Caerphilly County Borough Council

B040567

Plas Y Felin Primary School

Desk Top Study and Ground Investigation Report

May 2023

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TETRA TECH

Desk Top Study and Ground Investigation Report

B040567
May, 2023

PRESENTED TO

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EXECUTIVE SUMMARY

The Site	The site is located in Caerphilly, South Wales. It is northeast of Caerphilly Castle and north of the B4263 Mill Road. The approximate postcode is CF83 3FP and is centred on National Grid Reference ST 15282 87763. The site comprises the existing Plas Y Felin primary school buildings in the west and centre of the site with associated hard standing and playing field in the east of the site.
Site History	The available mapping shows that the site was agricultural land until the construction of the school in the 1970's. The mapping shows an absence of further development from the 1970s to present day. In the wider area the mapping shows a gradual expansion of residential development to the land south, west and north west throughout the 20th century, a gas works c.100m west of the site from 1920-2010 and a further school east of the site from the 1930s. The Nant yr Aber is located immediately east of the site. The mapping does not show any changes to the path of the river.
Geology	The BGS mapping does not identify Made Ground on site. However, limited deposits are anticipated associated with the initial development of the school. The BGS Geoindex identifies superficial deposits of Glacial Till across the site, with a small outcrop of alluvium along the eastern boundary. The site is shown to underlain by bedrock of the Grovesend Formation of mudstone and siltstone with well-developed coals.
Hydrogeology and Hydrology	The Glacial Till is classified as a Secondary Undifferentiated Aquifer. The Grovesend Formation bedrock is classified as a Secondary A Aquifer. Groundwater vulnerability on the site has been classified as "Secondary Aquifer – Low". The site is not located within a Source Protection Zone. The nearest water course is the Nant yr Aber located along the eastern boundary of the site. Groundwater beneath the site is anticipate to flow broadly eastward towards the Nant yr Aber.
Radon	The site is in an area where less than 1% of homes are above the Radon Action Level. As such, radon protection measures are not required for new developments.
Unexploded Ordnance	The freely available UXO risk mapping indicates that the site is located in a Low Risk area.
Environmental Database Search	The Groundsure report indicates that there are no records of significantly contaminative, high risk features on or adjacent to the site.
Site Investigation	The ground investigation was undertaken in two phases: <u>Phase One</u> This phase was undertaken between 5th and 9th January 2023 and comprised: • 10no. windowless sample boreholes to 5.00m bgl 5 of which to be installed as monitoring wells, • 9no. trial pits to 2.00m bgl with soil infiltration testing in 4no. locations, • 9no. TRL probe tests DCP). <u>Phase Two</u> This phase was undertaken between 16th and 20th January 2023 and comprised: • 3no. rotary boreholes by openhole methods to 40.00m bgl to identify coal seams below the site, • 4no. cable percussive boreholes to 10.00m bgl three. of which to be installed as monitoring wells. Following the two phases of ground investigation 3no. rounds of ground gas and groundwater monitoring were undertaken between 23rd January and 21st March 2023.

Ground Conditions	The ground investigation found ground conditions to comprise: • Topsoil across the majority of the site (max. of 0.50m). • Made Ground encountered at WS107 only to 0.50m bgl. • Alluvium was identified in a single location WS101 between 0.55 and 1.50m in the south-eastern corner of the site • Glacial Till was present across the site and proven to a maximum depth of 8.20m bgl.. • Grovesend Formation bedrock was identified in 3no. locations (BH101-BH103) from a minimum depth of 7.00m to a termination depth of 40.00m bgl.
Coal Mining Risk Assessment	The risk assessment indicates that there is a Low Risk of ground instability as a result of deep or shallow recorded/unrecorded mining and mining geology beneath the site. The high risk development designation is based on the location of the conjectured outcrop of the Mynyddislwyn Seam which has not been encountered during the rotary openhole drilling works.
Geotechnical Assessment	Site won materials are likely to comprise both fine and coarse grained Glacial Till. Testing has shown the soils to be considerably wet of optimum moisture content for achieving good compaction if re0used as engineered fill. The soils will need need drying out and or processing before re-use. Traditional shallow or pad foundations placed at a depth of 1.2m bgl are considered a viable option, although this will need to be confirmed once structural loading are known Alternative ground improvement of oiled foundations will need to be considered. Floor slabs mat be ground bearing where the formation consists of coarse grained Glacial Till. However, should fine grained Glacial Till be present at formation, which is likely given the variability of the unit, these soils will need to be removed and replaced with granular fill or floor slabs be suspended. Groundwater ingress into excavations will need to be considered and likely below 1m. At its shallowest groundwater was recorded at 0.3m bgl during winter months. For buried concrete the Design Sulphate Class for the site can be taken as DS-1 and the Aggressive Chemical Environment for Concrete (ACEC) site classification can be taken as AC-3z.
Ground Contamination Assessment	Analysis of the laboratory soils results has indicated low contaminant concentrations, below the generic screening criteria for a residential without plant uptake end use. Furthermore. asbestos was not identified in the lab results. As such, a low risk to current and future site users and moderate/low risk to construction workers has been identified. Analysis of the laboratory results for soil derived leachate and groundwater has also shown low contaminant concentrations resulting in a low risk to groundwater and off-site surface waters, including the Nant yr Aber.
Ground Gas Assessment	The ground gas monitoring has indicated low concentrations of carbon dioxide and methane coupled with low borehole flow rates resulting a classification of Character Situation 1 Very Low Risk. As such, gas protection measures are not required for future developments.
Conclusions and Recommendations	Should contamination not previously identified by the ground investigation be encountered during the development phase of works, it is recommended that works are ceased and that a suitable qualified environmental consultant is contacted to confirm the required control measures.

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
AOD	above Ordnance Datum
bgl	below ground level
BGS	British Geological Survey
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
C4SL	Category 4 Screening Levels
CIEH	Chartered Institute of Environmental Health
CLEA	Contaminated Land Exposure Assessment
CoC	Constituent of Concern
CSM	Conceptual Site Model
DEFRA	Department of Environment, food and Rural Affairs
DQRA	Detailed Quantitative Risk Assessment
DTS	Desktop Study
DRO	Diesel Range Organics
DWS	Drinking Water Standard
EA	Environment Agency (England)
EPH	Extractable Petroleum Hydrocarbons
EQS	Environmental Quality Standards
FOC	Fraction Organic Carbon
GPR	Ground Penetrating Radar
LOD	Limit of detection
LQM	Land Quality Management
NRW	Natural Resources Wales
OS	Ordnance Survey
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PPE	Personal Protection Equipment
ppm	parts per million
PRO	Petroleum Range Organics
SGV	Soil Guideline Values
SOM	Soil Organic Matter
SVOC	Semi-volatile organic compounds
TPH	Total Petroleum Hydrocarbon
TSV	Tier 1 Screening Values
VOC	Volatile Organic Carbon
VPH	Volatile Petroleum Hydrocarbons
AOD	above Ordnance Datum

1.0 INTRODUCTION

1.1 INSTRUCTION

Tetra Tech Environment Planning Transport Ltd (Tetra Tech) was commissioned by Caerphilly County Borough Council (the client) to undertake a Geo-Environmental Desk Top Study and Ground Investigation for a site known as Plas Y Felin (known hereafter as “the site”).

The location of the site is shown on Figure 1.

1.2 BRIEF

The brief was to provide a Phase 1 Geo-environmental Desk Study assessment and intrusive ground investigation to provide information on the ground conditions and enable a geotechnical assessment and contaminated land risk assessment to support the proposed development of the site.

The work was designed to comprise the following elements:

- 10 No. window sample boreholes to a maximum depth of 5.00m bgl with Standard Penetration Tests (SPTs) conducted at 1m intervals throughout the full depth of the holes;
- 4 No. Cable Percussive boreholes to circa 10m with in-situ testing (SPT/UT100 where possible);
- 3 No. Rotary open boreholes to a maximum depth of 30.00m bgl to determine depth and thickness of the coal seam;
- 9 No. Trial pits to be excavated to a maximum depth of 2.00m with five soil infiltration test locations with 3 repeat tests to be carried out in general accordance with guidance set out in BRE 365 (2016);
- 9 No. CBR tests via Dynamic Cone Penetrometer to inform pavement design;
- Installation of a total of 8 No. ground gas and groundwater monitoring wells;
- On-site inspection and logging of recovered samples;
- Representative soil samples taken and submitted for geotechnical classification testing;
- Representative soil samples submitted and tested for a suite of potential contaminants;
- 3 No. return visits to monitor ground gas and groundwater levels;
- Preparation of a Ground Investigation report.

1.3 PROPOSED DEVELOPMENT

The DTS and intrusive ground investigation has been progressed to support outline design and cost plan for a new school at the existing Plas Y Felin Primary School site in Caerphilly. At the time of issue of this report a final development design has not been produced, but indicative layouts have been provided.

Initial layouts show the proposed new school building to be relocated onto the lowermost part of the site, in the eastern part and adjacent to the Nant yr Aber River. It has been proposed that the existing school on the upper tier will be demolished converted into hard standing areas for car parking following the construction of the new school development.

1.4 REPORT SCOPE

This report includes the following key elements:

- A record of the site visit and visual inspection walkover;

- A discussion of the current site status and key associated environmental influences observable by general visual inspection around the site;
- An historical site and area review, primarily referring to past editions of Ordnance Survey Maps;
- A discussion of the general expected ground and groundwater conditions within the topographical and area context referring to our own geological and hydrogeological maps library;
- Details of an Environmental database search (Groundsure report) of key relevant agencies, including Local and Statutory Authorities such as the Environment Agency/Natural Resources Wales;
- A baseline UXO risk assessment using on-line databases to classify the site with regards to UXO risk;
- Procurement and review of a Coal Authority Mining Report;
- Full factual records of the site works carried out;
- Summary of the ground conditions encountered;
- In-Situ testing results;
- Environmental laboratory testing results;
- Geotechnical laboratory testing results;
- Interpretation of Geotechnical and Environmental laboratory data, including a qualitative ground contamination risk assessment (compliant with CIRIA 552 (CIRIA, 2001) methodology);
- An executive summary of the report to allow a rapid, layman's overview.

1.5 LIMITATIONS

The recommendations and opinions expressed in this report are based on information obtained as part of the desk study or provided by others. Information provided from other sources is taken in good faith and Tetra Tech cannot guarantee its accuracy.

This report is subject to the report conditions presented in Appendix A.

The information contained in this report is intended for the use of the Caerphilly County Borough Council and Tetra Tech can take no responsibility for the use of this information by any third party or for uses other than that described in this report or detailed within the terms of our engagement.

2.0 SITE INFORMATION

2.1 LOCATION

The site is located in Caerphilly, South Wales and lies directly north-east of Caerphilly Castle and to the north of the B4263 Mill Road. The postcode of the site is CF83 3FP. The site is approximately 2.2ha in area and is centered on National Grid Reference (NGR) ST 15282 87763.

The site address is:

Plas Y Felin Primary School, Caenant Rd, Caerphilly CF83 3FP

A site location plan is presented in Figure 1.

2.2 GENERAL AREA CONTEXT

Table 2-1 - Surrounding land uses

	Description
North	A dense wooded area, with mature trees, is located immediately to the north of the site with an Asda superstore located beyond. Adjacent to the west of this wooded area is a series of parallel rows of residential housing, which encompasses the Glyn Derw sheltered housing complex.
East	Ysgol Gymraeg and St. Ilan School are located immediately to the east of the site separated by the Nant yr Aber River. Further residential housing and light commercial units are situated beyond with Caerphilly Rugby Football club and Caerphilly Castle Ladies & Girls football club being situated off Pontygwindy Road.
South	Residential properties are located immediately to the south of the site with further properties beyond. These are separated again by the Nant yr Aber River.
West	Residential properties are located off Caenant Road and Lewis Drive with a railway line beyond. Energlyn and Churchill Park station is situated north east of the site.

2.3 SITE DESCRIPTION

A site walkover inspection was undertaken by Tetra Tech on 5th January 2023 prior to an intrusive investigation. The general site layout is shown in Figure 2.

2.3.1 Current Site Usage

The site is entirely closed to the general public with a perimeter fence separating the school from the residential and commercial areas which surround the site. The western and central portion of the site is occupied by two grass verges separated by an access road which leads to an area of hardstanding used for car parking. In the central part of the site comprises two separate school buildings that are joined via a link corridor. A single storey building is located along the western boundary fence perimeter which is separate to the main school buildings.

Located within the northern part of the site is an area of hardstanding that is currently being used for car parking, along with an area situated adjacent to this which occupied by soft playground equipment. There are a series of three flights of steps that lead from the higher level down to the lower level. This lower level, located within the eastern part of the site, is predominantly used as an area of soft landscaping with a single football pitch compromising much of this area.

2.3.2 Access and Boundaries

The school is fenced around its border and access is available via two swing gates at both locations. The first access point is immediately off Lewis Drive after exiting the B4263 (Mill Road), with the second access point being located at the end of Emlyn Drive, which similarly to the first access point is also off Lewis Drive.

2.3.3 Topography

The site generally consists of two levels. The higher level comprises the current school buildings along with areas of hard standing for both car parking and an area which is being used as a playground. This area of the site is generally level. The lower level (known as level 1) is located to the east of the school buildings and is located adjacent to the current River Nanty yr Aber. This area is also predominantly flat and is currently being utilised as sports pitches for the school with a series of football pitches located within the centre.

2.3.4 Ground Cover and Vegetation

The ground cover at the site consists of a mixture of either hardstanding or soft landscaped of grass and sporadic tree cover. Much of the soft landscaping is found around the extremities of the site with the hardstanding found within the central part of the site.

2.3.5 Drainage

A drainage survey has not been undertaken. Sewer covers were identified within areas of hard standing situated at the front of the school stemming from Caenant Road.

2.3.6 Services

A full comprehensive PAS128 utility survey has not been undertaken at the site. Utility plans shows the supply of services encroaching the site from the western boundary at the front of the school. Due to the site area being private, many of these services are notmapped. However, numerous scars and manhole covers could be seen sporadically around the site indicating the presence of services.

2.3.7 On-Site Structures and Fuel Tanks

No other structures or fuel tanks have been identified on site other than the school and associated outlet buildings that are currently present on site.

2.3.8 Electrical Substations

A single electrical substation is located on site in the north-west part of the site, which appears to be the electrical supply to the school.

2.3.9 Asbestos Containing Materials

No asbestos containing materials were observed during the walkover.

2.3.10 Signs of Contamination

There was no sign of contamination during the walkover.

2.4 PREVIOUS INVESTIGATIONS

No previous geo-environmental assessment reports relating to the site have been provided to Tetra Tech for review as part of this desk-based study.

3.0 GEOLOGY, HYDROGEOLOGY, HYDROLOGY AND RADON

3.1 GEOLOGY

Details of the geology underlying the site have been obtained from the following sources:

- British Geological Survey (BGS) Sheet No. EW249 Newport Solid and Drift Solid Edition, 1:50 000 scale;
- BGS website (British Geological Survey, 2023), accessed 05/01/2022.
- Environmental database (Groundsure) presented in Appendix B.
- BR211 Indicative Radon Mapping (Scivyer, 2015).
- Coal Authority Interactive Mapper (The Coal Authority, 2023), accessed 05/01/2022.
- Coal Mining Report (Reference 51003328578001) enclosed as Appendix C.

3.1.1 Made Ground

The Groundsure does not indicate the presence of Made Ground on site; however due to development of the site limited Made Ground deposits are anticipated.

3.1.2 Superficial Geology

There are two superficial deposits recorded on the site, Glacial Till and Alluvium.

Glacial Till (diamicton) of Devensian age is recorded across the majority of the site. It consists of a heterogenous mixture of clay, sand, gravel, cobbles and boulders varying widely in composition, size and shape.

A small outcrop of Alluvium deposits appears to encroach the site along the eastern boundary. This is likely to be associated with the Nant yr Aber River. The Alluvium deposits are indicated to comprise of Clay, Silt, Sand and Gravel.

3.1.3 Solid Geology

The site is underlain by the Grovesend Formation which comprises predominantly argillaceous, mudstones, siltstones and sandstones, with well-developed coals; minor lithic ("Pennant") sandstones; locally developed red mudstones in the type area.

3.1.4 Historical Borehole Logs

Local British Geological Survey (BGS) historical borehole records and logs have been referred to for information only. There are four borehole records within 200m of the site and are associated with the development of Mill Road Bus Depot.

A summary of reported ground conditions is presented in Table 3-1 below with copies of the borehole logs presented in Appendix E.

Table 3-1 – Summary of BGS Borehole Logs

Reference Number	Borehole type and Depth (m bgl)	Distance and Direction from Site	Details

ST 314970 187530	Shell and Auger (150mm diameter) 8.00	238m SW	**GL – 2.50m** *Soft brown mottled light brown sandy silty CLAY with some gravel, some ash and clinker (MADE GROUND).* **2.50 – 3.00m** *Soft brown sandy clayey SILT with soft brown silty CLAY.* **3.00 – 3.40m** *Soft light brown mottled yellow green clayey medium sandy SILT.* **3.40 – 8.00m** *Dense fine, medium and coarse subangular to angular GRAVEL with medium and coarse SAND and COBBLES.*
ST 314970 187530	Shell and Auger (150mm diameter) 5.00	238m SW	**GL – 0.50m** *Ash and hardcore.* **0.50 – 1.75m** *Soft brown mottled light brown sandy and silty CLAY with some gravel (MADE GROUND).* **1.75 – 2.50m** *Soft brown sandy silty CLAY with gravel.* **2.50 – 3.75m** *Soft brown-black sandy clayey SILT with some gravel.* **3.75 – 5.00m** *Dense grey fine, medium and coarse GRAVEL, and medium and coarse SAND with cobbles.*
ST 314970 187530	Shell and Auger (150mm diameter) 8.00	238m SW	**GL – 0.20m** *Black ash.* **0.20 – 1.75m** *Soft light brown – brown sandy silty CLAY with gravel. Becoming sandy with depth (MADE GROUND).* **1.75 – 2.75m** *Loose black clayey DUFF with clinker (MADE GROUND).* **2.75 – 3.20m** *Soft grey – brown mottled yellow green clayey very sandy SILT.* **3.20 – 5.00m** *Very dense grey subangular to rounded fine. medium and coarse GRAVEL with medium and coarse SAND and COBBLES.* **5.00 – 8.00m** *Very dense brown grey subrounded to subangular fine, medium, and coarse GRAVEL with medium and coarse*

			SAND and COBBLES. Sander with some silt to base.
ST 314970 187530	Shell and Auger (150mm diameter) 7.40	238m SW	**GL – 3.00m** *Very loose black duff with coarse sand and fine gravel sized clinker. Occasional patches of soft brown clay (MADE GROUND).* **3.00 – 4.25m** *Soft brown mottled coarse sandy CLAY.* **4.25 – 7.40m** *Dense grey fine medium and coarse subrounded GRAVEL with medium and coarse SAND and some cobbles. Becoming sandier with depth.*

3.1.5 BGS Soil Chemistry

The Groundsure Report also provides Urban Soil Chemistry Averages for the site (source: Urban Soil and Soil Chemistry data provided by the British Geological Survey). The information is summarised in Table 3-2 below.

