to site investigation (m)	Direction
10.3	North-East

See Section 4 for further information.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is in an area where a notice to withdraw support was given in 1945.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices





Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

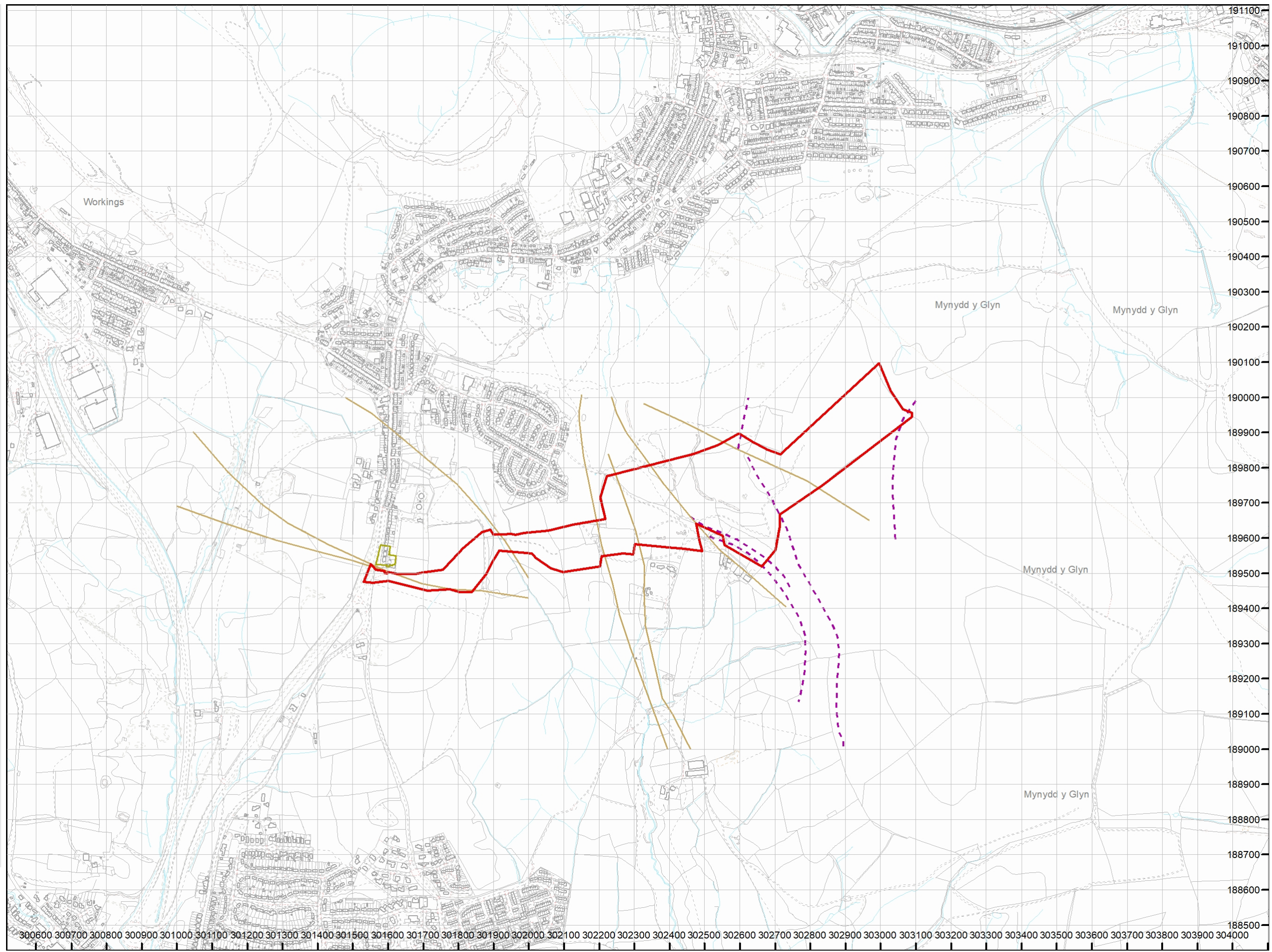
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Outcrop (Conjectured) 
- Geological faults 
- Site investigations 

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wsp

wsp.com

Annex C

Peat Probing Factual Report

Technical note:

Mynydd y Glyn Wind Farm – Peat Depth Survey Report

1. Introduction

Wood Group UK Limited (Wood) were commissioned by Pennant Walters Limited to complete peat depth probing at the site of the proposed Mynydd y Glyn Wind Farm, located approximately 2km to the west of Pontypridd in the Rhondda Cynon Taf as illustrated in **Figure 1**. The National Grid Reference (NGR) for the site centre is E303500 N189760. The majority of the Development Site comprises open ground set on the slopes of Mynydd y Glyn ranging from approximately 300m above ordnance datum (AOD) around the site boundary to the peak of Mynydd y Glyn in the centre of the site at 375m AOD.