Table 3-2 – Urban Soil Chemistry Averages

Determinand	Soil Concentration Range	
	Minimum (mg/kg)	Max (mg.kg)
Arsenic	15.00	15.00
Bioaccesible Arsenic	No data available	No data available
Cadmium	1.80	1.80
Chromium	60.00	90.00
Lead	100.00	100.00
Bioaccesible Lead	60.00	60.00
Nickel	15.00	30.00

3.2 HYDROGEOLOGY

3.2.1 Aquifer Classification

The Grovesend Bedrock Formation is designated as a Secondary A Aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The Superficial Glacial Till across most of the site is classified as a Secondary Undifferentiated Aquifer. This has been assigned in cases where it has not been possible to attribute either a Secondary A or B aquifer to the soil type due to the variable characteristics. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type. A small outcrop of Superficial Glacial Till in the south-east corner of the site is classified as a Secondary A Aquifer. These are permeable layers capable of supporting water supplies at a local rather than

strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

In practice and dependent on local conditions, these are either predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering, or may contain permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

3.2.2 Groundwater Vulnerability

Guidance released by the EA (Envionment Agency , March 2017) states that activities that have the potential to affect the quality or quantity of groundwater must prevent groundwater pollution. All groundwater is vulnerable to pollution, and some geological formations are more vulnerable than others. The risks of groundwater pollution from any given activity depend in part on:

- The physical, chemical and biological properties of the underlying soil and rocks;
- Depth and quality of soil;
- The presence of glacial sediment and other materials – known as 'drift' deposits; and,
- Depth of the unsaturated zone.

All of the above affect how groundwater is more or less vulnerable to pollution, with type of vulnerability generally one of the following:

- Intrinsic vulnerability – this relates to the physical characteristics, it includes soil type, presence of superficial soils, or rock type; and,
- Specific vulnerability – this relates to the effect of the proposed activity including any contaminant and consequent risk to groundwater.

A review of the Groundwater Vulnerability Maps has revealed that the Bedrock and Superficial Deposits are categorised as 'Secondary Aquifer – Low'. Low vulnerability aquifers are defined as being able to *"areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability"*

3.2.3 Groundwater Source Protection Zones

The EA defines groundwater Source Protection Zones (SPZs) around identified abstractions to aid the assessment of risk to groundwater or abstraction sources from development. SPZs have three subdivisions and bespoke SPZs are defined for all major abstraction sources intended for human consumption or food use, e.g. boreholes and springs. These sub-divisions are defined as follows:

- SPZ1 – Inner protection zone - defined as the 50-day travel time from any point below the water table to the abstraction source. This zone has a minimum radius of 50 metres;
- SPZ2 – Outer protection zone - defined by a 400-day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the abstraction source, depending on the size of the abstraction;
- SPZ3 – Source catchment protection zone - defined as the area around an abstraction source within which all groundwater recharge is presumed to be discharged at the abstraction source.

The site is not shown to be situated within an EA defined groundwater SPZ.

3.2.4 Depth to Groundwater and Anticipated Groundwater Flow Direction

No available previous Ground Investigation Reports or borehole logs are available to comment on the groundwater flow direction. However, due to the close proximity of the nearest watercourse (Nanty yr Aber) and

the general sloping of the site towards the watercourse, within the east of the site, it may be assumed that groundwater would flow in the direction of the river.

However, this should later be confirmed following intrusive site investigation.

3.2.5 Groundwater Abstractions

There are no groundwater abstractions recorded within 250m of the site as recorded within the Environmental Database (Groundsure report). The nearest groundwater abstraction is 1372m SW details of which can be found within the Groundsure Report.

3.3 HYDROLOGY

Details of the hydrology of the area have been obtained from the following sources:

- MAGIC interactive mapping website (DEFRA, 2022), accessed 09/01/2022; and,
- Environmental database (Groundsure Report).

3.3.1 Watercourses

The Groundsure report records a single watercourse present, namely the Nant yr Aber 5m NE of the site, flowing from the south of the site, along the eastern boundary and towards the north-east. This watercourse is an inland river which is not influenced by normal tidal action. There are a series of on ground surface watercourses (92m N) which contain water year-round (in normal circumstances), which are likely to be tributaries associated with the Nant yr Aber.

The site is within a Water Framework Directive (WFD) surface water body catchment area for the operational catchment of the River Rhymney, located approximately 1300m NE of the site, and located within the management catchment of the South East Valleys.

3.3.2 Surface Water Abstractions

There are no surface water abstractions within 250m of the site boundary.

3.3.3 Discharge Consents

Table 3-5 below outlines the three surface water discharge consents recorded within 250m of the site. A further three discharge consents are situated within 500m of the site, details of which can be found within the Groundsure Report.

Table 3-3 – Summary of Surface Water Discharge Consents within 250m of the site.

Location and Direction	Address	Details	
On site	Res Devmt Ps off Morgan Street Residential development Caerphilly Wales	Effluent Type: Sewage discharges – pumping station – water company. Permit Number: AN0287201 Permit Version: 1 Receiving Water: Nant Yr Aber	Status: Effective Issue date: 22/02/1999 Effective Date: 22/02/1999 Revocation Date: -

114m S	Caerphilly – M/J Park SWO	Effluent Type: Sewagae Dsicharges – Sewer Storm Overflow – Water Company Permit Number: AN0016501 Permit Version: 1 Receiving Water: NANT-YR-ABER	Status: Surrendered Issue date: 07/10/1986 Effective Date: 07/10/1986 Revocation Date: -
114m S	Caerphilly – M/J Park SWO	Effluent Type: Sewagae Dsicharges – Sewer Storm Overflow – Water Company Permit Number: AN0016502 Permit Version: 1 Receiving Water: NANT-YR-ABER	Status: Surrendered Issue date: 07/10/1986 Effective Date: 07/10/1986 Revocation Date: -

3.3.4 Pollution Incidents and Prosecutions

A summary of recorded Pollution Incidents and Prosecutions are presented in Table 3-6 below.

Table 3-4 – Summary of Pollution Incidents and Prosecutions within 250m of the site.

Location and Direction	Details	
44m S	Incident Date: 09/04/2001 Incident Identification: 1987 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
53m S	Incident Date: 13/07/2013 Incident Identification: 1132692 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: - Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
125m SW	Incident Date: 11/10/2002 Incident Identification: 114181 Pollutant: Specific Waste Materials Pollutant Description: Other Specific Waste Material / Other Contaminated Water	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
177m SW	Incident Date: 31/03/2002 Incident Identification: 67880 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

3.4 RADON

The BRE document 211 (Scivyer, 2015) mapping coverage for the site area was consulted and indicates that the site is located within an area where no radon protection measures are required for new developments. This statement is supported by the Groundsure Report (Appendix B) which confirms that the site is in a low probability radon area as less than 1% of homes are above the action level.

In December 2022 the UK Health Security Agency and BGS have published an updated radon potential map for Great Britain. The interactive mapping shows no change for the site.

3.5 HISTORICAL MINING

According to the Coal Authority Interactive Viewer (The Coal Authority, 2023) the site is located within a Coal Mining Reporting Area and a middle strip across the site is recorded as a Development High Risk Area. As such, a site-specific Coal Authority Report has been obtained for the site and is presented in Appendix C and summarised in Table 3-7 below.

Table 3-5 – Summary of Coal Authority Report

Feature	Details
Past Underground Coal Mining	Two coal seams associated with the Mynyddislwyn Lower Leaf seam (reference 41RX and 41RY) are identified to underlie the site at two separate depths of 151m and 160m bgl with a dipping rate of 3.4 and 2.1 degrees respectively. Both seams were last mined within 1879, with a dipping direction of north (41RX) and north-east (41RY)
Present Underground Coal Mining	Nothing recorded within the Coal Authority Report.
Future Underground Coal Mining	None recorded
Mine Entries	None recorded within 100 metres of the enquiry boundary.
Coal Mining Geology	A single workable seam coal outcrop (Mynyddislwyn Big Rider), with a bearing outcrop of 90 is present beneath the site. However, the direction to outcrop is unknown.
Past Opencast Coal Mining	None recorded within 500 metres of the enquiry boundary
Present Opencast Coal Mining	None recorded within 500 metres of the enquiry boundary
Future Opencast Coal Mining	None recorded within 500 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.
Hazards related to coal mining	Nothing recorded within the Coal Authority Report.

Withdrawal of Support	The property is not in an area where a notice to withdraw support has been given. 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

3.5.1 Non-Coal Related Mining

The Groundsure Report shows that there is no evidence of non-coal related mining to have occurred within the site boundary. There are no natural cavities or BritPits within 500m of the site. The nearest surface ground workings are located 31m and 34m south-west of the site with the area being used as a pond which was identified in 1899 and 1875 mapping (1:10,560). An unspecified pit, located 243m south-west, was present in 1969 (1:10,560 mapping).

There are twenty records of underground workings within 1000m of the site, although none of these records are within 500m of the site. Full details of these records can be found within the Groundsure Report.

3.6 BGS RECORDED MINERAL SITES

With reference to the Environmental Database (Groundsure report) and the BGS Geoindex database, there are no BGS recorded mineral sites recorded within 500m of the site. Mineral sites that are within 500m of the site have been outlined within the previous section 3.5.1.

4.0 UNEXPLODED ORDNANCE

Based on freely available mapping data from Zetica UXO (Zetica UXO, 2008), accessed on 10th January 2022, the site is located within a **Low Risk** Area with regards to Unexploded Ordnance (UXO). A 'Low Risk' area is defined by Zetica as:

'Low risk regions are those with a bomb density of up to 10 bombs per 1000 acres. These areas are considered to have a significant but low UXB risk. In general, further action to mitigate the risk is considered prudent, although not essential. Care is required when assessing the risk for specific sites where the risk may be higher because of local wartime activity'.

Due to the site being situated within a low risk area, a Zetica UXO PDSA was deemed not to be required.

5.0 SITE HISTORY

5.1 INTRODUCTION

The historical development of the site and surrounding area has been assessed using information available from historical Ordnance Survey (OS) maps within the Groundsure Report for the site which is presented in Appendix B of this report.

In the context of the summary of historical development of the surrounding area, the descriptions are limited to within approximately 500m of the site boundary, unless specified in the following section.

5.2 SITE HISTORY

5.2.1 Detailed Analysis of Site History

The table below provides a detailed account of the review of available OS mapping coverage and historical aerial imagery for the site and general area dating back to 1875.

Table 5-1 – Summary of Historical Data

Map Date & Scale	Within Site Boundary	Surrounding Area
1875. 1:10,560 1876 1:2,500	Undeveloped agricultural fields.	Caerphilly located approx. 500m SE of site. Railway line heading N-S approx. 250m W of site. Majority undeveloped agricultural land in other directions. The Nant yr Aber river runs N-S along the E boundary of the site and turns towards the W, coming within 20m of site. Energlyn Mill noted 100m S of site.
1898-1899. 1:10,560 1900 1:2,500	No significant changes.	Increase in residential properties to within 500m SE.
1915. 1:10,560	No significant changes.	Large increase in residential properties approx. 250m W, NE, E and SE of site. Gas works noted approx. 125m SW of site.
1920. 1:2,500	No significant changes.	New residential properties noted directly S of site and allotment gardens noted SE of new properties.
1937. 1:2,500	No significant changes.	New school noted approx. 125m E of site. Further increase in residential properties to the SE.
1965-1968. 1:10,560 1962 1:2,500	No significant changes.	Large increase in residential properties in all directions from site – up to 750m and beyond. Gas works to SW increased in size.
1976. 1:2,500	Two new school buildings constructed. Infant School in the SW and Junior School in the centre of the site.	Increase in residential properties in all directions from site.
1993. 1:1,250	No significant changes.	No significant changes.

2010. 1:10,000	No significant changes.	Gas works no longer noted to SW.
2021. 1:10,000	No significant changes.	No significant changes.

5.2.2 Summary of Site History

The available historical mapping indicates that the site was utilised as agricultural fields prior to the development of the infants school in the southwest of the site, and junior school in the centre of the site during the 1970s. The mapping shows no evidence of further development of buildings since the initial construction.

In the wider area, the mapping indicates that the surrounding land use in the late 1800s was predominantly agricultural with a small number of mills c.100m south and a railway line c.150m west. Mapping from the 1920s shows the start of the residential development south of the site and a gas works c.100m west of the site. Mapping from 1937 shows the development of a school in the fields east of the site. Through the remainder of the 20th century the mapping shows an expansion of the residential development south, with additional housing immediately west and north west shown in mapping from the 1970s. The gas works west of the site remains until 2010 where mapping shows in has been demolished, with residential housing shown in this area in the 2020 mapping.

6.0 ENVIRONMENTAL DATABASE SEARCH

6.1 INTRODUCTION

Regulatory authority information relevant to the site and its surroundings has been obtained from the undertaking of an environmental database search (Groundsure). The information is summarised below, and the environmental database records are enclosed in Appendix B. Distances stated are approximate and are taken from the boundary of the site to the database recorded entries.

The following summary is generally limited to locations within 250m of the site boundaries unless it is considered that installations or activities beyond that range could potentially have an impact on the site or be affected by the redevelopment of the site.

6.2 POLLUTION CONTROLS

The Groundsure Insight Report identifies no Pollution Controls within 250m of the site boundary.

6.3 WASTE

The Groundsure Insight Report identifies no records pertaining to waste disposal, management, and transfer facilities within 250m of the site boundary.

The nearest historical waste site is situated 183m SW at the former bus depot, Mill Road, Caerphilly, CF83 3F, which submitted planning application to convert a recycling centre. The application was received on 01/05/1993 with no further information available.

6.4 HAZARDOUS SUBSTANCES

The following table outlines records relating to the storage and use of Hazardous Substances within 250m of the site boundary.

Table 6-1 – Summary of Hazardous Substances within 250m of the Site

Type	Details
Control of Major Hazards Sites (COMAH)	91m SW British Gas, Gasworks, Mill Road, Caerphilly, CF8 3FE Historical NIHHS Site
Explosive Sites	None recorded
Notification of Installations Handling Hazardous Substances (NIHHS)	134m SW 25/11/1992 Transco PLC, Caerphilly Holder Station, Mill Road, Caerphilly, Mid Glamorgan, Wales, CF83 3FF Details: Natural Gas Storage Site. Enforcement: Data requested, not received. Date of enforcement: Data requested, not received. Comment: Data requested, not received.

There are no recorded pollution events, no landfills within the site boundary, no fuel stations, nor any environmentally sensitive areas which would impact the site. There is industrial land use nearby the site, reflective of the residential area that it is situated within.

6.5 ENVIRONMENTALLY SENSITIVE AREAS

Table 6-2 – Summary of Environmentally Sensitive Areas within 250m.

Designation	Location and Name	Details
Nitrate Vulnerable Zone (Surface Waters)	None recorded	None recorded
Nitrate Vulnerable Zone (Groundwater)	None recorded	None recorded
Special Protected Areas	None recorded	None recorded
Sites of Special Scientific Interest	None recorded	None recorded
Special Areas of Conservation	None recorded	None recorded
Adopted green belt	None recorded	None recorded
Green belt	None recorded	None recorded
Nature Reserve	None recorded	None recorded

6.6 FLOODING

The absence or presence of flooding potential at the site is summarised in the table below.

Table 6-3 - Summary of Flooding Potential

Designation	On Site	Detail
River and Coastal Flooding	Yes	Flood Zone 2
Flooding below Ground Level (from Groundwater)	Yes	Low
Flooding from Surface Waters	Yes	The site is marked as susceptible to surface water flooding, with a 1 in 30 year return period, and a flooding depth of between 0.3m to 1.0m

6.7 INDUSTRIAL LAND USE

The following section outlines the surrounding industrial land use within 100m and considered to be relevant to the site and the proposed development.

Table 6-4 - Summary of Industrial Land Use within 100m

Land Use	Detail
Electricity Substation	Gwent, CF83
Sylric Press (14m SE)	26, Morgan Street, Caerphilly, Gwent, CF83 3FQ Published Goods
Sewage Pumping System (42m SE)	Gwent, CF83. Waste storage, processing and disposal.

Central Cars Cardiff (51m S)	23, Morgan Street, Caerphilly, Gwent, CF83 3FQ Vehicle hire and rental
Caerphilly Van Centre (61m SW)	Caenant House, Mill Road, Caerphilly, Gwent, CF83 3FE New vehicles
Day's Valeting (62m S)	1, Caenant Road, Caerphilly, Gwent, CF83 3FP Vehicle Cleaning Services
Electricity Sub Station (61m S)	Gwent CF83
Works (81m S)	Gwent, CF83 Unspecified Works Or Factories

The above table is not an extensive list, only those that would have an impact on the proposed development. For full comprehensive details of the Industrial land use then refer to the Groundsure Report within Appendix B.

6.8 SUMMARY OF ENVIRONMENTAL SETTING

A review of environmental records and historical maps has demonstrated that the site environmental setting has been dominated by its current usage as a school, which has undergone minor expansions overtime. There are also records relating to light industrial usage and manufacturing the adjacent to and within the area surrounding the site.

However, there are no records of significantly contaminative, high risk features adjacent to the site (e.g. fuel stations, landfills, gas works) or within the site boundary. Whilst light industrial usage and commercial buildings surrounding the site have been documented which could have led to migration of contamination onto the site itself, it is more likely that any contamination which may be present would be the result of the site's long-term usage as a following construction of the school buildings.

7.0 RATIONALE FOR SITE INVESTIGATION

Based on the findings of the Desk Top Study presented above, ground investigation is considered necessary to support the assessment process. The rationale for the intrusive phase of investigation in terms of geotechnical and ground contamination assessments is presented below.

7.1 GROUND CONTAMINATION

The UK procedure for the assessment of potential ground contamination considered the likely Source-Pathway-Receptor linkages between potential contamination on the site and proposed receptors in terms of both human health and the risks to the wider environment.

Based on the information presented in the proceeding sections the following sources have been identified on site which require further assessment through intrusive ground investigation.

- Made Ground associated with the initial construction of the school buildings

The proposed development includes the construction of a new school with associated hard standing areas used for car parking and as such the following potential receptors at risk are highlighted, both within the context of the current land use and the proposed development.

- Infilled ground
- Electrical substations

7.2 GEOTECHNICAL CONSIDERATIONS

Based on the anticipated ground conditions and the proposed development the following elements are considered to require ground investigation in terms of ground conditions and potentials geotechnical constraints.

- Depth to competent strata / bedrock;
- Presence of soft and unsuitable materials;
- Depth to groundwater;
- Soil infiltration rate;

7.3 PROPOSED GROUND INVESTIGATION

Based on the information summarised above a ground investigation was designed to assess the following elements.

- Investigation, logging and sampling of general ground conditions (superficial deposits and Made Ground soils) to assess the variability of soils and assess the depth to competent strata and/or bedrock;
- Installation of land gas and groundwater monitoring wells;
- Geotechnical testing of soils (in-situ and laboratory);
- Chemical laboratory testing of soils, soil derived leachate and groundwater chemistry for a range of contaminants including heavy metals, polycyclic aromatic hydrocarbons (PAHs), speciated hydrocarbons and asbestos testing of soils;
- Return visits to monitor land gas (In line with CIRIA 665 guidance) and groundwater;
- An interpretive land quality assessment including development of a refined conceptual site model (based on site specific data) and a qualitative risk assessment (compliant with UK CLR guidance and CIRIA 552 methodology) within the context of a commercial land use scenario;
- An interpretive geotechnical assessment of ground properties with respect to the proposed development of the site, including assessment of likely solutions for foundations, floor slabs and hard

surface areas. Feasibility of soakaway drainage, sulphate chemical attack and other salient matters such as potential requirements for ground stabilisation.

8.0 SITE INVESTIGATION

The site investigation was undertaken in two phases. The initial phase was undertaken between 5th January 2023 to 9th January 2023. Phase 2 of the site investigation was undertaken between 16th January to 20th January 2023.

Three groundwater and ground gas monitoring visits were undertaken between 23rd January and 21st March 2023 following the completion of the ground investigations.

Details of the fieldwork methods are given in the notes section at the end of this report.

8.1 SCOPE

The scope of the site investigation included the following:

Phase 1 Ground Investigation

- 10 No. Windowless Sample borehole to a maximum depth of 5.00m bgl including in -situ standard penetrating testing with dynamic probes following a shallow refusal.
- Installation of 5 No. 50mm ground gas and groundwater monitoring well;
- 9 No. machine excavated trial pits to a maximum depth of 2.00m bgl, with four locations having infiltration tests undertaken to BRE Digest 365 to inform drainage design;
- 9 No. TRLs, using DCP method, undertaken in locations of machine excavated Trial Pits to inform pavement design;
- On-site inspection and logging of recovered samples;
- Representative soil samples taken and submitted for geotechnical classification testing;
- Representative soil samples taken, submitted and tested for a suite of potential contaminants;

Phase 2 Ground Investigation

- 3 No. rotary boreholes by openhole methods to 40.00m bgl to identify coal seam below the site;
- 4 No. cable percussive boreholes to 10.00m bgl within the floor plan of the proposed building to inform foundation design.
- Installation of 3 No. 50mm ground gas and groundwater monitoring well;
- On-site inspection and logging of recovered samples;
- Representative soil samples taken and submitted for geotechnical classification testing;
- Representative soil samples taken, submitted and tested for a suite of potential contaminants;

The ground investigations were designed to provide an overall assessment of ground conditions.

Figure 2 shows the layout of the exploratory holes advanced during the site investigation. Exploratory hole logs including photographic plates are presented in Appendix E.

9.0 GROUND CONDITIONS ENCOUNTERED

9.1 STRATA ENCOUNTERED

The sequence of strata encountered beneath the site was;

- Topsoil
- Localised Made Ground
- Localised Alluvium Deposits
- Glacial Deposits
- Grovesend Formation

A summary of each stratum depth is provided in the table below, with descriptions of each stratum detailed in the subsequent sections. Exploratory hole logs including photographic plates can also be seen in Appendix E.

Table 9-1 – Summary of Ground Conditions Encountered

Location	Depth to base of strata (m bgl)					
	Topsoil	Made Ground	Alluvium	Glacial Till – Diamicton		Bedrock – Grovesend Formation
				Fine grained	Coarse grained	
WS101	GL – 0.55	Ne	0.55-1.50*	Ne	Ne	Ne
WS102	GL – 0.30	Ne	Ne	Ne	0.30 – 1.20*	Ne
WS103	GL – 0.50	Ne	Ne	0.50 - 2.40	2.40 - 4.00*	Ne
WS104	GL – 0.30	Ne	Ne	0.30 – 4.00*	Ne	Ne
WS105	GL – 0.50	Ne	Ne	0.50 – 2.00	2.00 – 3.50*	Ne
WS106	GL – 0.50	Ne	Ne	0.50 – 1.50*	Ne	Ne
WS107	Ne	GL – 0.50	Ne	0.50 – 2.00*	Ne	Ne
WS108	GL – 0.35	Ne	Ne	0.35 – 1.30*	Ne	Ne
WS109	GL – 0.40	Ne	Ne	0.40 – 2.00 3.00 – 4.40*	Ne	Ne
WS110	GL – 0.40	Ne	Ne	0.40 – 5.00*		Ne
TP101	GL – 0.20	Ne	Ne	0.20 – 0.80*	Ne	Ne
TP102	GL – 0.30	Ne	Ne	Ne	0.30 – 1.35*	Ne
TP103	GL – 0.30	Ne	Ne	Ne	0.30 – 1.50*	Ne

TP104	GL – 0.20	Ne	Ne	Ne	0.20 – 1.20*	Ne
TP105	GL – 0.30	Ne	Ne	0.30 – 0.80	0.80 – 1.70*	Ne
TP106	GL – 0.20	Ne	Ne	0.20 – 0.40	0.40 – 1.30*	Ne
TP107	Ne	GL – 0.50	Ne	Ne	0.50 – 1.70*	Ne
BH101	GL – 0.40	Ne	Ne	0.40-8.20	Ne	8.20-40.00
BH102	Ne	Ne	Ne	GL-7.40	Ne	7.40–40.00
BH103	Ne	Ne	Ne	GL-7.00	Ne	7.00-40.00
BH104	GL – 0.25	Ne	Ne	Ne	0.25 – 7.00*	Ne
BH105	GL – 0.25	Ne	Ne	0.25-4.30*	Ne*	Ne
BH106	GL – 0.20	Ne	Ne	Ne	0.20 – 7.00*	Ne
BH107	GL – 0.30	Ne	Ne	0.30 – 1.50	1.50 – 7.60*	Ne

*Base of stratum not proven Ne denotes not encountered

9.1.1 Topsoil

Topsoil was encountered across the entirety of the site, excluding two locations (TP107 and WS107) where there was Made Ground mixed within the strata. The topsoil was encountered to a maximum depth of 0.55m bgl which was identified in WS101. The topsoil was noted to be fairly consistent in composition across the slight variations within the varied intrusive ground investigation methods.

The topsoil encountered in the window sample locations could generally be described as *'grass turf over light brown slightly sandy gravelly SILT with occasional patches of clay. Sands are predominantly fine to medium. Gravels are fine to medium of subangular sandstone and blocky angular mudstone. Horizon has rare nodules of rootlets'* which was identified in WS106 to a depth of 0.50m bgl.

The topsoil encountered in the trial pit locations could generally be described as *'dark brown slightly sandy gravelly CLAY Sand is fine to coarse Gravel is fine to fine coarse angular to subangular with abundant rootlets'* which was identified in TP102 to a depth of 0.30m bgl with the topsoil encountered within the cable percussive boreholes being described *'firm brown silty slightly gravelly CLAY. Gravel is fine to medium sub rounded of sandstone'* which was identified to 0.25m bgl in BH105.

9.1.2 Made Ground

Made Ground was only encountered in two exploratory locations to a maximum depth of 0.50m bgl within WS107 and TP107. The Made Ground encountered could generally be described *as 'grass turf over light brown gravelly slightly clayey sandy SILT. Sands are fine to medium. Gravels are fine to medium of subangular mudstone with occasional clasts of subrounded sandstone. Horizon has occasional rootlets within the first 100mm. Horizon has rare subangular tabular red tile fragments in situ at 0.25m bgl'* which was identified in WS107 or as *'turf over dark brown slightly sandy CLAY. Sand is fine with abundant roots and rootlets'* which was identified in TP107.

9.1.3 Superficial Deposits – Alluvium

Superficial deposits, interpreted on site to be Alluvium were encountered on site and were found to be underlying the Topsoil in one exploratory hole location in the south eastern corner of the site. The coarse-grained alluvium deposits across the site could generally be described as *'greyish brown very silty sandy GRAVEL. Sands are fine to medium. Gravels are fine to medium of sandstone and mixed lithologies'* which was encountered in WS101 to a depth of 1.50m bgl.

9.1.4 Superficial Deposits – Glacial Till

Superficial deposits, interpreted on site to be Glacial Till (Diamicton) were encountered in all exploratory locations, excluding WS101, and were found to a maximum depth of 8.20m bgl which was encountered in BH101. The composition of the superficial deposits was found to have a fine grained and coarse-grained component following intrusive investigation.

The fine-grained superficial deposits could generally be described as '*orangish brown with frequent greyish brown and black staining, sandy gravelly CLAY. Sands are fine to medium. Gravels are fine to coarse becoming coarser with depth. Horizon becoming very cobbly from 0.65m bgl. Horizon becoming slightly damp with* depth *from 1.70m bgl horizon becoming very cobbly with flint and sandstone'* which was encountered in WS107 to a depth of 2.00m bgl.

A coarser component of Glacial Till deposits were also encountered on site and this stratum could generally be described as *'yellowish brown clayey silty sandy GRAVEL. Sands are fine to medium, gravels are fine to medium becoming coarser with depth of sandstone and mudstone, subangular to subrounded sandstone. horizon has rare and isolated patches of orangish brown and grey clay mottling, more frequent with depth'* which was identified to a depth of 1.20m bgl in WS102.

9.1.5 Bedrock – Grovesend Formation

Bedrock encountered beneath the site was interpreted to be the Grovesend Formation and was recorded in three of the exploratory locations (BH101-BH103).

Based on the drillers descriptions, the Grovesend Formation was noted to consist of interbedded layers of Mudstone and Sandstone. No coal seams, broken ground, voiding or loss of flush was noted during the drilling of BH101-BH103.

9.2 GROUNDWATER

During intrusive works, groundwater was encountered as strikes within the superficial deposits at depths ranging from 0.90m bgl in TP106 to 5.20m bgl in BH104. In total there were eleven recorded groundwater strikes within the exploratory locations.

Table 9-2 – Summary of Groundwater Strikes

A summary table of groundwater strikes are summarised in the table below:

Location	Final Depth (m bgl)	Depth 'Water Strike' (m bgl)	Depth Water Rose to (m bgl)	
BH104	7.00	5.20	2.80	Water rose to 2.80m after 20 minutes.
BH105	4.30	1.80	1.50	Water rose to 1.50m after 20 minutes.
BH106	7.00	1.55	1.00	Water rose to 1.00m after 20 minutes.

Location	Final Depth (m bgl)	Depth 'Water Strike' (m bgl)	Depth Water Rose to (m bgl)	
BH107	7.60	2.00	1.50	Water rose to 1.50m after 20 minutes.
TP102	1.35	1.20	1.20	Water was static after 20 minutes.
TP103	1.50	1.50	0.70	Water rose to 0.70m after 20 minutes.
TP104	1.20	1.35	1.35	Water was static after 20 minutes.
TP106	1.30	1.50	1.50	Water was static after 20 minutes.
TP107	1.70	0.90	0.90	Water was static after 20 minutes.
WS101	1.50	1.00	1.00	Water was static after 20 minutes.
WS107	2.00	1.20	1.20	Water was static after 20 minutes.

For full details of the water strikes at each location please see the full exploratory logs in Appendix E.

9.3 IN SITU TESTING

9.3.1 Standard Penetration Testing

Standard Penetration Tests were undertaken at 1.00m intervals during dynamic window sampling, in accordance with BS EN ISO 22476-3 (2005) and BS5930 (2015) to assess the relative density of the Made Ground and superficial deposits encountered within the boreholes.

As stipulated by BS5930:2015, the SPT N-values represented on the borehole logs are the uncorrected results which were obtained in the field, and these are presented on the boreholes logs in Appendix E.

9.3.2 Dynamic Cone Penetrometer - TRL probes

DCP probing to provide California Bearing Ratio values for pavement design was undertaken in eight exploratory positions (TRL01-TRL07) up to 1.0m bgl in the south-western area of the site. Results are presented in Appendix F.

9.3.3 Soil Infiltration Testing

4No. soil infiltration tests were scheduled to be carried out within trial pits, namely TP/SA01, TP/SA104, TP/SA105 and TP107. The tests were undertaken within the superficial deposits. The results of these tests can be found in Appendix G and are summarised in the table below.

Table 9-2 – Summary of Soil Infiltration Testing

Location	Depth (m bgl)	Strata	Hydraulic Conductivity (m/sec)		
			Test 1	Test 2	Test 3

TP/SA01	0.80	Dark reddish brown clayey gravelly SAND with medium cobble content Sand is fine to coarse Gravel is fine to coarse angular to subrounded Cobbles are subrounded subangular becoming less clayey with depth.	Test failed – water did not reach 75% invert level after 24 hours.	No further test undertaken
TP/SA04	1.20	Dark orangish brown clayey gravelly SAND with high cobble content Sand is fine to coarse Gravel is fine to coarse angular to subangular Cobbles are subrounded subangular angular well rounded.	No test undertaken due to groundwater strike.	
TP/SA105	1.70	Light orangish brown very gravelly SAND with high cobble content and with medium boulder content Sand is fine to coarse Gravel is fine to coarse angular to subangular Cobbles are subangular subrounded assorted lithologies Boulders are 400mm	Test failed – water did not reach 25% invert level after 24 hours.	No further test undertaken
TP107	1.70	Reddish orange very slightly clayey SAND. Sand is fine to coarse	No test undertaken due to groundwater strike.	

9.4 VISUAL OR OLFACTORY EVIDENCE OF CONTAMINATION

There were no significant visual or olfactory evidence of gross contamination was encountered during the ground investigation.

No Asbestos Containing Materials (ACM's) were identified during any part of the investigation. Environmental samples were obtained from shallow depths and scheduled for analysis. Results from the contamination testing can be found within Appendix I.

9.5 OBSTRUCTIONS

A drainage survey has not been conducted on the site and was not part of the ground investigation.

Within TP106, an old land drain was identified running north to south in orientation at 0.40m bgl. Following the uncovering of this land drain the pit was further extended and the drain was repaired with pipe and bedded with gravel.

10.0 COAL MINING RISK ASSESSMENT

All information collated on ground conditions is based on extrapolation from data available on adjacent sites and from literature sources. In summary, the following data sources have been consulted.

- Coal Authority Report ref. 51003328578001
- Coal Authority Interactive Map Viewer 2023
- British Geological Survey 1:50,000 scale mapping, Sheet 249: Newport
- British Geological Survey Geoindex Online Mapping
- British Geological Survey Borehole Database, comprising borehole logs of shafts and borehole records adjacent to the site.
- Tetra Tech Rotary Percussive Openhole Borehole Records

The BGS geology map indicates that the site is underlain by the Grovesend Formation which is predominantly argillaceous, comprising mudstones, siltstones and sandstones, with well developed coals; minor lithic ("Pennant") sandstones and locally developed red mudstones. The high-risk development designation highlighted on the coal authority interactive mapping is associated with a conjectured coal outcrop of the Mynyddislwyn Big Rider Seam that runs generally east west through the middle of the site. A plan showing the location of the conjectured coal seam is presented in Appendix C. No other high-risk development designations are present across the rest of the site area.

The Coal Authority Report is provided in Appendix C) and was summarised in Section 3.5. The key aspects are repeated below:

- The property lies within a surface area that could be affected by 2 seam(s) of coal at depths of 151m and 160m depth and last worked in 1879.
- No probable unrecorded shallow workings are recorded.
- No mine entries recorded within 100 metres of the boundary.
- The Coal Authority has no evidence of a damage notice or subsidence claim for the property or within 50m of the property since 31st October 1994.

10.1 RISK ASSESSMENT AND MITIGATION STRATEGY

Table 13-1 summarises the key hazards identified by review of the available data sources, the factors affecting risk posed by each hazard and an assessment of the estimated risk proposed to any redevelopment of the site.

Assessing risks from coal mining is based upon guidance provided by the Coal Authority following a ‘risk based’ approach implemented through PPG 14 – Development on Unstable Land.

The risk posed has been assessed as one of three categories.

Table 10-1 – Coal Mining Risk

High risk	Based upon the data available there is a significant risk of shallow ground instability associated with coal mining. Investigation will be required as part of the site re-development. Mitigation measures likely to be required.

Moderate risk	Based upon the data available there is a potentially significant risk of shallow ground instability associated with coal mining. Investigation will be required as part of the site re-development. Mitigation measures may be required.
Low risk	Based upon the data available there is a low risk of shallow ground instability associated with coal mining. No further assessment or investigation is recommended.

The table below summarises the potential risks associated with coal mining legacy at the site.

Table 10-2 – Coal Mining Risk Categories

Coal Mining Legacy	Yes	No	Risk Assessment
Underground coal and ironstone mining (recorded)	✓		Required
Shallow (<30m) underground coal and ironstone mining (recorded)		✓	Not Required
Underground coal and ironstone mining (unrecorded)	✓		Required
Shallow (<30m) underground coal and ironstone mining (unrecorded)	✓		Required
Recorded Mine entries (Shafts and adits)		✓	Not Required
Coal and ironstone mining geology	✓		Required
Record of previous mine gas emissions		✓	Not Required
Record of coal mining surface hazard		✓	Not Required
Surface Mining (recorded/unrecorded)		✓	Not Required

Hazard	Areas of site affected	Factors Effecting risk	Risk Estimate	Mitigation Recommendation	Risk Estimate (Post Recommendation)
Collapse of workings (recorded and unrecorded) shallow coal seams Coal and Ironstone Mining Geology	Entire Site	The Coal Authority believes that there is potential for coal at or close to the surface with the Mynyddislwyn Seam Outcrop running generally east to west through the middle of the site. Although the coal authority do not believe there are unrecorded shallow mineworkings this seam may have been worked in the past from shallow depths (<30m). The Coal Authority recommends that the potential for such should be considered prior to development.	Moderate	Rotary openhole borehole drilling of three 40m boreholes was undertaken to ascertain whether broken ground or voiding was present beneath the site associated with unrecored mining of the Mynyddislwyn Seam. No evidence of broken ground or voiding was encountered. No further mitigation necessary.	Low
Collapse of workings (recorded and unrecorded) deep coal and ironstone seams.	Entire Site	The property is in a surface area that could be affected by underground mining of two seams (Mynyddislwn Lower Leaf) from shallow 151m to 160m depth last worked in 1879.	Moderate	Rotary openhole borehole drilling of three 40m boreholes was undertaken to ascertain whether broken ground or voiding was present beneath the site. No evidence of broken ground or voiding was encountered. Any subsidence associated with the mining of the Mynyddislwn Lower Leaf last worked in 1879 is unlikely to have propagated at surface. No further mitigation necessary.	Low

10.2 CONCLUSIONS AND RECOMMENDATIONS

The risk assessment indicates that there is a **Low Risk** of ground instability as a result of deep or shallow recorded/unrecorded mining and mining geology beneath the site. The high risk development designation is based on the location of the conjectured outcrop of the Mynyddislwyn Seam which has not been encountered during the rotary openhole drilling works. No voiding or broken ground associated with historic mineworkings were encountered during the rotary openhole drilling.