1.1 Scope of Works

The design of the peat survey was developed in general accordance with the Guidance on Developments on Peatland¹.

The Phase 1 survey was undertaken on a 100m x 100m grid of points across the Developable Area of the site with peat depth measurement taken at each survey point. This factual report details the findings of the survey works and presents both a peat spot depth and peat contour plan (included as **Figures 2 and 3**).

1.2 Limitations

The peat depth survey was undertaken in accordance with best practice guidance to characterise peat depths across the site. It should be recognised that the survey and interpolations based on the survey provide information characterising the variation of peat depths and that different conditions may be present between survey locations.

Where utilities were identified a 50m exclusion zone was applied. Therefore, in some localised areas the grid spacing could not be fully adhered to.

2. Desk Study Information

2.1 Pedology

The Cranfield Soil and Agrifood Institute Soilscales map² indicates that the centre of the site across the flat summit plateau of Mynydd y Glynn is covered by very acid loamy upland soils with a wet peaty surface. On the sloping ground towards the edge of the site locally freely draining acid loamy soils over rock are recorded.

¹ Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only.

² Cranfield Soil and Agrifood Institute, Soilscales Map, <http://www.landis.org.uk/soilscales/>, accessed October 2021.

2.2 Geology

The British Geological Survey Geoindex³ indicates that only localised superficial deposits are present across the site. Peat is illustrated in the centre and east of the site in areas of gentle topography at the higher elevations of Mynydd y Glyn. Glacial Till is recorded in the far west of the site and adjacent to the southern boundary.

The bedrock underlying the site is predominantly recorded as sandstone of the Brithdir Member, with sandstone, siltstone and mudstone of the Rhondda Member locally interbedded.

3. Survey Work

3.1 Methodology

The peat probing survey was undertaken in accordance with the locations and frequencies outlined in Section 1.1 and included the recording of the surveyed peat depths. The survey was undertaken using an extendable carbon fibre utility probe with lengths of probe carried to record depths of up to 8m below ground level (bgl). The probes are pushed into the ground by hand, until refusal on a hard stratum or obstruction.

The recorded depths were inputted into a personal digital assistant (PDA) with global position system (GPS) functionality to allow for a six figure NGR for each location.

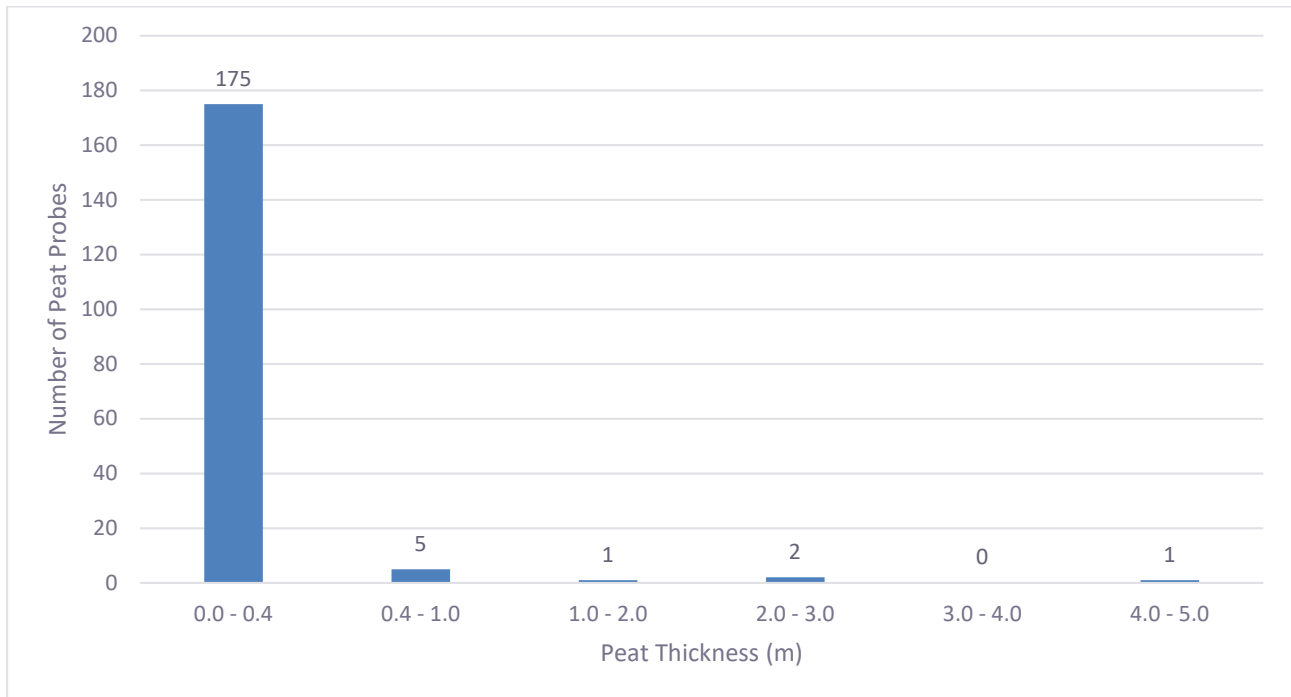
The survey records the depth of any soft deposits (including peat) but is not exclusively related to peat depth and may include soft deposits that could also impact windfarm design and construction. No samples were obtained as part of this investigation.