11.0 LABORATORY TESTING

11.1 GEOTECHNICAL TESTING

A programme of laboratory testing was carried out on samples taken from the various strata encountered during the site investigation. Geotechnical testing was scheduled by Tetra Tech and carried out by GSTL Ltd, an approved supplier in accordance with the requirements of Tetra Tech quality system and UKAS accredited for a range of geotechnical tests. The test procedures used were generally in accordance with the methods described in BS1377:1990. Details of the specific tests used in each case are given in Table 11-1. Laboratory geotechnical test results are given in Appendix H.

Table 11-1 - Summary of Geotechnical Testing

Test	No.	Test Method
Moisture Content	11	BS1377:1990 Part 2:3.2
4 Point Liquid & Plastic Limit	11	BS1377:1990 Part 2:4.3&5.3
PSD: Wet Sieve method	16	BS1377:1990 Part 2:9.2
PSD: Sedimentation by Pipette	11	BS1377:1990 Part 2:9.4
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould)	6	BS1377:1990 Part 4 3.3
BRE Reduced Suite: pH, Acid Soluble Sulphate, Water Soluble Sulphate and Total Sulphur	16	BS1377:1990 Part 3 & BRE CP2/79 (non-accredited test)

11.2 ENVIRONMENTAL TESTING

Environmental chemistry was investigated by specialist chemical analysis of selected soil samples carried out by ALS Environmental Laboratories, an approved supplier in accordance with the requirements of Tetra Tech quality system and UKAS and MCERTS accredited for a range of chemical analyses. The testing was scheduled by Tetra Tech and is summarised in Table 11-2. The test results are presented in Appendix I.

Table 11-2 - Summary of Environmental Testing

Test suite	No.

Soil Samples:
• Tetra Tech Suite C
  ○ Heavy metals including Chromium (Hexavalent), Boron (water soluble), Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium and Zinc;
  ○ Inorganics – including pH, Water soluble Sulphate as SO4 (2:1 Extract), Cyanide (Easily liberatable- low level);
  ○ Speciated Petroleum Hydrocarbons (TPH CWG);
	16

○ Speciated Polyaromatic Hydrocarbons (USEPA 16); ○ BTEX and MTBE; ○ Asbestos Screen; and, ○ Phenol.	
Soil Derived Leachate Samples • Tetra Tech Leachate Suite C ○ Heavy metals including Antimony, Boron, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium and Zinc; ○ Inorganics – including pH, Sulphate, Chloride, Nitrite, Nitrate, Total Cyanide, Ammoniacal Nitrogen and NH3 and NH4 and Total Alkalinity ○ Speciated Petroleum Hydrocarbons (TPH CWG); ○ Speciated Polyaromatic Hydrocarbons (USEPA 16); ○ BTEX and MTBE; ○ Phenol.	7
Groundwater Suites • Tetra Tech Groundwater Suite C ○ Heavy metals including Antimony, Boron, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium and Zinc; ○ Inorganics – including pH, Sulphate, Chloride, Nitrite, Nitrate, Total Cyanide, Ammoniacal Nitrogen and NH3 and NH4 and Total Alkalinity ○ Speciated Petroleum Hydrocarbons (TPH CWG); ○ Speciated Polyaromatic Hydrocarbons (USEPA 16); ○ BTEX and MTBE; ○ Phenol.	6

12.0 GROUNDWATER AND GAS MONITORING

12.1 GROUNDWATER MONITORING

Groundwater levels were monitored on three occasions following the completion of the ground investigation, between 23rd January 2023 and 21st March 2023. The monitoring data is presented in Appendix J and summarised in Table 12-1 below.

Table 12-1- Summary of groundwater levels

Location	Base of borehole (m bgl)	Depth to water (m bgl)		
		23/01/23	07/03/23	21/03/23
WS101	1.12	DRY	1.07	1.08
WS102	0.70	DRY	DRY	0.61
WS104	3.75	0.56	0.75	GL (flooded well)
WS105	1.07	1.05	1.50	0.77
WS109	1.66	0.14	0.44	GL (flooded well)
BH104	6.80	3.70	3.63	2.68
BH106	7.55	1.98	1.95	1.10
BH107	7.02	1.30	1.23	0.31

12.2 GROUND GAS MONITORING

Ground gas levels were monitored on 3 occasions following the completion of the ground investigation, between 23rd January 2023 and 21st March 2023. The monitoring data is presented in Appendix J and in Table 12-2 below.

Table 12-2 – Summary of 1 ground gas monitoring

Location	Max. Methane (peak) (% vol)	Max. Carbon Dioxide (peak) (% vol)	Min. Oxygen (steady) (% vol)	Max. Carbon Monoxide (steady) (ppm)	Max. Hydrogen Sulphide (steady) (ppm)	Max. Borehole flow (peak) (l/h)
WS101	0.2	2.6	17.2	2.6	<1	0.3
WS102	0.2	2.8	14.7	2.8	<1	0.3
WS104	0.2	3.0	19.0	3.0	<1	0.1
WS105	0.2	1.7	13.5	1.7	<1	0.1
WS109	0.2	1.1	4.2	1.1	<1	0.1
BH104	0.2	0.2	19.1	0.6	<1	0.3
BH106	0.2	2.0	18.0	2.0	<1	0.2
BH107	0.2	0.2	20.7	0.3	<1	-0.3

The results indicate relatively low concentrations of carbon dioxide (maximum of 3.0%/vol) and methane (maximum 0.2%/vol).

In addition, the ground gas monitoring results indicate hydrogen sulphide and carbon monixide concentrations of <1 ppm throughout monitoring.

The monitoring rounds were undertaken during atmospheric pressure conditions ranging from 992mb to 1014mb. A review of atmospheric pressure graphs on weatheronline.co.uk indicates that monitoring was undertaken during periods of rising pressure (round 1) and falling pressure (rounds 2 and 3).

The monitoring sheets in Appendix J indicate variable flow rates across the rounds ranging from -6.2l/hr to 0.4l/hr. A review of the groundwater levels and exploratory logs indicates for a number of locations the groundwater level was above the top of the screened section and as such the flow rate values recorded is not considered to provide an accurate representation of the gas regime. On this basis, the flow rate has been discounted from the assessment in the instances where shallow groundwater above the screened section. These are indicated on the monitoring sheets.

13.0 SOIL INFILTRATION TESTING

13.1 BACKGROUND

On 7th January 2019, the Welsh Government introduced Schedule 3 of the Flood and Water Management Act 2010 which requires new developments to consider the feasibility of Sustainable Drainage Systems (SuDS) at the design stage. New developments over 100m^2 or including more than one property must obtain approval of the drainage system from the SuDS Approval Body (SAB) prior to the commencement of construction.

To support the assessment study, preliminary soil infiltration testing has been undertaken as part of the site investigation to provide information on the potential infiltration rates within the sub-strata on the site.

Soil infiltration tests have been undertaken in line with BRE 365 (2016) methodology and any deviations from this approach are documented within the following section. Where possible, locations and depths of test pits were determined based on the proposed drainage design.

13.2 TEST LOCATIONS

The soil infiltration test locations were outlined and positioned on site between Caerphilly County Borough Council and Tetra Tech. The locations were chosen to give a general understanding of the permeability parameters present on site.

No deviations from the specification were required, due to target depth being achieved at the single infiltration location. Test locations were securely fenced and covered until the testing period was completed and excavations backfilled in as dug order upon completion.

13.3 SOIL INFILTRATION TESTS

Four soil infiltration tests were undertaken within a machine excavated trial pit as summarised in the following table.

Table 13-1 Summary of Soil Infiltration Test Locations

Test Location	Depth to Base (m bgl)	Top of Target Strata (m bgl)	Target strata
TP/SA101	0.80	0.49m	Dark reddish brown clayey gravelly SAND with medium cobble content Sand is fine to coarse Gravel is fine to coarse angular to subrounded Cobbles are subrounded subangular becoming less clayey with depth.
TP/SA104	1.20	No test undertaken	Dark orangish brown clayey gravelly SAND with high cobble content Sand is fine to coarse Gravel is fine to coarse angular to subangular Cobbles are subrounded subangular angular well rounded.

TP/SA105	1.70	0.50m	Light orangish brown very gravelly SAND with high cobble content and with medium boulder content Sand is fine to coarse Gravel is fine to coarse angular to subangular Cobbles are subangular subrounded assorted lithologies Boulders are 400mm
TP107	1.70	No test undertaken	Reddish orange very slightly clayey SAND. Sand is fine to coarse

It was scheduled that three repeat fills were to be undertaken within the test location over a period of three days. Following the results from the first test, Tetra Tech was instructed by Caerphilly Council to not undertake further testing (Test 2 and 3) as this phase of investigation was only for feasibility of drainage.

Test locations were securely fenced and covered until the testing period was completed and excavations backfilled on completion.

The results of the soil infiltration tests are presented in the following table. Full test results are included in Appendix G of this report.

Table 13-2 Summary of Soil Infiltration Test Results

Test Location	Soil Infiltration Rate (m/s)		
	Test 1	Test 2	Test 3
TP01	Test failed after 24 hours. Test did not reach 25% effective depth.	No further test undertaken.	
TP104	No test undertaken due to groundwater strike.		
TP105	Test failed after 24 hours. Test did not reach 25% effective depth.	No further test undertaken.	
TP107	No test undertaken due to groundwater strike.		

13.4 GROUND CONDITIONS

13.4.1 Depth to groundwater

Due to the nature of where the soil infiltration testing was being undertaken and given the close proximity to the River Nant yr Aber, a trial pit was not excavated adjacent to the test location in order to identify the groundwater level.

Groundwater strikes varied across the site with water strikes encountered within the Superficial Deposits. The water strikes encountered in these deposits were found to be between 0.90m bgl (identified in TP107) and 5.20m bgl in BH104. These strikes were encountered during intrusive investigation with strikes in the trial pits being encountered within the pit walls and not from the base of the pit which may suggest a perched water strike.

A comprehensive list of the groundwater strikes can be identified in Table 9-2, which indicates the depth of the strike and how quickly it rose following 20minutes of testing.

13.4.2 Strata Type

The strata type for the infiltration testing was undertaken within the Glacial Till (Diamicton).

Superficial deposits, interpreted on site to be Glacial Till (Diamicton) were encountered in all exploratory locations and were found to a maximum depth of 6.80m bgl which was encountered in BH06. The composition of the superficial deposits was found to have a fine grained and coarse-grained component following intrusive investigation.

The fine-grained superficial deposits could generally be described as '*orangish brown with frequent greyish brown and black staining, sandy gravelly CLAY. Sands are fine to medium. Gravels are fine to coarse becoming coarser with depth. Horizon becoming very cobbly from 0.65m bgl. Horizon becoming slightly damp with* depth *from 1.70m bgl horizon becoming very cobbly with flint and sandstone'* which was encountered in WS107 to a depth of 2.00m bgl.

A coarser component of Glacial Till deposits were also encountered on site and this stratum could generally be described as *'yellowish brown clayey silty sandy GRAVEL. Sands are fine to medium, gravels are fine to medium becoming coarser with depth of sandstone and mudstone, subangular to subrounded sandstone. horizon has rare and isolated patches of orangish brown and grey clay mottling, more frequent with depth'* which was identified to a depth of 1.20m bgl in WS102.

Full draft logs of the exploratory pits are included in Appendix E.

13.4.3 Ground Contamination

Significant ground contamination was not been identified as part of the ground investigation, a contamination assessment is presented in Sections 16.0 and 17.0.

13.5 CONSTRAINTS AND LIMITATIONS

The information presented above is intended to assess the feasibility of soakaway drainage in order to support the development of the drainage strategy. Further testing, groundwater monitoring and ground investigation may be required to support a full SAB application or to inform the development of the final design process.

Ground conditions can vary throughout the year, including the location of the groundwater table. Consideration should be given to the potential effects of seasonal variation when reviewing the data above. It should be noted that at the time of investigation the site had numerous areas of standing water, particularly on level 1 of the site, below the foot of the embankment separating the two levels.

14.0 GEOTECHNICAL ASSESSMENT

14.1 SOIL PROPERTIES

The ranges of the various soil properties measured are discussed below, to aid in the selection of design values. However, the appropriate choice of characteristic and design values will depend on the particular analysis and design philosophy used and should be selected by the designer.

Where characteristic values are given, these are reasonably conservative estimates of a measured or assessed property that may be used to represent the overall behaviour of the material. Design values are similar but also take into account the ground-structure interaction for a given structure so need to be selected by the designer. It is recommended, however, that design values used do not exceed the characteristic values given in this report.

14.1.1 Made Ground

Made Ground was only encountered in one exploratory hole locations, WS107, during the ground investigation with a limited vertical extent and therefore hasn't been considered as part of this assessment.

14.1.2 Alluvium

Alluvium was encountered in a single exploratory hole location, WS101, between 0.55m and 1.50m. Due to the limited lateral extent across the site the Alluvium has not been considered as part of this geotechnical assessment.

14.1.3 Fine Grained Glacial Till

Shallow fine-grained Glacial deposits were identified within 14 positions immediately below the topsoil and occasionally from surface. They varied in thickness between 0.2m and 7.8m. A summary of test results is presented in the table below.

Table 14-1 - Summary of test results within the fine-grained Glacial Till

	No. of results	Range (min-max)	Average	Lower quartile	Upper quartile	Charact-eristic value+
Natural moisture content (m - %)	9	24 – 48	36	31	40	40
Liquid limit (LL)	9	52 – 76	65	60	70	60
Plastic limit (PL)	9	22 – 32	28	27	29	27
Plasticity index (PI)	9	30 – 45	37	33	41	41
Modified Plasticity Index[1]	9	11 – 30	24	22	29	29
SPT N Values	28	11 – 50	33	22	50	22
Angle of shearing resistance, φ *	28	30.3 – 41.0	36.9	33.7	41.0	33.7
Undrained shear strength (kPa):						
- from SPT N values[2]	28	48 – 220	145	97	220	97
- from hand vanes	3	20 - 62	38	26	47	20

Notes:
+ suggested characteristic values are appropriate for most normal applications but designers should satisfy themselves that they are suitable for the specific application and design method they are using;
* Estimated from a correlation from Peck, Hansen and Thornburn, Foundation Engineering, Wiley, 2nd ed., (1974)(6)
1 Modified Plasticity Index (I'P) is defined as: I'P = (PI x %passing 425um)/100%;
2 Estimated from a correlation by Stroud and Butler (1975)(4)

Based on the above, it is recommended that the following values are taken as design/characteristic values for this material:

- Undrained shear strength 75kPa
- SPT N Value 22
- Angle of shearing resistance, φ 33.7º

14.1.4 Coarse Grained Glacial Till

Shallow coarse-grained deposits were identified within 16 exploratory hole locations immediately below the topsoil or fine grained Glacial Till and varied in thickness between 0.3m and 6.6m. A summary of test results is presented in the table below.

Table 14-2 - Summary of test results within the coarse-grained Glacial Till

	No. of results	Range (min-max)	Average	Lower quartile	Upper quartile	Charact-eristic value+
SPT N Values	25	8 – 50	31	25	41	31
Angle of shearing resistance, φ*	25	29.3 – 41.0	36.3	34.6	38.9	36.3

Notes:
+ suggested characteristic values are appropriate for most normal applications but designers should satisfy themselves that they are suitable for the specific application and design method they are using;
* Estimated from a correlation from Peck, Hansen and Thornburn, Foundation Engineering, Wiley, 2nd ed., (1974)(6)

Based on the above, it is recommended that the following values are taken as design/characteristic values for this material:

- SPT N Value 31
- Angle of shearing resistance, φ 36.3º

15.0 GEOTECHNICAL DESIGN CONSIDERATIONS

15.1 PROPOSED DEVELOPMENT

The ground investigation was progressed to support the outline design and cost plan for a new school at the existing Plas Y Felin Primary School site in Caerphilly. At the time of issue of this report a final development design has not been produced, but indicative layouts have been provided.

Initial layouts show the proposed new school building to be relocated onto the lowermost part of the site, in the eastern part and adjacent to the Nant yr Aber River. It has been proposed that the existing school on the upper tier will be demolished converted into hard standing areas for car parking following the construction of the new school development.

15.2 EARTHWORKS

Given the current levels of the site and the tiering from west to east, earthworks (cut and fill) is anticipated at the site. Site won materials will comprise both fine and coarse grained Glacial Till. Compaction tests undertaken on selected samples of the Glacial Till are consistent and indicated that soils can be compacted to a maximum dry density of circa 1.80Mg/m^3 at an optimum moisture content of 10-12%. However, all the soils are considerably wet of optimum moisture content, with natural moisture contents typically over 30% (Characteristic value in Section 14 is 40%). Therefore, these soils will require drying before they can be re-used as engineered fill. Lowering the moisture content could be achieved natural during the spring and summer months or aby the addition of lime.

15.3 FOUNDATIONS

Within the area of the proposed building (north east quandrant) topsoil was encountered overlying shallow fine-grained and coarse-grained Glacial Till. The Glacial Till has been recorded, as typically comprising firm to stiff fine grained soils or medium dense to dense coarse grained soils. The vertical and horizontal distribution of fine and coarse grained dominated soils is variable, which is typical of Glacial Till. This stratum is suitable as a founding medium for foundations.

It is considered that strip or pad foundations, placed at least 1.20m bgl within the Glacial Till and penetrating the strata by a minimum of 300mm are viable. Using conventional methods suggested by Hansen[(1)], such shallow foundations may be designed, in accordance with Eurocode 7 BS EN1997-1 (ULS DA1-2, partial factor of 1.25 for φ), to an allowable net bearing pressure, Rd, of 150kNm^2 and should result in settlement less that 25mm. Settlements of foundations within fine and coarse-grained material were estimated using the Giroud method[(2)]*.

The ground investigation has highlighted the following additional considerations:

- Groundwater ingress into excavations will need to be considered and is likely below 1m. The ground investigation was undertaken during the winter months and groundwater was recorded as shallow as 0.3mbgl during one monitoring visit. The groundwater level will vary seasonally and likely be lower during the summer months.
- Trial pits excavations were typically stable, although some instability was recorded. It is considered form work for foundations excavations will likely be required.

[1] Hansen, A General Formula for Bearing Capacity, Danish Geotechnical Institute Bulletin No. 11, 1961. Also, Danish Geotechnical Institute Bulletin No. 28, 1968; and Code of Practice for Foundation Engineering, Danish Geotechnical Institute Bulletin No. 32, 1978.
[2] Stresses under linearly loaded rectangular area, J. P. Giroud, Journal of the American Society of Civil Engineers, vol. 96, SM1, 1970.

- If foundations cross from a fine to a coarse-grained soil which is anticipated at the site, reinforcement of the foundation should be considered to prevent differential settlement.

If higher structural loading are high, traditional foundations may no longer be viable and consideration will need to be given to ground improvement or the use of piled foundations.

Foundation excavations should be inspected by a suitably experienced engineer or inspector to ensure the founding material is suitable natural deposits. Any soft, loose or otherwise unsuitable material should be excavated and replaced by compacted granular backfill or lean concrete.

Alluvium was only recorded in one location, WS101, located outside of the proposed building footprint. Given the limited geotechnical data collected for this unit, should Alluvium be encountered within foundation excavations, they will need to be deepened and extended to the underlying Glacial Till. Alluvium is mostly likely be present in close proximity to the Nant yr Aber.