3.2 Survey Findings

The Phase 1 peat depth survey was undertaken by Wood on the 14th September 2021 during a period of relatively dry weather. The survey comprised a total of 183 probes taken across the Developable Area, revealing potential peat depths in the range of between 0.00m and >4.10m. The calculated mean depth of recorded peat was 0.13m. The Welsh Government define true peat as being $\geq 0.4\text{m}$ in depth. Figure 3.1 illustrates the spread of survey results.

³ British Geological Survey Geoindex, <http://mapapps2.bgs.ac.uk/geoindex/home.html>, accessed October 2021.

Figure 3.1 – Summary of Peat Survey Data



Based on the findings of the survey, peat is only present in localised areas of the site, predominantly on relatively flat ground to the west of the summit of Mynydd y Glyn. The peat depth data obtained during the survey has been used to generate a peat depth plan and interpolated peat depth map for the Development Site. The plans are included as **Figures 2 and 3**. The peat survey results are recorded in Appendix A.

The contour plan was created using ESRI ArcGIS and the Natural Neighbour interpolation method. This method was chosen given the relative simplicity of the weighting compared to other interpolation methods. It also avoids exaggeration of minimal and maximal values and results in a modelled surface that passes through the sample point value. The method also does not produce a pronounced “bulls-eye” effect on the modelled surface. However, unlike other methods it is not possible to barrier the interpolation. It also models depths over the furthest geographic extent and does not extrapolate out from the maximum extents of the sample points to the maximum rectangular extent. This method also calculates cell values across the longest extents of the sample points resulting in interpolations over large distances where there are large gaps in the sampling points, or they are irregularly distributed.

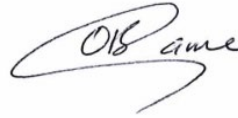
4. Summary

The survey indicated that the site is generally not underlain by peat. However, a localised peat bog is present to the west of the summit of Mynydd y Glyn with depths ranging from 2.4m bgl to a maximum surveyed depth of at least 4.10m bgl. The peat survey data is illustrated in Figures 2 and 3. The majority of the site is considered to be directly underlain by bedrock. However, this should be confirmed with an intrusive ground investigation. Given the presence of peat across the top of Mynydd y Glynn, a Phase 2 peat survey of the site is recommended following the design freeze of the proposed windfarm layout.



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Ouarda Boumendjel-Game

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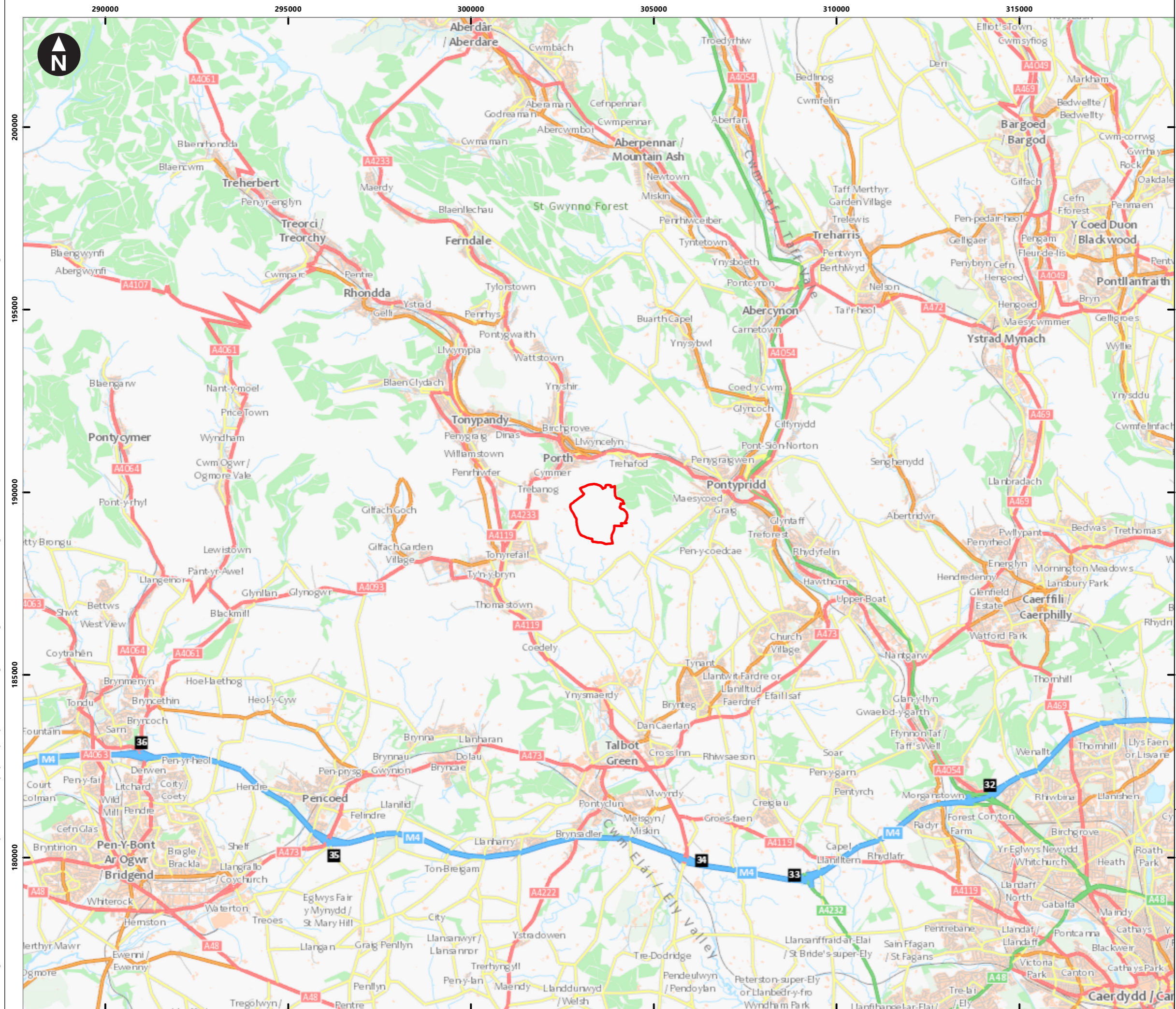
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Figures