Construction elsewhere on the site would require further ground investigation as the deeper exploratory hole locations targeted the proposed building footprint provided.

15.4 FLOOR SLABS

Tests results have indicated that the fine grained soils are plastic and will expand/contract with moisture content variations. If coarse grained souls are present at formation level, ground bearing floor slabs can be utilised and designed to combined dead and live loads of 20kNm^2. However, where fine grained sols are present these would need to be removed and replaced with granular fill or floor slabs should be suspended.

15.5 CHEMICAL ATTACK ON BURIED CONCRETE

Chemical tests undertaken on representative samples from the Glacial Till show low levels of water-soluble sulphates and generally slightly acidic conditions (in places as low as pH5.2). Based on these conditions, it is recommended that for foundations the Design Sulphate Class for the site, as defined in BRE Special Digest 1, be taken as DS-1, and the Aggressive Chemical Environment for Concrete (ACEC) site classification be taken as AC-3z.

15.6 TEMPORARY WORKS

Trials pit stability was generally described as good during excavation however a sidewall collapse occurred in TP107 during excavation. It is considered that shoring or battering of even shallow excavations in the short term may be required. Groundwater is likely to be encountered at shallow depth (0.3m bgl downwards) and dewatering of excavations is likely to be required.

15.7 PAVEMENTS

Based on the 18 results gathered within the Glacial Till, CBR values were in the range of 6% to 57% (average 23%). Given the very variable nature of the results obtained it is recommended a conservative value of 6% is adopted for pavement design within this stratum.

Proof rolling of the formation level will be required and any loose or soft spots should be removed and replaced with an engineer fill, in accordance with a suitable specification. The formation level will also need to be protected during inclement weather from deterioration.

Prior to placement of the founding material and the construction of the road pavement, the sub-formation and formation will need to be inspected and checked in accordance with a suitable specification to ensure the ground conditions are as expected. All testing should be carried out in accordance with DMRB IAN 73/06 to confirm that the ground conditions at the time of construction are consistent with the previous design parameters.

15.8 DRAINAGE

Soakaway testing where undertaken resulted in failure with a number of tests not being undertaken due to the shallow groundwater encountered as high as 0.30m bgl on occasion. It is therefore considered soakaway drainage will not be feasible at the site.

16.0 GROUND CONTAMINATION ASSESSMENT – HUMAN HEALTH

16.1 INTRODUCTION

The UK Contaminated Land Regime (CLR) allows for a tiered approach to the assessment of ground contamination which is designed to allow increasingly site-specific assessment. In order to assess the potential risk posed by contaminants contained within the soils at the study area a generic quantitative risk assessment (gQRA) has been undertaken by comparing recorded concentrations of chemical constituents in soil with Generic Assessment Criteria (GAC) to identify whether, at the concentrations recorded, the presence of the constituent has the potential to adversely affect the health of site users (a Tier 1 assessment). GAC are set at levels where potential exposure is deemed to be within acceptable limits.

If the recorded concentrations of a particular constituent are below the GAC then the risk is generally considered to be acceptable and further assessment / or mitigation measures are not required. Where a substance is recorded at concentrations higher than GAC this does not necessarily indicate that a particular risk is present, however, it does typically signify the requirement to undertake further assessment in line with the UK tiered risk assessment framework.

16.2 ASSESSMENT CRITERIA

16.2.1 Generic Assessment Criteria

The following GAC for soils have been utilised for the screening process, in order of preference:

- CL:AIRE published C4SL (DEFRA, 2014);
- CIEH/LQM published S4UL (LQM/CIEH, 2015);
- Tetra Tech internal Tier 1 Screening Criteria (issue 15) derived using the derivation tool CLEA version 1.06, in line with the current UK Contaminated Land Regime.

C4SL are currently available for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead[3]. The C4SL were originally developed to support the categorisation of sites in accordance with Part 2A are also, based on DEFRA guidance, considered suitable for use during the assessment of sites as part of the planning process.

Where C4SLs are not available, 'Suitable for Use Levels' (S4UL) developed by CIEH/LQM have been used. The S4UL provide GAC based on minimal or tolerable risk intended to be protective of human health for individual or mixtures of substances. It is considered conservative and appropriate to use these values for contaminants for which C4SL are unavailable. GAC for volatile and semi-volatile organic compounds (VOC and SVOC) not presented in the S4UL document are sourced from CL:AIRE (CL:AIRE, January 2010).

Where no published screening values are available Tetra Tech have derived their own values (easily liberatable cyanide).

The CLEA model states that "For most exposure pathways, the contamination is assumed to be at or within one metre of the surface" (Environment Agency, 2009). It is considered that at depths greater than 1.0m, the probability of human exposure via the direct contact pathways are significantly reduced, leaving inhalation of volatile compounds as the dominant pathway with regard to human health risks. Typically, volatile compounds only significantly affect the indoor inhalation pathway. The same screening concentrations have been used for all depths at this stage, though it is noted that these are highly conservative for depths below 1.00m bgl.

[3] Arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI, lead assuming 6% SOM (1% SOM C4SL also published for benzene).

16.2.2 Proposed End Use

Screening criteria have been developed for the following land use scenarios:

- Residential with plant uptake;
- Residential without plant uptake;
- Allotments;
- Public open space (park and residential);
- Commercial / Industrial.

The proposed development on site will consist of a new school at the existing Plas Y Felin Primary School site in Caerphilly. Initial layouts show the proposed new school building to be relocated onto the lowermost part of the site, in the eastern part and adjacent to the Nant yr Aber River. It has been proposed that the existing school on the upper tier will be demolished converted into hard standing areas for car parking following the construction of the new school development.

As such the following screening assessment has been undertaken against a residential without plant uptake end use scenario to provide a conservative assessment.

16.2.3 Soil Organic Matter

For organic contaminants, the generic soil screening values have been derived for a range of concentrations of soil organic matter (1%, 2.5%, 6%). In order to provide a conservative assessment, the GAC derived for a 1% SOM have been adopted.

16.3 TIER 1 – SOIL SCREENING

16no. soil samples collected from across the site were submitted for chemical laboratory analysis. Full copies of laboratory certificates for all soil analysis are included in Appendix I.

Comparison of the chemical analysis results with the generic assessment criteria for a residential without plant uptake end use has indicated that the reported contaminant concentrations are below the respective GACs and as such there is not considered to be a significant risk to human health in the context of the proposed development.

16.4 ASBESTOS

16no. samples obtained were submitted for testing for the presence of asbestos containing materials. The laboratory results did not identify ACM in the samples obtained. As such ACM is not considered to pose a significant risk to human health in the context of the proposed development.

17.0 GROUND CONTAMINATION ASSESSMENT – WIDER ENVIRONMENT

17.1 INTRODUCTION

The potential for contaminated groundwater on site to adversely affect controlled water receptors (groundwater and surface water bodies) has been assessed at this stage by direct comparison of analytical data from the Tetra Tech ground investigation with relevant Water Quality Standards (WQS).

Similarly, the potential for soil contamination to impact controlled waters has been assessed by comparing analytical data from soil derived leachate tests directly against WQS.

17.2 ASSESSMENT CRITERIA

In light of the environmental setting of the site under consideration. The following water quality standards have been adopted, in order of preference.

- Water Framework Directive (WFD),
- Environmental Quality Standards (EQS);[4]
- WHO 2008 - Petroleum Products in Drinking Water (WHO 2008)
- UK Drinking Water Standards[5].

17.2.1 Bioavailability

For certain heavy metals (copper, zinc, manganese, nickel and lead) the bioavailability of the metal within the water can be calculated to generate a bespoke screening criteria based on other groundwater parameters. This assessment is undertaken utilising the Metal Bioavailability Assessment Tool (M-BAT) which was developed using the $EQS_{(bioavailable)}$ developed in line with the Water Framework Directive.

In the case of copper, zinc, manganese and nickel the assessment takes into account the concentration of calcium, Dissolved Organic Carbon (DOC) and pH of the water sample. The assessment for lead only takes the DOC of the sample into account. A spreadsheet has been developed for the assessment by the UK Technical Advisory Group on the Water Framework Directive.

17.3 SOIL DERIVED LEACHATE METHODOLOGY

Soil derived leachate samples can be used to identify potentially mobile contamination within soil samples collected from the site. It should be noted that the laboratory test methodology indicates a potential mobility of contaminants and is usually considered to reflect a worst-case situation and unlikely to represent on-site conditions.

The laboratory preparation of leachate samples is likely to produce higher concentrations of leachable components than conditions encountered on site and as such the following assessment is considered to be inherently conservative in nature. Furthermore, the resulting data are screened against criteria intended to be protective of water bodies and drinking water supplies and are not intended to assess the potential significance of contaminant mobility.

[4] Where WFD 2015 are not presented revoked WFD 2010 standards are used
[5] WHO 2005; WHO 2008; UK Water Supply Regulations 2010 and 1989 Regulations. Priority given to UK drinking water standards

17.4 TIER 1 SCREENING ASSESSMENT – SOIL DERIVED LEACHATE

7no. soil derived leachate samples were screened against a suite of determinants outlined in Section 17.2.

The results of the screening indicated a single exceedance of Fluoranthene at TP106 with a sample concentration of 0.009ug/l, marginally exceeding the Freshwater EQS of 0.0063ug/l. Given the marginal nature of the exceedance this is not considered to post a significant risk to the wider water environment.

Remaining contaminants concentrations were below their respective TSVs.

17.5 TIER 1 SCREENING ASSESSMENT – GROUNDWATER

6no. groundwater samples were obtained from the monitoring installations on the site and analysed for the suite of determinants outlined in Section 11.2. The results were screened against a suite of determinants outlined in Section 17.2.

The results of the screening have indicated that reported contaminant concentrations are below the respective WQS TSVs and as such there is not considered to a be significant risk to the wider water environment.

18.0 PRELIMINARY GROUND GAS ASSESSMENT

18.1 INTRODUCTION

Three return ground gas monitoring visits were undertaken between 23rd January and 21st March 2023. Full factual site records of the gas monitoring results are presented in Appendix J and summarised in Section 12.2.

18.1.1 Ground Gas Monitoring

Ground gases are monitored within boreholes on the site recording the following parameters.

- Concentrations of ground gases;
    - Methane (%v/v);
    - Carbon dioxide (%v/v);
    - Oxygen (%v/v);
    - Carbon monoxide (ppm);
    - Hydrogen sulphide (ppm);
- Borehole flow rate (l/hr);
- Depth to groundwater;
- Atmospheric pressure trends;

Where groundwater levels are noted to be above the screened sections of the boreholes the data is not considered to be representative of the ground gas regime and are therefore not used within the risk assessment process.

Atmospheric pressure trends are recorded on site during the monitoring process, but are also noted in the preceding three days, and one day after each monitoring visit. Falls in atmospheric pressure are generally considered to indicate a higher potential for ground gas migration from the sub surface and as such monitoring during periods of falling pressure are considered to represent worst case scenarios as outlined in the CL:AIRE Technical Bulletin TB17 (CL:AIRE, August 2018).

18.1.2 Land Gas Risk Assessment Methodology

The key reference document which has been used to undertake the semi-quantitative land gas assessment presented in this report is CIRIA C665 (CIRIA, 2007). This provides a framework for assessment of land gas risk to buildings/structures with foundations (i.e. houses and/or commercial properties).

The risk assessment process is based on a Source-Pathway-Receptor Conceptual Site Model Methodology, with consideration given to the potential sources likely to be present on the site and the ground gas monitoring regime designed to reflect the scale of the source potential.

The collected data has been used for the purposes of undertaking a semi-quantitative assessment in accordance with the CIRIA 665 methodology. The calculation used to calculate the gas screening value (GSV) for the site, together with the relevant definition of units, is as follows:

GSV (litres of gas/hr) = borehole flow rate (l/hr) x gas concentration (volume/100)

The calculated GSV values are used to determine the Characteristic Situation (CS) for the site in terms of methane and carbon dioxide, based on the conditions outlined in Table 18-1 below.

CS classification is applicable to all buildings, with the exception of low-rise housing with a ventilated underfloor void, in these situations, the NHBC Traffic Light System is adopted, as outlined in Table 18-2.

Table 18-1 –GSV Classification (Modified Wilson and Card Methodology)

Characteristic Situation	Risk Classification	Gas Screening Value Threshold (l/hr)	Additional Considerations
1	Very Low Risk	<0.07	Methane concentration <1% Carbon dioxide <5%
2	Low Risk	<0.7	Borehole flow rate <70 l/hr
3	Moderate Risk	<3.5	-
4	Moderate to High Risk	<15	Quantitative risk assessment required to evaluate scope of protective measures
5	High Risk	<70	-
6	Very High Risk	>70	-

Table 18-2 –NHBC Traffic Light Classification

Traffic Light	Methane		Carbon Dioxide	
	Typical maximum concentration (%v/v)	GSV (litres per hour)	Typical maximum concentration (%v/v)	GSV (litres per hour)
Green				
	1	0.16	5	0.78
Amber 1				
	5	0.63	10	1.56
Amber 2				
	20	1.56	30	3.13
Red				

It should be noted that the suggested threshold values lie between each traffic light boundary and therefore the wider conceptual model should be considered to provide a comprehensive assessment of the ground gas regime on the site before a classification can be attributed.

18.2 PRELIMINARY GROUND GAS RISK ASSESSMENT

18.2.1 Conceptual Site Model

The following sections outline the anticipated Source-Pathway- Receptor model associated with the proposed development on site.

Sources

The following potential sources have been identified on and off site.

- Made Ground deposits;
- Ground gas and/ vapors associated with former gas works c.100m west of the site.

Pathways

The following potential pathways have been identified which may act as preferential pathways for ground gas migration:

- The underlying strata have been classified as ranging from silts, clays and gravels . As such, there is potential for some horizontal and vertical migration of ground gas;
- Buried service runs and existing foundations, including sub-floor voids.

Receptors

Within the context of ground gases, the following enclosed structures are considered to represent potential receptors.

- The existing structure on the site
- Structures and enclosed areas within proposed development.

18.2.2 Risk Assessment – Methane and Carbon Dioxide

In order to assess the significance of ground gases at the site, measured concentrations and flow rates have been used to derive Gas Screening Values (GSVs). GSVs are the product of gas concentration and gas flow measured in a borehole and provide an indication of the flow of the particular gas in question out of the ground.

Due to the limited data obtained from the site the worst-case values have been used within the risk assessment.

Based on a maximum flow recorded of 0.4l/hr and the maximum recorded concentration of carbon dioxide (CO_2) and methane (CH_4) during the three monitoring visits, the GSVs have been calculated as presented in Table 18-3.

Table 18-3 – Initial GSV Calculations

	Maximum Concentration (%)	Maximum Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (Wilson and Card)	NHBC Traffic Light
Carbon Dioxide	2.60	0.4	0.0104	CS1 Very Low Risk	Green
Methane	0.20	0.4	0.0008	CS1 Very Low Risk	Green

These values have been compared with the Revised Wilson and Card Classification presented in Table 18-1.

The risk assessment process indicates the site is representative of Characteristic Situation 1 (Very Low Risk) and Green within the NHBC Traffic Light System based on the recorded concentrations of carbon dioxide and methane and maximum flow rates within the sub surface.

18.2.3 Carbon Monoxide and Hydrogen Sulphide

Maximum concentrations of carbon monoxide and hydrogen sulphide were recorded at <1ppm for both compounds throughout the monitoring period. The recorded concentrations are considered to be suitably low to negate the requirement for additional risk assessment.

18.2.4 Atmospheric Pressure Trends

The monitoring rounds were undertaken during atmospheric pressure conditions ranging from 992mb to 1014mb. A review of atmospheric pressure graphs on weatheronline.co.uk indicates that monitoring was undertaken during periods of rising pressure (round 1) and falling pressure (rounds 2 and 3).

18.3 SUMMARY AND DISCUSSION

The site has been classified as Characteristic Situation 1 (Very Low Risk) / Green based on the worst-case recorded concentrations of carbon dioxide and methane and maximum flow rates. Site classification of a Characteristic Situation 1 / Green indicates gas protection measures are not required within new developments.

19.0 CONCEPTUAL SITE MODEL AND PRELIMINARY GROUND CONTAMINATION RISK ASSESSMENT

19.1 OVERVIEW

The information presented in the previous sections of this report have been collated and evaluated to establish an initial qualitative risk assessment for the site. A conceptual model of the site has been generated based on information derived from this Phase 1 Geo-environmental Assessment, supplemented by information attained during the Tetra Tech site walkover.

The site has been considered with regard to current UK legislation and guidance, namely Part 2A of the Environmental Protection Act 1990 and the Contaminated Land (England) Regulations 2006, as amended, and in accordance with current UK good practice guidelines (for example BS10175:2011).

In general, ground contamination can occur through several causes, particularly from historical operations and activities. Contamination can result from either on-site sources or from on-site migration from off-site sources, leading to long term liabilities under recent legislation for any site owner.

For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

- Source, i.e. a substance that is capable of causing pollution or harm;
- Pathway, i.e. a route by which the contaminant can reach a target; and
- Receptor (target), i.e. something which could be adversely affected by the contaminant.

If one of these elements is absent there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

19.2 CURRENT SITE USAGE AND PROPOSED DEVELOPMENT

The site is currently comprised of the Plas y Felin Primary School and associated hard standing and playing fields. The proposed development for the site is for the construction of a new school building in the east (lower) part of the site and the demolition of the current school building for hard standing car parking.

As such the end use will remain the same under current and future conditions.

19.3 CONCEPTUAL SITE MODEL

The key source, pathways and receptor model is outlined below within the context of potential development of the site.

As the proposed development is for the construction of a school, the following risk assessment is undertaken in the context of a residential without plant uptake end use scenario to provide a conservative approach.

19.3.1 Potential Sources of Contamination

The main potential sources of contamination on the site are associated with existing features as well as historical land uses on the site as summarised below.

On site Sources

- Made Ground associated with former development on the site;
- Historical substations

Off Site Sources

- Ground contamination associated with the former gas works c.100m west of the site (1900-2010).

19.3.2 Potential Contaminant Pathways

The following contaminant pathways are considered to potentially be active based on the current site use and proposed development:

Human Exposure Pathways

- Direct dermal contact or ingestion of soils, or inhalation of dust and/or vapours (i.e. human interaction with surface and sub-surface materials).

Environmental Pathways

- Leaching and horizontal or vertical migration through the unsaturated ground, either through permeable sub-surface materials and/or preferential pathways;
- Lateral and vertical migration of groundwater through permeable sub-surface materials and/ or preferential pathways;
- Leaching to surface water run-off/drainage;
- The migration and accumulation of gases or vapours through permeable sub-surface materials and/ or preferential pathways.

19.3.3 Potential Receptors at Risk

The following potential receptors have been identified:

Human Health

- Current site users (school users)
- Future site users (school users)
- Site workers during the redevelopment of the site;
- Adjacent site users (residential)

Wider Environment

- Secondary Undifferentiated Aquifer within superficial deposits and Secondary A Aquifer in underlying Grovesend Formation bedrock.;
- Surface waters i.e. Nanty yr Aber immediately east of the site;
- Plant uptake; and
- Building Infrastructure and supply pipes.
- Adjacent Properties

19.4 GROUND CONDITIONS RISK ASSESSMENT

The source, pathway, receptor linkages identified in the previous section are outlined and a qualitative risk assessment shown in the following tables.