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Key

Site boundary

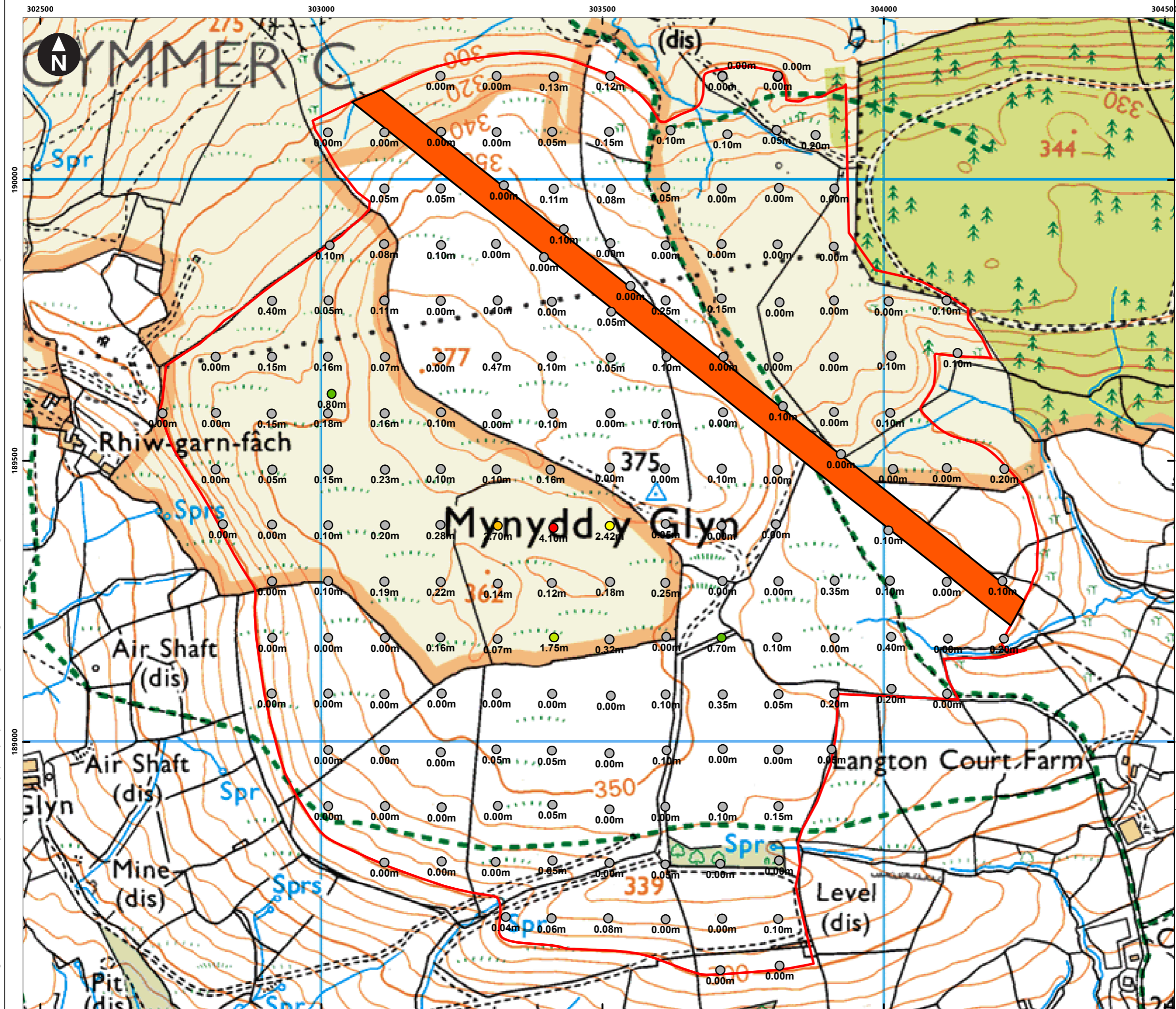
0 1,400 2,800 4,200 5,600 m
Scale at A3: 1:100,000
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Mynnydd Glyn Wind Farm
Phase 1 Peat Depth Survey Report

Figure 1.0
Site Location

October 2021

\\sal-fs12.global.amec.com\SHARED\Projects\42864\Mynydd_y_Glyn\Deliver_Stage\Design_Technical\Drawings\GIS\MXD\42864-WOOD-XX-XX-FG-R-0001_S3_P01_1.mxd Originator: laura.morales



Key

- Site boundary

Peat Depth (m)

- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- 4.0 - 4.5

Survey Constraints

- Utilities

0 90 180 270 360 m
Scale at A3: 1:6,500
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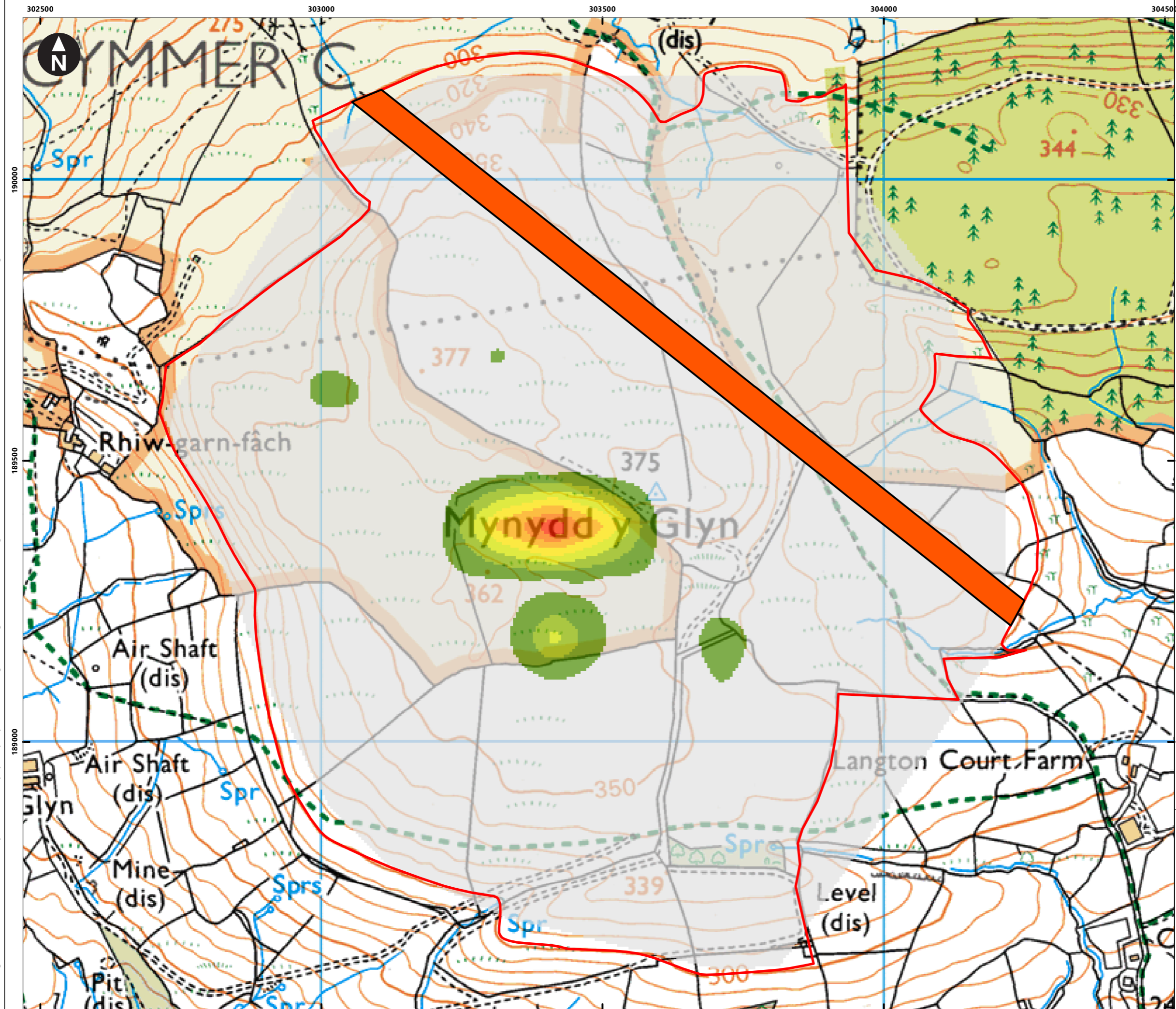
Mynydd Glyn Wind Farm
Phase 1 Peat Depth Survey Report