The risk assessment considers the site within an area context and assesses potential risks to identified receptors in relation to the existing site setting and the proposed development. CIRIA C552 has been used to define the risk rating presented in the Qualitative Risk Assessment matrix, the methodology for which is presented in Appendix K.

Table 19-1 – CIRIA C552 Qualitative Risk Assessment

This matrix is based on CIRIA C552 risk evaluation methodology, definitions for risk ratings is presented in Appendix K						
Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements
Made Ground associated with initial construction of the school, including asbestos	Direct dermal contact with dust and shallow soils. Direct ingestion of soils and produce grown in soils.	Current Site Users	Medium	Unlikely	Low	The ground investigation has identified very limited Made Ground on site, only being encountered in WS07 to 0.50m bgl. Furthermore, the laboratory results of samples obtained from across the site indicated low contaminant concentrations, below the GACS for a residential without plant uptake end use. As such the risk to human health is considered to be low. Residual risks to construction workers can be mitigated through the use of appropriate PPE and good hygiene practices.
		Future Site Users		Unlikely	Low	
		Construction Workers		Low Likelihood	Moderate/ Low	
	Leaching and migration in groundwater	Groundwater	Medium	Unlikely	Low	As above, the ground investigation found very limited Made Ground deposits on site. Furthermore, the results of the laboratory testing found low contaminant concentrations in both soil derived leachate testing and groundwater testing. As such the risk to groundwater and the adjacent Nany Y Aber is considered to be low.
		Surface Water – Nant y Aber		Unlikely	Low	

	Inhalation of asbestos fibres	Current Site Users	Medium	Unlikely	Low	As above, the ground investigation found very limited Made Ground deposits on site. The laboratory results did not identify asbestos containing material in the 16no. samples tested from across the site. As such the risk to human health is considered to be low. Residual risks to construction workers can be mitigated through the use of appropriate PPE and good hygiene practices.
		Future Site Users		Unlikely	Low	
		Construction Workers		Low Likelihood	Moderate / Low	
Ground contamination associated with former gas works c. 100, west of the site	Direct dermal contact with dust and shallow soils. Direct ingestion of soils and produce grown in soils.	Current Site Users	Medium	Unlikely	Low	The laboratory results from the west of the site and across the site showed generally low contaminant concentrations, indicating that it is considered unlikely that the site has been significantly, detrimentally impacted by the activities of the former gas works c.100m west of the site. As such, the risk to human health is considered to be low. As above, residual risks to construction workers can be mitigated through the use of appropriate PPE and good hygiene practices.
		Future Site Users		Unlikely	Low	
		Construction Workers		Low Likelihood	Moderate / Low	
	Leaching and migration in groundwater	Groundwater	Medium	Unlikely	Low	As above, the results of the laboratory testing found low contaminant concentrations in groundwater samples, indicating that it is considered unlikely that the

		Surface Water – Nanty Aber		Unlikely	Low	site has been significantly, detrimentally impacted by the activities of the former gas works c.100m west of the site. As such the risk to groundwater and the adjacent Nany Y Aber is considered to be low. .
Ground gas generation/ vapours from Made Ground and/or off-site former gas works c.100m west	Inhalation of ground gas/ vapours	Current Site Users	Medium	Unlikely	Low	The results of the ground gas monitoring have indicated generally low concentrations of carbon dioxide and methane coupled with a low flow rate, resulting in a classification of CS1 Very Low Risk. A classification of CS1 indicates that gas protection measures will not be required for the proposed development.
		Future Site Users		Unlikely	Low	
		Construction Workers		Unlikely	Low	
Radon	Inhalation	Current Site Users	Medium	Unlikely	Low	The freely available radon mapping has indicated that radon protection measures are not required for future developments on site due to the site being located in an area where <1% of homes are above the Radon Action Level.
		Future Site Users		Unlikely	Low	
		Construction Workers		Unlikely	Low	

20.0 CONCLUSIONS AND RECOMMENDATIONS

20.1 GROUND CONTAMINATION

20.1.1 Summary

The ground investigation has identified an absence of Made Ground across much of the site, with a shallow depth of Made Ground encountered in WS107 only. In the remainder of the site, a thin mantle of Topsoil (maximum depth of 0.50m bgl) is noted to overlay Glacial Till across the majority of the site.. Grovesend Formation bedrock was encountered in the three deep boreholes from a minimum depth of 7.00m bgl to a termination depth of 40.00m bgl.

The results of the laboratory testing has indicated generally low contaminants concentrations in soil, soil derived leachate and groundwater samples which results in a low risk to current and future site users, groundwater and off-site surface receptors including the Nant y Aber, which runs along the eastern boundary of the site.

Residual risks to construction workers can be mitigated through the use of appropriate PPE and good hygiene practices throughout the development phase.

20.1.2 Asbestos

The ground investigation did not identify a significant presence of Made Ground on site. Furthermore, the results of the laboratory testing did not identify ACM in any of the 16no. samples tested. As such the potential risk to human health from ACM is considered to be low.

20.1.3 Ground Gas

The results of the ground gas monitoring hve indicated generally low concentrations of carbon dioxide and methane coupled with a low flow rate, resulting in a classification of CS1 Very Low Risk. A classification of CS1 indicates that gas protection measures will not be required for the proposed development.

20.2 GEOTECHNICAL

The coal mining risk assessment indicates that there is a Low Risk of ground instability as a result of deep or shallow recorded/unrecorded mining and mining geology beneath the site.

Site won materials are likely to comprise both fine and coarse grained Glacial Till. Testing has shown the soils to be considerably wet of optimum moisture content for achieving good compaction if re0used as engineered fill. The soils will need drying out and or processing before re-use.

Traditional shallow or pad foundations placed at a depth of 1.2m bgl are considered a viable option, although this will need to be confirmed once structural loading are known Alternative ground improvement of oiled foundations will need to be considered.

Floor slabs mat be ground bearing where the formation consists of coarse grained Glacial Till. However, should fine grained Glacial Till be present at formation, which is likely given the variability of the unit, these soils will need to be removed and replaced with granular fill or floor slabs be suspended.

Groundwater ingress into excavations will need to be considered and likely below 1m. At its shallowest groundwater was recorded at 0.3m bgl during winter months..

For buried concrete the Design Sulphate Class for the site can be taken as DS-1 and the Aggressive Chemical Environment for Concrete (ACEC) site classification can be taken as AC-3z.

20.3 SOIL INFILTRATION TESTING

Soil infiltration testing was initially scheduled for 3no. repeats in 4no. locations. However, testing was not undertaken in 2no. locations due to the shallow depth of groundwater. In the remaining two locations, only one repeat was undertaken as the water within the soakaways did not drain within a 24-hour period. As such, no further testing was undertaken.

20.4 RECOMMENDATIONS

Based on the information contained within this report the following recommendations are made:

- Should contamination not previously identified by the ground investigation be encountered during the development phase of works, it is recommended that works are ceased and that a suitable qualified environmental consultant is contacted to confirm the required control measures.
- A Geotechnical Design Report should be prepared once structural details of the proposed structure are known.

21.0 NOTES

1. Standards

All boring operations, sampling of soils, *in situ* testing and geotechnical laboratory testing have been carried out in accordance with the recommendations of the British Standards BS 5930(2015)[1], BS 1377 (1990)[2] and BS10175 (2001)[3].

Soil and rock descriptions follow the recommendations of BS 593. Where descriptions or classifications are based on other documents (e.g. BS 8004 (1986) or CIRIA Project Report 11 (1993)), this is stated in the report text.

2. Site methods

Unless specifically stated otherwise, the following methods are used for exploratory holes.

- Holes described as cable percussive are bored using a light cable percussive rig. Standard penetration tests are carried out where appropriate, as shown in the logs. Disturbed and undisturbed samples are taken from the exploratory holes at the depths on the records.
- Window sampling generally uses the windowless sampling method, using a tracked Geotool.
- Dynamic probes are usually heavy dynamic probes, using the same tracked Geotool used for window sampling.

3. Definitions and abbreviations

The following terms are used in the exploratory hole logs

Samples

U	Undisturbed 102mm dia. sample
TW	Thin Walled undisturbed 102mm dia. sample
B	Bulk sample
D	Small disturbed sample
W	Water sample
CBR	California Bearing Ratio test or CBR value obtained from Mexiprobe test

In situ tests

S	Standard penetration test (SPT)
N	SPT N value (blows/300mm)
HP	Hand penetrometer – shear strength
SV	Hand shear vane – shear strength
VOC	Volatile organic compounds (ppm)
PID	Photo-ionisation detector – used to detect the presence of VOCs.

Core recovery and rock quality

TCR	Total core recovery (%)
SCR	Solid core recovery (%)
RQD	Rock quality designation (%)
FI	Fracture index
NR	No recovery
NI	Not intact

Rotary drilling sizes

	Nominal diameter (mm)	
Index letter	**Borehole**	**Core**
N	75	54
H	99	76
P	120	92
S	146	113

Water strikes

▽	Level of water strike
▼	Water level rose to this level (see Remarks at foot of log for details)

Depth means depth below existing ground level unless otherwise specified. Values specified in soil descriptions given in the exploratory hole logs are depths unless otherwise specified.

22.0 REFERENCES

British Geological Survey. (2022). *GeoIndex*. Retrieved from http://www.bgs.ac.uk/GeoIndex/

CIRIA. (2001). *Contaminated land risk assessment A guide to good practice.*

CIRIA. (2007). *CIRIA C665, Assessing Risks Posed by Hazardous Ground Gases to Building.* London.

CL:AIRE. (August 2018). *Technical Bulletin TB17. Ground Gas Monitoring and 'Worst-Case' Conditions .* CL:AIRE.

DEFRA. (2022). *MAGIC*. Retrieved from Magic Map: http://magic.defra.gov.uk/MagicMap.aspx

Envionment Agency . (March 2017). *New Groundwater Vulnerability Mapping Methodology in England and Wales. Reference SC040016/R.* Environment Agency .

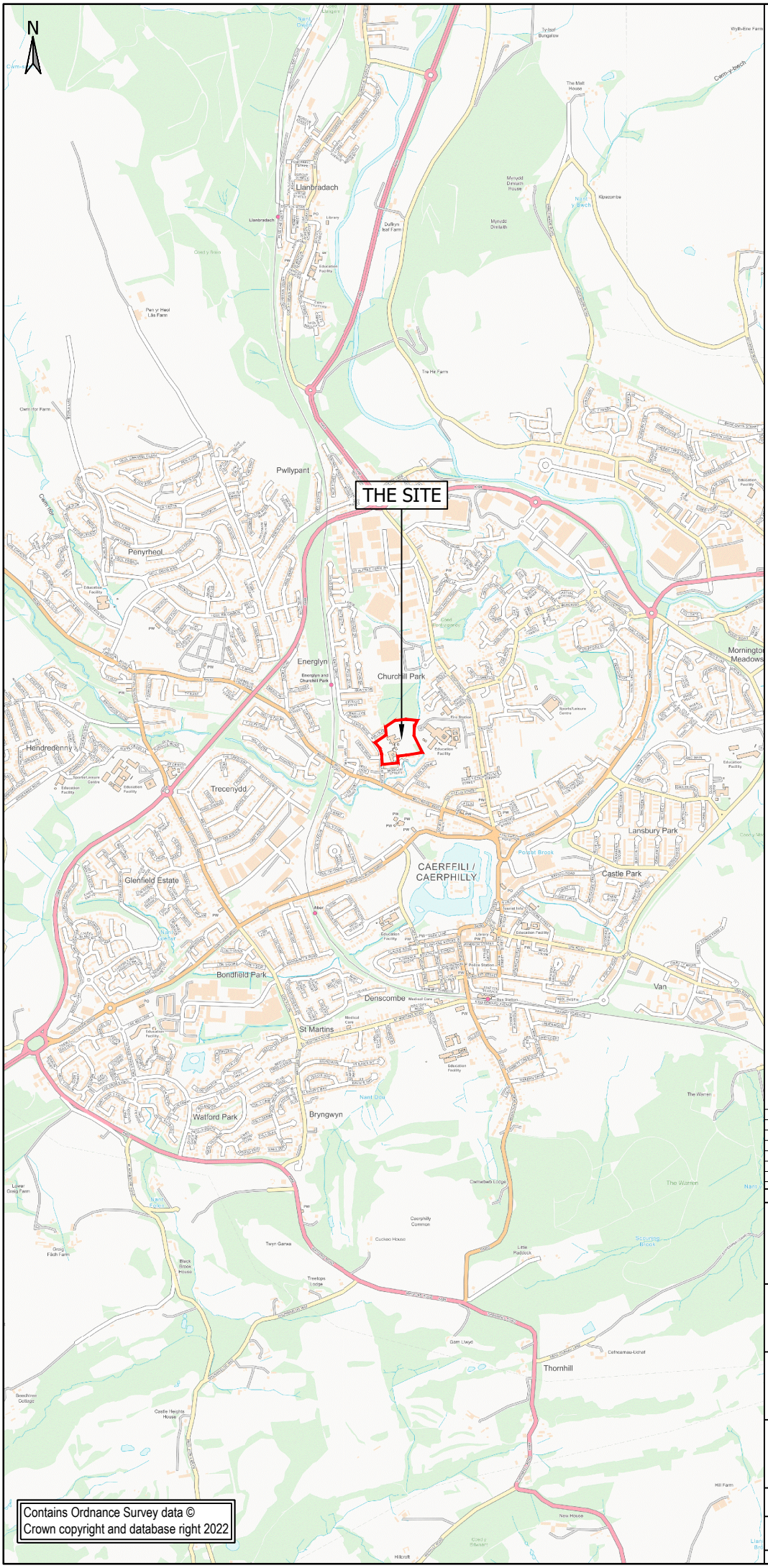
Scivyer, C. (2015). *BRE 211. Radon: Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbisment projects). Fifth Edition. .* BRE.

The Coal Authority. (2021). *Coal Athority Interactive Viewer*. Retrieved from http://mapapps2.bgs.ac.uk/coalauthority/home.html

Zetica UXO. (2008). *Zetica UXO Risk Maps*. Retrieved from https://zeticauxo.com/downloads-and-resources/risk-maps/

FIGURES

Figure 1- Site Location Plan



Rev	Description	Date	Drn	Chk	App
P01	PRELIMINARY FIRST ISSUE	25.01.2023	PP	PM	SR

Document Control

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TETRA TECH

Client

CAERPHILLY COUNTY BOROUGH COUNCIL

Project Name

PLASYFELIN

Sheet Title

SITE LOCATION PLAN

TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A4	Suitability
784-B040567	PP	25.01.23	PM	25.01.23	SR	25.01.23	As Shown	S0

Client Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision
B040567	TTE	00	XX	DR	U	0001	P01

TTE_MT_v1

Figure 2 – Site Investigation Layout Plan

N

WS104
BH106
WS103
TP/SA104
BH107
BH105
TP106
TP/SA105
WS105
BH103
TP103
WS102
WS106
BH104
TP102
WS101
TP/SA101
BH102
BH101
WS107
WS108
WS110
WS109

0 2.5 5 7.5 10 12.5 m
SCALE 1:250

LEGEND:

- ROTARY OPEN HOLE
- CABLE PERCUSSIVE BOREHOLE
- WINDOWLESS SAMPLE
- TRIAL PIT & SOAKAWAY TEST

PRELIMINARY ISSUE

Rev	Description	Date	Drn / Chk / App
P01	PRELIMINARY FIRST ISSUE	17.05.2023	PP CS KW

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TETRA TECH

Client

CAERPHILLY COUNTY BOROUGH COUNCIL

Project Name

PLASYFELIN

Sheet Title

SITE INVESTIGATION LAYOUT PLAN

TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A0	Suitability
784-B040567	PP	17.05.23	CS	17.05.23	KW	17.05.23	As Shown	S0

Client Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision
B040567	- TTE	- 00	- XX	- DR	- U	- 0003	P01

TTE_WT_v1

Figure 3 – Proposed Development Plan

NOTES :-

DO NOT SCALE FROM THIS DRAWING

ANY DISCREPENCIES TO BE REPORTED TO THE CONTRACT ADMINISTRATOR

CONTRACTOR TO CHECK DIMENSIONS ON SITE

DRAWINGS ISSUED WITHOUT STATUS ARE DRAFT ONLY

SHEET SIZE: A1

rev	date	amendment	drawn	chckd

drawing status

Preliminary ☐ Tender ☐ Construction ☒

Corporate Property
Ty Penallta
Tredomen Park
Ystrad Mynach
Hengoed
CF82 7PG

Interim Head of Property: M. Williams B.Eng., C.Eng, M.I.C.E.

project title

Plasyfelin Replacement Primary School
Caerphilly

drawing title

Site Plan Concept On Topo Survey

date	scale	drawn	checked
06/16/22	1 : 500	Author	Checker

project no.	drawing no.	rev.
5026	Option 1-6	

APPENDICES

APPENDIX A – REPORT CONDITIONS

APPENDIX A - REPORT CONDITIONS

GROUND INVESTIGATION

This report is produced solely for the benefit of Caerphilly County and Borough Council and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on a visual site inspection, reference to accessible referenced historical records, information supplied by those parties referenced in the text and preliminary discussions with local and Statutory Authorities. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive research. Where ground contamination is suspected but no physical site test results are available to confirm this, the report must be regarded as initial advice only, and further assessment should be undertaken prior to activities related to the site. Where test results undertaken by others have been made available these can only be regarded as a limited sample. The possibility of the presence of contaminants, perhaps in higher concentrations, elsewhere on the site cannot be discounted.

Whilst confident in the findings detailed within this report because there are no exact UK definitions of these matters, being subject to risk analysis, we are unable to give categoric assurances that they will be accepted by Authorities or Funds etc. without question as such bodies often have unpublished, more stringent objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to Tetra Tech. In time improved practices or amended legislation may necessitate a re-assessment.

The assessment of ground conditions within this report is based upon the findings of the study undertaken. We have interpreted the ground conditions in between locations on the assumption that conditions do not vary significantly. However, no investigation can inspect each and every part of the site and therefore changes or variances in the physical and chemical site conditions as described in this report cannot be discounted.

The report is limited to those aspects of land contamination specifically reported on and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report and provides an opinion on surrounding sites. If migrating pollution or contamination (past or present) exists further extensive research will be required before the effects can be better determined.

APPENDIX B – GROUNDSURE REPORT

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

PLASYFELIN PRIMARY SCHOOL, PLASYFELIN PRIMARY SCHOOL, LEWIS DRIVE, CAERPHILLY, CF83 3FT

Order Details

Date: 05/12/2022

Your ref: 7008935_Plas_y_Felin_

Our Ref: GS-9241210

Site Details

Location: 315230 187729

Area: 2.69 ha

Authority: Caerffili - Caerphilly County Borough Council

Summary of findings p. 2

OS MasterMap site plan p.13

Aerial image p. 8

groundsure.com/insightuserguide

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	Historical industrial land uses	0	1	32	49	-
18	1.2	Historical tanks	0	0	18	20	-
19	1.3	Historical energy features	1	0	18	18	-
21	1.4	Historical petrol stations	0	0	0	0	-
21	1.5	Historical garages	0	3	3	15	-
22	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
23	2.1	Historical industrial land uses	0	1	50	77	-
28	2.2	Historical tanks	0	0	31	40	-
31	2.3	Historical energy features	3	0	33	31	-
34	2.4	Historical petrol stations	0	0	0	0	-
34	2.5	Historical garages	0	4	5	27	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
36	3.1	Active or recent landfill	0	0	0	0	-
36	3.2	Historical landfill (BGS records)	0	0	0	0	-
37	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
37	3.4	Historical landfill (EA/NRW records)	0	0	0	3	-
38	3.5	Historical waste sites	0	0	1	3	-
38	3.6	Licensed waste sites	0	0	0	0	-
39	3.7	Waste exemptions	0	0	0	8	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
40	4.1	Recent industrial land uses	1	2	13	-	-
42	4.2	Current or recent petrol stations	0	0	1	2	-
42	4.3	Electricity cables	0	0	0	0	-
42	4.4	Gas pipelines	0	0	0	0	-
42	4.5	Sites determined as Contaminated Land	0	0	0	0	-

43	4.6	Control of Major Accident Hazards (COMAH)	0	0	1	0	-
43	4.7	Regulated explosive sites	0	0	0	0	-
43	4.8	Hazardous substance storage/usage	0	0	1	0	-
44	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
44	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
44	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	1	-
44	4.12	Radioactive Substance Authorisations	0	0	0	0	-
45	4.13	Licensed Discharges to controlled waters	1	0	2	3	-
46	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
46	4.15	Pollutant release to public sewer	0	0	0	0	-
46	4.16	List 1 Dangerous Substances	0	0	0	0	-
46	4.17	List 2 Dangerous Substances	0	0	0	1	-
47	4.18	Pollution Incidents (EA/NRW)	0	1	4	3	-
48	4.19	Pollution inventory substances	0	0	0	0	-
48	4.20	Pollution inventory waste transfers	0	0	0	0	-
48	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
49	5.1	Superficial aquifer	Identified (within 500m)				
51	5.2	Bedrock aquifer	Identified (within 500m)				
53	5.3	Groundwater vulnerability	Identified (within 50m)				
54	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
54	5.5	Groundwater vulnerability- local information	None (within 0m)				
55	5.6	Groundwater abstractions	0	0	0	0	6
57	5.7	Surface water abstractions	0	0	0	0	0
57	5.8	Potable abstractions	0	0	0	0	0
57	5.9	Source Protection Zones	0	0	0	0	-
58	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
59	6.1	Water Network (OS MasterMap)	0	2	8	-	-

60	6.2	Surface water features	0	3	3	-	-
61	6.3	WFD Surface water body catchments	1	-	-	-	-
61	6.4	WFD Surface water bodies	0	1	0	-	-
61	6.5	WFD Groundwater bodies	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
63	7.1	Risk of flooding from rivers and the sea	High (within 50m)				
64	7.2	Historical Flood Events	0	0	0	-	-
64	7.3	Flood Defences	0	4	5	-	-
65	7.4	Areas Benefiting from Flood Defences	0	0	4	-	-
65	7.5	Flood Storage Areas	0	0	0	-	-
66	7.6	Flood Zone 2	Identified (within 50m)				
67	7.7	Flood Zone 3	Identified (within 50m)				
Page	Section	Surface water flooding					
68	8.1	Surface water flooding	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding					
70	9.1	Groundwater flooding	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
71	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	3
72	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
72	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
72	10.4	Special Protection Areas (SPA)	0	0	0	0	0
72	10.5	National Nature Reserves (NNR)	0	0	0	0	0
73	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
73	10.7	Designated Ancient Woodland	0	0	0	1	40
75	10.8	Biosphere Reserves	0	0	0	0	0
75	10.9	Forest Parks	0	0	0	0	0
75	10.10	Marine Conservation Zones	0	0	0	0	0
75	10.11	Green Belt	0	0	0	0	0
75	10.12	Proposed Ramsar sites	0	0	0	0	0

76	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
76	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
76	10.15	Nitrate Sensitive Areas	0	0	0	0	0
76	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
77	10.17	SSSI Impact Risk Zones	0	-	-	-	-
77	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
78	11.1	World Heritage Sites	0	0	0	-	-
79	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
79	11.3	National Parks	0	0	0	-	-
79	**11.4**	**Listed Buildings**	0	0	1	-	-
80	11.5	Conservation Areas	0	0	0	-	-
80	11.6	Scheduled Ancient Monuments	0	0	0	-	-
80	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
81	12.1	Agricultural Land Classification	None (within 250m)				
81	12.2	Open Access Land	0	0	0	-	-
81	12.3	Tree Felling Licences	0	0	0	-	-
81	12.4	Environmental Stewardship Schemes	0	0	0	-	-
82	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
83	13.1	Priority Habitat Inventory	0	0	0	-	-
83	13.2	Habitat Networks	0	0	0	-	-
83	13.3	Open Mosaic Habitat	0	0	0	-	-
83	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
84	**14.1**	**10k Availability**	Identified (within 500m)				
85	14.2	Artificial and made ground (10k)	0	0	0	0	-
86	**14.3**	**Superficial geology (10k)**	2	2	3	4	-

87	14.4	Landslip (10k)	0	0	0	0	-
88	14.5	Bedrock geology (10k)	1	0	1	1	-
89	14.6	Bedrock faults and other linear features (10k)	0	0	1	2	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
90	15.1	50k Availability	Identified (within 500m)				
91	15.2	Artificial and made ground (50k)	0	0	0	0	-
91	15.3	Artificial ground permeability (50k)	0	0	-	-	-
92	15.4	Superficial geology (50k)	2	2	1	1	-
93	15.5	Superficial permeability (50k)	Identified (within 50m)				
93	15.6	Landslip (50k)	0	0	0	0	-
93	15.7	Landslip permeability (50k)	None (within 50m)				
94	15.8	Bedrock geology (50k)	1	0	1	1	-
95	15.9	Bedrock permeability (50k)	Identified (within 50m)				
95	15.10	Bedrock faults and other linear features (50k)	0	0	1	1	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
96	16.1	BGS Boreholes	0	0	4	-	-
Page	Section	Natural ground subsidence					
98	17.1	Shrink swell clays	Very low (within 50m)				
99	17.2	Running sands	Low (within 50m)				
101	17.3	Compressible deposits	Moderate (within 50m)				
103	17.4	Collapsible deposits	Very low (within 50m)				
105	17.5	Landslides	Very low (within 50m)				
106	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
108	18.1	Natural cavities	0	0	0	0	-
109	18.2	BritPits	0	0	0	0	-
109	18.3	Surface ground workings	0	2	1	-	-
109	18.4	Underground workings	0	0	0	0	20
110	18.5	Historical Mineral Planning Areas	0	0	0	0	-

110	18.6	Non-coal mining	0	0	0	0	0
111	18.7	Mining cavities	0	0	0	0	0
111	18.8	JPB mining areas	None (within 0m)				
111	**18.9**	**Coal mining**	Identified (within 0m)				
111	18.10	Brine areas	None (within 0m)				
112	18.11	Gypsum areas	None (within 0m)				
112	18.12	Tin mining	None (within 0m)				
112	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
113	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
114	**20.1**	**BGS Estimated Background Soil Chemistry**	2	2	-	-	-
114	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
114	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
115	21.1	Underground railways (London)	0	0	0	-	-
115	21.2	Underground railways (Non-London)	0	0	0	-	-
116	21.3	Railway tunnels	0	0	0	-	-
116	**21.4**	**Historical railway and tunnel features**	0	0	9	-	-
116	21.5	Royal Mail tunnels	0	0	0	-	-
117	21.6	Historical railways	0	0	0	-	-
117	**21.7**	**Railways**	0	0	7	-	-
117	21.8	Crossrail 1	0	0	0	0	-
118	21.9	Crossrail 2	0	0	0	0	-
118	21.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 14/04/2020

Site Area: 2.69ha

Recent site history - 2017 aerial photograph

Capture Date: 25/05/2017

Site Area: 2.69ha

Recent site history - 2014 aerial photograph

Capture Date: 23/07/2014

Site Area: 2.69ha

Recent site history - 2009 aerial photograph

Capture Date: 12/10/2009

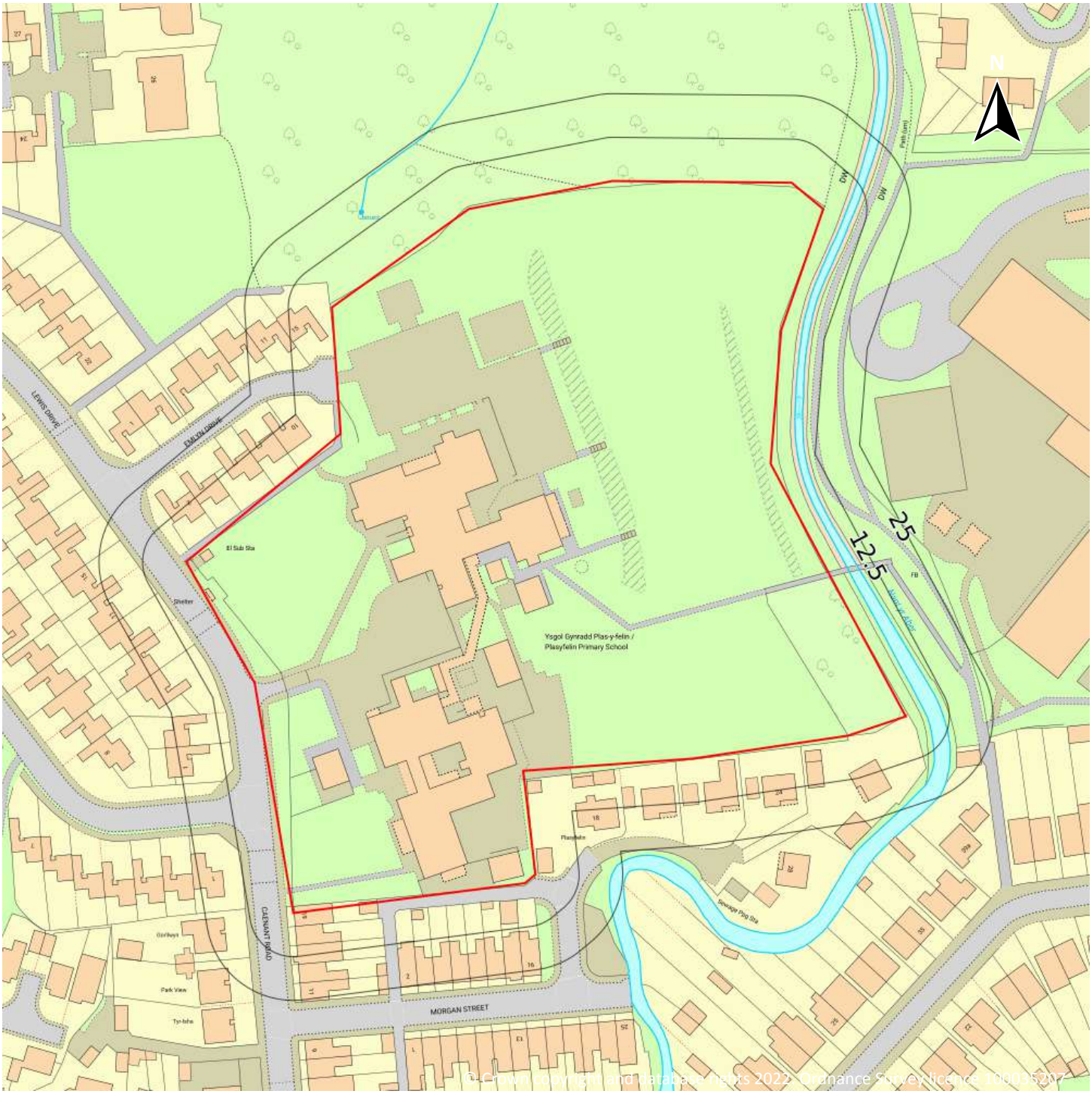
Site Area: 2.69ha

Recent site history - 2000 aerial photograph

Capture Date: 21/07/2000

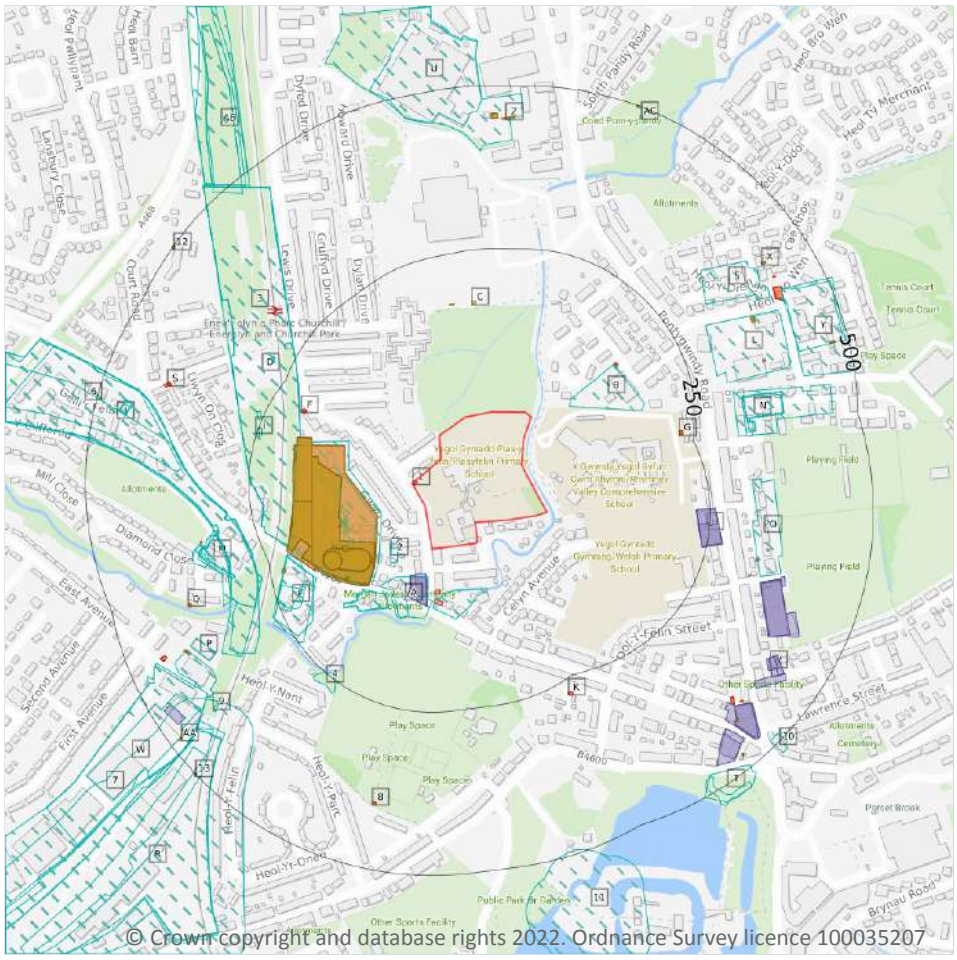
Site Area: 2.69ha

OS MasterMap site plan



Site Area: 2.69ha

1 Past land use



1.1 Historical industrial land uses

Records within 500m	82

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	43m SW	Corn Mill	1875	1174936

ID	Location	Land use	Dates present	Group ID
2	51m SW	Unspecified Mill	1969	1165921
B	61m NE	Fire Station	1969 - 1992	1261242
A	64m W	Gas Works	1915 - 1922	1270028
A	67m S	Unspecified Works	1978 - 1992	1243201
A	75m W	Unspecified Works	1969	1267074
A	85m SW	Unspecified Mill	1899	1165924
A	85m SW	Unspecified Works	1978 - 1992	1263211
A	97m SW	Unspecified Tank	1969 - 1992	1217061
A	99m SW	Woollen Mill	1899	1173676
A	99m SW	Disused Woollen Mill	1915 - 1922	1201113
A	106m W	Unspecified Commercial/Industrial	1960	1256459
A	113m SW	Unspecified Commercial/Industrial	1947	1250772
A	114m W	Unspecified Tank	1960	1215127
A	120m W	Unspecified Tank	1948	1223648
A	120m W	Unspecified Tank	1915 - 1922	1238997
A	120m SW	Unspecified Tanks	1915 - 1922	1228580
A	120m SW	Unspecified Tank	1947	1175803
A	121m W	Unspecified Tank	1947	1216736
A	129m SW	Unspecified Tank	1969 - 1992	1199961
A	129m SW	Unspecified Tank	1948 - 1960	1232892
A	134m SW	Gasometer	1915 - 1922	1235419
A	135m SW	Unspecified Tank	1947	1229210
A	139m SW	Unspecified Old Tanks	1947	1175125
3	176m W	Railway Sidings	1947 - 1948	1226398
D	177m W	Railway Sidings	1922	1254728
D	177m W	Railway Sidings	1915	1254759
E	183m SW	Disused Woollen Mill	1947 - 1948	1252281
E	187m SW	Unspecified Depot	1992	1230295

ID	Location	Land use	Dates present	Group ID
E	197m SW	Unspecified Depot	1978	1216450
E	203m SW	Laundry	1915 - 1922	1213669
I	241m W	Railway Building	1947 - 1948	1251344
4	243m SW	Unspecified Pit	1969	1186101
I	251m W	Goods Shed	1915 - 1948	1242541
D	262m NW	Railway Building	1978 - 1992	1193192
J	264m SW	Railway Sidings	1948 - 1965	1231667
J	264m SW	Railway Sidings	1915 - 1922	1253563
J	268m W	Railway Sidings	1947	1248111
J	269m SW	Railway Sidings	1899	1215867
D	275m NW	Railway Building	1948	1196842
D	275m NW	Railway Building	1915 - 1922	1212313
L	292m NE	Unspecified Factory	1969	1173331
M	304m W	Unspecified Mill	1875	1165923
M	304m W	Disused Woollen Mill	1915 - 1922	1210835
M	304m W	Woollen Mill	1899	1173675
M	307m W	Unspecified Works	1978 - 1992	1192669
N	311m E	Unspecified Factory	1978 - 1992	1219695
O	315m E	Unspecified Works	1969	1178908
5	318m NE	Unspecified Factory	1969 - 1978	1198937
N	324m E	Glove Factory	1948	1182012
N	326m E	Unspecified Factory	1960	1214166
N	326m E	Unspecified Factory	1969	1257685
M	330m W	Disused Woollen Mill	1948	1253857
M	331m W	Disused Woollen Mill	1947	1222476
6	354m W	Unspecified Factory	1978 - 1992	1261669
P	368m SW	Unspecified Works	1978 - 1992	1255187
R	382m SW	Goods Yard	1965 - 1968	1258249