Figure 2.0
Phase 1 Peat Depth Results

October 2021



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Key

- Site boundary

Survey Constraints

- Utilities

Peat Depth (m)

- 0.0 - 0.4
- 0.4 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0

0 90 180 270 360 m
Scale at A3: 1:6,500
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Mynydd Glyn Wind Farm
Phase 1 Peat Depth Survey Report

Figure 3.0
Phase 1 Interpolated Peat Depth

Appendix A – Peat Probing Data



Appendix A
Mynydd y Glyn
Peat Depth Survey Results

Probe ID	Date	Peat Depth (m)	Easting	Northing
1	14/09/2021	0	303513	189487
2	14/09/2021	0	303514	189585
3	14/09/2021	0.05	303515	189683
4	14/09/2021	0.05	303516	189765
5	14/09/2021	0	303550	189811
6	14/09/2021	0	303514	189887
7	14/09/2021	0.08	303515	189983
8	14/09/2021	0.15	303512	190085
9	14/09/2021	0.12	303514	190185
10	14/09/2021	0.13	303414	190184
11	14/09/2021	0.05	303411	190085
12	14/09/2021	0.11	303413	189984
13	14/09/2021	0.1	303432	189912
14	14/09/2021	0	303396	189863
15	14/09/2021	0	303410	189783
16	14/09/2021	0.1	303410	189686
17	14/09/2021	0.1	303411	189584
18	14/09/2021	0.16	303408	189484
19	14/09/2021	4.1	303413	189381
20	14/09/2021	0.12	303410	189282
21	14/09/2021	1.75	303414	189185
22	14/09/2021	0	303411	189085
23	14/09/2021	0.05	303410	188984
24	14/09/2021	0.05	303411	188888
25	14/09/2021	0.05	303411	188789
26	14/09/2021	0.08	303510	188686
27	14/09/2021	0.06	303409	188686
28	14/09/2021	0.04	303328	188688
29	14/09/2021	0	303310	188786
30	14/09/2021	0	303314	188886
31	14/09/2021	0.05	303311	188986
32	14/09/2021	0	303312	189086
33	14/09/2021	0.07	303314	189182
34	14/09/2021	0.14	303314	189281
35	14/09/2021	2.7	303314	189384
36	14/09/2021	0.32	303513	189182
37	14/09/2021	0.18	303514	189285
38	14/09/2021	2.42	303513	189384
39	14/09/2021	0	303612	189486
40	14/09/2021	0.05	303613	189387
41	14/09/2021	0.25	303612	189283
42	14/09/2021	0	303614	189187
43	14/09/2021	0.1	303613	189084
44	14/09/2021	0.1	303614	188984
45	14/09/2021	0	303612	188884

Probe ID	Date	Peat Depth (m)	Easting	Northing
46	14/09/2021	0.05	303612	188781
47	14/09/2021	0	303613	188684
48	14/09/2021	0	303712	188685
49	14/09/2021	0	303709	188593
50	14/09/2021	0	303815	188601
51	14/09/2021	0.1	303812	188685
52	14/09/2021	0	303709	188782
53	14/09/2021	0	303814	188788
54	14/09/2021	0.15	303813	188886
55	14/09/2021	0.1	303714	188884
56	14/09/2021	0	303714	188987
57	14/09/2021	0	303812	188985
58	14/09/2021	0.05	303907	188986
59	14/09/2021	0.2	303912	189086
60	14/09/2021	0.05	303813	189085
61	14/09/2021	0.35	303714	189084
62	14/09/2021	0.7	303711	189185
63	14/09/2021	0.1	303811	189185
64	14/09/2021	0	303913	189184
65	14/09/2021	0.35	303913	189287
66	14/09/2021	0	303813	189286
67	14/09/2021	0	303713	189286
68	14/09/2021	0	303711	189384
69	14/09/2021	0.1	303712	189486
70	14/09/2021	0.1	303613	189583
71	14/09/2021	0.1	303614	189685
72	14/09/2021	0.25	303612	189785
73	14/09/2021	0	303613	189884
74	14/09/2021	0.05	303612	189987
75	14/09/2021	0.1	303621	190088
76	14/09/2021	0.05	303809	190088
77	14/09/2021	0	303713	190185
78	14/09/2021	0	303811	190183
79	14/09/2021	0.1	303722	190081
80	14/09/2021	0	303712	189985
81	14/09/2021	0	303712	189885
82	14/09/2021	0.15	303712	189789
83	14/09/2021	0	303715	189685
84	14/09/2021	0	303714	189586
85	14/09/2021	0	303811	189484
86	14/09/2021	0	303808	189387
87	14/09/2021	0.1	303821	189597
88	14/09/2021	0	303811	189885
89	14/09/2021	0	303814	189986
90	14/09/2021	0.2	304014	189094
91	14/09/2021	0.4	304013	189187
92	14/09/2021	0.1	304011	189286
93	14/09/2021	0.1	304008	189376
94	14/09/2021	0	304112	189284

Probe ID	Date	Peat Depth (m)	Easting	Northing
95	14/09/2021	0	304114	189183
96	14/09/2021	0	304113	189085
97	14/09/2021	0.2	304214	189183
98	14/09/2021	0.1	304212	189286
99	14/09/2021	0	304017	189486
100	14/09/2021	0	304113	189487
101	14/09/2021	0.2	304215	189486
102	14/09/2021	0	303924	189512
103	14/09/2021	0.1	304012	189585
104	14/09/2021	0.1	304132	189692
105	14/09/2021	0	304009	189784
106	14/09/2021	0.1	304014	189687
107	14/09/2021	0.1	304112	189785
108	14/09/2021	0	303912	189685
109	14/09/2021	0	303911	189881
110	14/09/2021	0	303913	189984
111	14/09/2021	0.2	303879	190080
112	14/09/2021	0	303812	190185
113	14/09/2021	0	303713	190185
114	14/09/2021	0	303912	189785
115	14/09/2021	0	303912	189586
116	14/09/2021	0	303812	189685
117	14/09/2021	0	303815	189782
118	14/09/2021	0	303112	188785
119	14/09/2021	0	303013	188885
120	14/09/2021	0	303113	188885
121	14/09/2021	0	303013	188985
122	14/09/2021	0	303113	188985
123	14/09/2021	0	302912	189086
124	14/09/2021	0	303013	189086
125	14/09/2021	0	303112	189084
126	14/09/2021	0	302913	189185
127	14/09/2021	0	303013	189185
128	14/09/2021	0	303113	189185
129	14/09/2021	0	302912	189286
130	14/09/2021	0	302825	189387
131	14/09/2021	0	302812	189485
132	14/09/2021	0	302718	189585
133	14/09/2021	0	303212	190185
134	14/09/2021	0	303312	190185
135	14/09/2021	0	302812	189585
136	14/09/2021	0	303312	189583
137	14/09/2021	0	303212	189684
138	14/09/2021	0	303213	189785
139	14/09/2021	0	303311	189886
140	14/09/2021	0	303325	189990
141	14/09/2021	0	303012	190084
142	14/09/2021	0	303112	190084
143	14/09/2021	0	303213	190085

Probe ID	Date	Peat Depth (m)	Easting	Northing
144	14/09/2021	0	303312	190085
145	14/09/2021	0.16	303212	189186
146	14/09/2021	0.1	303013	189286
147	14/09/2021	0.19	303112	189285
148	14/09/2021	0.22	303213	189284
149	14/09/2021	0.1	303013	189385
150	14/09/2021	0	302912	189386
151	14/09/2021	0.2	303113	189385
152	14/09/2021	0.28	303212	189386
153	14/09/2021	0.05	302913	189485
154	14/09/2021	0.15	303013	189485
155	14/09/2021	0.23	303113	189485
156	14/09/2021	0.1	303213	189486
157	14/09/2021	0.1	303312	189485
158	14/09/2021	0.15	302912	189584
159	14/09/2021	0.18	303012	189585
160	14/09/2021	0.16	303113	189585
161	14/09/2021	0.1	303213	189586
162	14/09/2021	0	302812	189685
163	14/09/2021	0.15	302912	189685
164	14/09/2021	0.16	303012	189685
165	14/09/2021	0.07	303113	189685
166	14/09/2021	0.47	303312	189685
167	14/09/2021	0.4	302912	189785
168	14/09/2021	0.05	303013	189786
169	14/09/2021	0.11	303112	189786
170	14/09/2021	0.1	303314	189786
171	14/09/2021	0.1	303015	189883
172	14/09/2021	0.08	303111	189886
173	14/09/2021	0.1	303213	189884
174	14/09/2021	0.05	303112	189985
175	14/09/2021	0.05	303213	189985
176	14/09/2021	0.8	303019	189619
177	14/09/2021	0	303214	189086
178	14/09/2021	0	303212	188981
179	14/09/2021	0	303214	188883
180	14/09/2021	0	303214	188787
181	14/09/2021	0	303515	189082
182	14/09/2021	0	303513	188979
183	14/09/2021	0	303513	188879
184	14/09/2021	0	303513	188784

Annex D

Risk Assessment Methodology

The environmental risk assessment aims to assess the significance of each potential contaminant linkage. The key to the classification is that the designation of risk is based upon the consideration of both:

- **The magnitude of the potential consequence (i.e. severity).** It takes into account both the potential severity of the hazard and the sensitivity of the receptor; and
- **The magnitude of probability (i.e. likelihood).** It takes into account both the presence of the hazard and receptor and the integrity of the pathway.

The definitions for the qualitative risk assessment have been taken from "Guidance for the Safe Development of Housing on Land Affected by Contamination" Annex 4 R&D Publication 66: 2008 Volume 2.

The Likelihood Probability Classifications of SPR Linkage being realised is presented in Table D.1.

Table D.1 Likelihood Probability Classifications of SPR Linkage being realised

Classification	Definition	Examples
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit <10 yrs old containing a double skinned UST with annual integrity testing results available.
Low Likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.	a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space. b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space. b) Ground/ groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.

Classification	Definition	Examples
High Likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden. b) Ground/groundwater contamination could be present from chemical works, containing a number of USTs, having been in operation on the same site for over 50 years.

“Potential Consequence of Contaminant Linkage” gives an indication of the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure via the particular linkage being examined. The classification of consequence is presented in Table D.2.

Table D.2 Outline of Hazard Consequence Classifications for Receptor Types from Contamination Impact:

Classification	Human Health	Controlled Water	Ecology	Property Structures/ Crops and animals	Examples
Severe	Highly elevated concentrations likely to result in “significant harm” to human health as defined by the EPA 1990, Part 2A, if exposure occurs.	Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.	Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population.	Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in “significant harm” to human health as defined by the EPA 1990, Part 2A if exposure occurs.	Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.	Significant damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.

Classification	Human Health	Controlled Water	Ecology	Property Structures/ Crops and animals	Examples
Mild	Exposure to human health unlikely to lead to “significant harm”.	Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce.	Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population.	Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (e.g. mild skin rash). Surface spalling of concrete.
Minor	No measurable effects on humans	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.

The risk matrix to link the likelihood and consequence is shown in Table D.3

Table D.3 Risk Matrix

Likelihood:	Unlikely	Low Likelihood	Likely	High Likelihood
Potential Consequence:				
Severe	Moderate/low risk	Moderate Risk	High Risk	Very High Risk
Medium	Low	Moderate/low risk	Moderate Risk	High Risk
Mild	Very low risk	Low Risk	Moderate/low risk	Moderate Risk
Minor	Very low risk	Very low risk	Low Risk	Low Risk

The overall risk definitions are summarised in Table D.4.

Table D.4 Risk Definitions

Risk	Definition
Very Low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.

Risk	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