ID	Location	Land use	Dates present	Group ID
7	384m SW	Unspecified Commercial/Industrial	1978 - 1992	1248647
U	401m N	Unspecified Commercial/Industrial	1992	1159110
9	403m SW	Railway Building	1915 - 1922	1217143
W	409m SW	Unspecified Works	1965 - 1968	1268483
Y	421m E	Unspecified Factory	1978 - 1992	1255795
Y	422m NE	Unspecified Factory	1969	1208678
R	425m SW	Railway Sidings	1947	1242096
W	430m SW	Railway Building	1948	1172051
R	434m SW	Railway Sidings	1915 - 1922	1240491
R	434m SW	Railway Sidings	1978	1236952
R	435m SW	Railway Sidings	1948 - 1968	1228966
U	440m N	Unspecified Works	1978	1178910
J	445m W	Railway Building	1948	1216415
J	446m W	Railway Building	1947	1232458
J	447m W	Railway Building	1915 - 1922	1210695
R	469m SW	Railway Sidings	1899	1192506
T	473m SE	Brewery	1899	1174580
T	476m SE	Unspecified Ground Workings	1969 - 1978	1201381
AB	478m NW	Railway Sidings	1916	1227125
AB	478m NW	Railway Sidings	1922	1193067
AB	482m NW	Railway Sidings	1915	1213261
AC	483m NE	Unspecified Tank	1916	1175804
AB	484m NW	Railway Sidings	1947 - 1948	1217220
10	489m SE	Malthouse	1899	1171588
11	494m S	Horn Works	1899 - 1922	1229166

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	38

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	71m W	Gas Works	1920	190150
A	84m SW	Gas Works	1976 - 1995	193314
A	85m SW	Gas Works	1987	187422
A	94m SW	Tanks	1961 - 1969	180211
A	95m SW	Gasholders	1976 - 1993	192739
A	95m SW	Gas Holders	1987	178133
A	126m SW	Gasometer	1920	170754
A	126m SW	Unspecified Tank	1937	173016
A	127m W	Unspecified Tank	1920 - 1937	188759
A	134m SW	Unspecified Tank	1976 - 1993	183958
A	139m SW	Gasometer	1920	170755
A	139m SW	Unspecified Tank	1937	173015
A	145m SW	Unspecified Tank	1920 - 1937	181670
A	153m W	Gas Works	1998	189414
A	156m W	Gas Works	1982	178733
C	166m N	Unspecified Tank	1977 - 1989	186903
C	172m N	Unspecified Tank	1977 - 1989	184368
E	227m SW	Tanks	1982	169279
O	324m E	Unspecified Tank	1961 - 1969	192503
O	342m E	Unspecified Tank	1961	173017
L	365m E	Unspecified Tank	1976 - 1989	191307

ID	Location	Land use	Dates present	Group ID
L	367m NE	Unspecified Tank	1969	172978
L	368m NE	Unspecified Tank	1976 - 1989	181268
P	404m SW	Tanks	1976 - 1988	184474
P	406m SW	Unspecified Tank	1995	173014
X	424m NE	Unspecified Tank	1971 - 1977	193112
T	429m SE	Unspecified Tank	1976 - 1996	179833
Z	448m N	Tanks	1977	169232
Z	450m N	Tanks	1977 - 1998	179592
Z	450m N	Tanks	1971	179685
Y	471m E	Unspecified Tank	1989	179824
Y	472m E	Unspecified Tank	1995	180233
Y	475m E	Unspecified Tank	1976	191091
T	475m SE	Unspecified Tank	1976 - 1996	178356
AA	480m SW	Unspecified Tank	1976 - 1988	187378
12	497m NW	Unspecified Tank	1976 - 1993	190826
AC	497m NE	Unspecified Tank	1920	172975
13	498m SW	Unspecified Tank	1961	173013

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**37**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Electricity Substation**	**1976 - 1993**	**112302**

ID	Location	Land use	Dates present	Group ID
A	64m S	Electricity Substation	1976 - 1993	103036
A	71m W	Gas Works	1920	100731
A	77m S	Electricity Transformer	1969	99577
A	84m SW	Gas Works	1976 - 1995	110327
A	95m SW	Gasholders	1976 - 1993	104765
A	95m SW	Gas Holders	1987	99984
A	126m SW	Gasometer	1920	99151
A	139m SW	Gasometer	1920	99152
A	147m SW	Electricity Substation	1976 - 1993	105603
B	149m NE	Electricity Substation	1976 - 1987	106793
B	150m NE	Electricity Transformer	1969	99593
B	150m NE	Electricity Substation	1993	109481
A	153m W	Gas Works	1998	107107
A	156m W	Gas Works	1982	102407
F	196m W	Electricity Transformer	1976 - 1982	109430
F	197m W	Electricity Substation	1995 - 1998	108363
G	227m E	Electricity Substation	1976 - 1995	107142
G	228m E	Electricity Transformer	1969	99592
K	268m SE	Electricity Transformer	1969	99578
K	269m SE	Electricity Substation	1976 - 1993	103955
O	328m E	Electricity Substation	1976 - 1995	110728
M	333m W	Electricity Substation	1998	97415
Q	379m SW	Electricity Substation	1995	97414
Q	379m SW	Electricity Transformer	1976 - 1982	109535
8	397m S	Electricity Substation	1976 - 1993	112702
S	398m W	Electricity Transformer	1976 - 1982	112621
S	398m W	Electricity Substation	1995 - 1998	107960
T	399m SE	Electricity Substation	1976 - 1989	108232

ID	Location	Land use	Dates present	Group ID
T	400m SE	Electricity Substation	1996	113263
S	402m W	Electricity Substation	1969	97413
T	413m SE	Electricity Transformer	1969	99580
X	415m NE	Electricity Substation	1977 - 1988	103763
X	417m NE	Electricity Substation	1971	104023
X	428m NE	Electricity Substation	1992	97416
P	439m SW	Electricity Transformer	1969 - 1988	106680
P	439m SW	Electricity Substation	1995	97433

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	**0**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	**21**

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	39m SW	Garage	1993	32740
A	43m SW	Garage	1969 - 1987	35992
A	44m SW	Garage	1976	32601

ID	Location	Land use	Dates present	Group ID
H	229m E	Garage	1976 - 1989	36159
H	230m E	Garage	1969	34366
H	233m E	Garage	1995	34142
O	344m E	Garage	1989	34910
O	344m E	Garage	1961	32553
O	345m E	Garage	1976	32709
O	345m E	Garage	1995	34528
O	372m E	Garage	1969	33852
T	402m SE	Garage	1961 - 1969	36707
V	405m SE	Garage	1976	32772
V	407m SE	Garage	1989 - 1996	35747
V	410m SE	Garage	1961 - 1969	35838
V	412m SE	Garage	1976	34027
T	413m SE	Garage	1989	36916
T	413m SE	Garage	1976 - 1996	35804
T	430m SE	Garage	1976 - 1989	36050
T	433m SE	Garage	1961	33813
AA	458m SW	Garage	1976	32079

This data is sourced from Ordnance Survey / Groundsure.

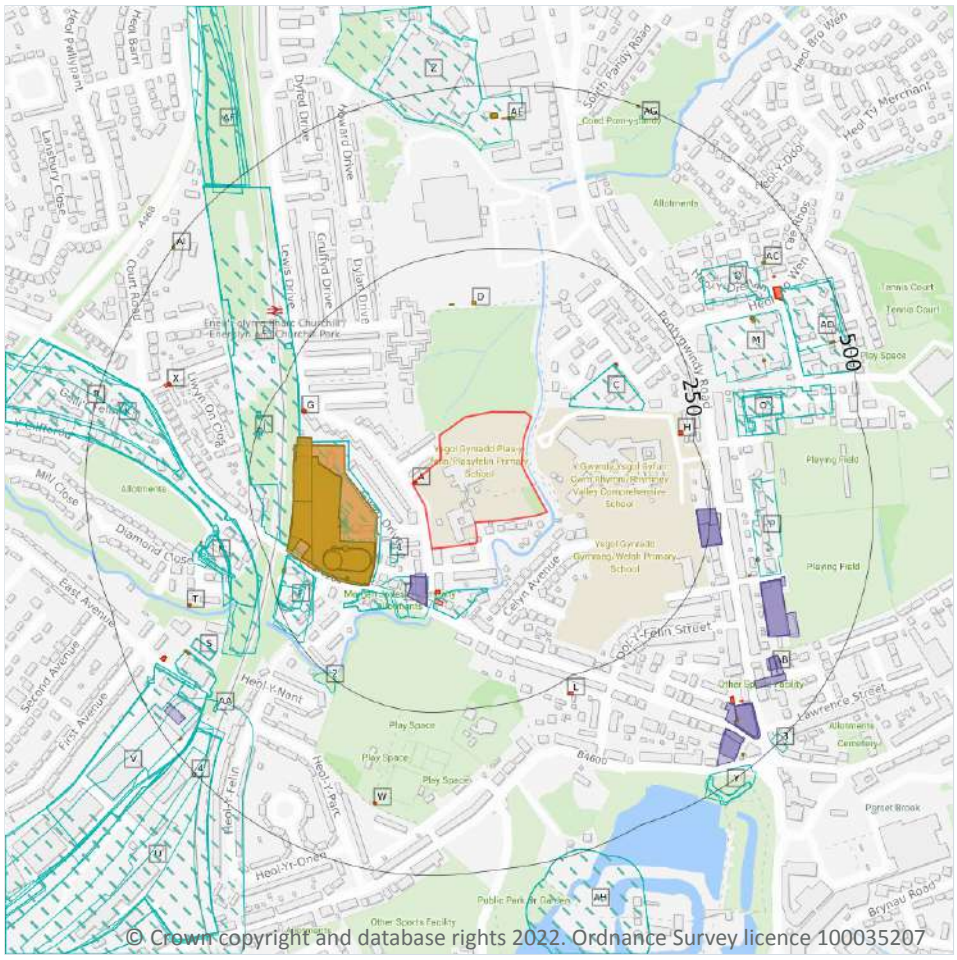
1.6 Historical military land

Records within 500m	**0**

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m	128

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 23**

ID	Location	Land Use	Date	Group ID
B	43m SW	Corn Mill	1875	1174936
1	51m SW	Unspecified Mill	1969	1165921
C	61m NE	Fire Station	1992	1261242

ID	Location	Land Use	Date	Group ID
C	61m NE	Fire Station	1969	1261242
C	61m NE	Fire Station	1978	1261242
B	64m W	Gas Works	1922	1270028
B	64m W	Gas Works	1915	1270028
B	67m S	Unspecified Works	1992	1243201
B	67m S	Unspecified Works	1978	1243201
B	75m W	Unspecified Works	1969	1267074
B	85m SW	Unspecified Mill	1899	1165924
B	85m SW	Unspecified Works	1992	1263211
B	85m SW	Unspecified Works	1978	1263211
B	97m SW	Unspecified Tank	1992	1217061
B	97m SW	Unspecified Tank	1969	1217061
B	97m SW	Unspecified Tank	1978	1217061
B	99m SW	Woollen Mill	1899	1173676
B	99m SW	Disused Woollen Mill	1922	1201113
B	99m SW	Disused Woollen Mill	1915	1201113
B	106m W	Unspecified Commercial/Industrial	1960	1256459
B	113m SW	Unspecified Commercial/Industrial	1947	1250772
B	114m W	Unspecified Tank	1960	1215127
B	120m W	Unspecified Tank	1922	1238997
B	120m W	Unspecified Tank	1948	1223648
B	120m W	Unspecified Tank	1915	1238997
B	120m SW	Unspecified Tanks	1922	1228580
B	120m SW	Unspecified Tanks	1915	1228580
B	120m SW	Unspecified Tank	1947	1175803
B	121m W	Unspecified Tank	1947	1216736
B	129m SW	Unspecified Tank	1992	1199961
B	129m SW	Unspecified Tank	1969	1199961

ID	Location	Land Use	Date	Group ID
B	129m SW	Unspecified Tank	1960	1232892
B	129m SW	Unspecified Tank	1978	1199961
B	134m SW	Gasometer	1922	1235419
B	134m SW	Gasometer	1915	1235419
B	134m SW	Unspecified Tank	1948	1232892
B	135m SW	Unspecified Tank	1947	1229210
B	139m SW	Unspecified Old Tanks	1947	1175125
E	176m W	Railway Sidings	1947	1226398
E	177m W	Railway Sidings	1922	1254728
E	177m W	Railway Sidings	1948	1226398
E	177m W	Railway Sidings	1915	1254759
F	183m SW	Disused Woollen Mill	1948	1252281
F	185m SW	Disused Woollen Mill	1947	1252281
F	187m SW	Unspecified Depot	1992	1230295
F	197m SW	Unspecified Depot	1978	1216450
F	203m SW	Laundry	1922	1213669
F	203m SW	Laundry	1915	1213669
J	241m W	Railway Building	1947	1251344
J	242m W	Railway Building	1948	1251344
2	243m SW	Unspecified Pit	1969	1186101
J	251m W	Goods Shed	1947	1242541
J	252m W	Goods Shed	1922	1242541
J	252m W	Goods Shed	1948	1242541
J	252m W	Goods Shed	1915	1242541
E	262m NW	Railway Building	1992	1193192
E	262m NW	Railway Building	1978	1193192
K	264m SW	Railway Sidings	1922	1253563
K	264m SW	Railway Sidings	1948	1231667

ID	Location	Land Use	Date	Group ID
K	264m SW	Railway Sidings	1915	1253563
K	268m W	Railway Sidings	1947	1248111
K	269m SW	Railway Sidings	1899	1215867
E	275m NW	Railway Building	1922	1212313
E	275m NW	Railway Building	1948	1196842
E	275m NW	Railway Building	1915	1212313
M	292m NE	Unspecified Factory	1969	1173331
N	304m W	Unspecified Mill	1875	1165923
N	304m W	Disused Woollen Mill	1922	1210835
N	304m W	Disused Woollen Mill	1915	1210835
N	304m W	Woollen Mill	1899	1173675
N	307m W	Unspecified Works	1992	1192669
N	307m W	Unspecified Works	1978	1192669
O	311m E	Unspecified Factory	1992	1219695
O	311m E	Unspecified Factory	1978	1219695
P	315m E	Unspecified Works	1969	1178908
Q	318m NE	Unspecified Factory	1969	1198937
Q	318m NE	Unspecified Factory	1978	1198937
O	324m E	Glove Factory	1948	1182012
O	326m E	Unspecified Factory	1969	1257685
O	326m E	Unspecified Factory	1960	1214166
N	330m W	Disused Woollen Mill	1948	1253857
N	331m W	Disused Woollen Mill	1947	1222476
R	349m W	Railway Sidings	1965	1231667
R	354m W	Unspecified Factory	1992	1261669
R	354m W	Unspecified Factory	1978	1261669
S	368m SW	Unspecified Works	1992	1255187
S	368m SW	Unspecified Works	1978	1255187

ID	Location	Land Use	Date	Group ID
U	382m SW	Goods Yard	1965	1258249
V	384m SW	Unspecified Commercial/Industrial	1978	1248647
V	385m SW	Unspecified Commercial/Industrial	1992	1248647
Z	401m N	Unspecified Commercial/Industrial	1992	1159110
AA	403m SW	Railway Building	1922	1217143
AA	403m SW	Railway Building	1915	1217143
AA	409m SW	Unspecified Works	1965	1268483
AA	409m SW	Unspecified Works	1968	1268483
AD	421m E	Unspecified Factory	1992	1255795
AD	421m E	Unspecified Factory	1978	1255795
AD	422m NE	Unspecified Factory	1969	1208678
U	425m SW	Railway Sidings	1947	1242096
V	428m SW	Unspecified Works	1965	1268483
V	428m SW	Unspecified Works	1968	1268483
V	430m SW	Railway Building	1948	1172051
U	434m SW	Railway Sidings	1922	1240491
U	434m SW	Railway Sidings	1915	1240491
U	434m SW	Railway Sidings	1978	1236952
U	435m SW	Railway Sidings	1948	1228966
Z	440m N	Unspecified Works	1978	1178910
U	441m SW	Railway Sidings	1965	1228966
U	441m SW	Railway Sidings	1968	1228966
K	445m W	Railway Building	1948	1216415
K	446m W	Railway Building	1947	1232458
K	447m W	Railway Building	1922	1210695
K	447m W	Railway Building	1915	1210695
U	469m SW	Railway Sidings	1899	1192506
Y	473m SE	Brewery	1899	1174580

ID	Location	Land Use	Date	Group ID
Y	476m SE	Unspecified Ground Workings	1978	1201381
Y	477m SE	Unspecified Ground Workings	1969	1201381
AF	478m NW	Railway Sidings	1916	1227125
AF	478m NW	Railway Sidings	1948	1226398
AF	478m NW	Railway Sidings	1922	1193067
AF	482m NW	Railway Sidings	1915	1213261
AG	483m NE	Unspecified Tank	1916	1175804
AF	484m NW	Railway Sidings	1948	1217220
AF	485m NW	Railway Sidings	1947	1217220
3	489m SE	Malthouse	1899	1171588
AH	494m S	Horn Works	1915	1229166
AH	494m S	Horn Works	1899	1229166
AH	494m S	Horn Works	1922	1229166

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**71**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 23**

ID	Location	Land Use	Date	Group ID
B	71m W	Gas Works	1920	190150
B	84m SW	Gas Works	1993	193314
B	85m SW	Gas Works	1987	187422
B	85m SW	Gas Works	1976	193314
B	94m SW	Tanks	1961	180211
B	94m SW	Tanks	1969	180211
B	95m SW	Gasholders	1993	192739

ID	Location	Land Use	Date	Group ID
B	95m SW	Gas Holders	1987	178133
B	95m SW	Gasholders	1976	192739
B	126m SW	Gasometer	1920	170754
B	126m SW	Unspecified Tank	1937	173016
B	127m W	Unspecified Tank	1920	188759
B	127m W	Unspecified Tank	1937	188759
B	134m SW	Unspecified Tank	1993	183958
B	135m SW	Unspecified Tank	1987	183958
B	136m SW	Unspecified Tank	1976	183958
B	139m SW	Gasometer	1920	170755
B	139m SW	Unspecified Tank	1937	173015
B	145m SW	Unspecified Tank	1920	181670
B	145m SW	Unspecified Tank	1937	181670
B	153m W	Gas Works	1976	193314
B	153m W	Gas Works	1995	193314
B	153m W	Gas Works	1998	189414
B	156m W	Gas Works	1982	178733
D	166m N	Unspecified Tank	1977	186903
D	167m N	Unspecified Tank	1989	186903
D	167m N	Unspecified Tank	1977	186903
D	172m N	Unspecified Tank	1977	184368
D	173m N	Unspecified Tank	1989	184368
D	173m N	Unspecified Tank	1977	184368
F	227m SW	Tanks	1982	169279
P	324m E	Unspecified Tank	1961	192503
P	324m E	Unspecified Tank	1969	192503
P	342m E	Unspecified Tank	1961	173017
M	365m E	Unspecified Tank	1989	191307

ID	Location	Land Use	Date	Group ID
M	365m E	Unspecified Tank	1989	191307
M	366m E	Unspecified Tank	1976	191307
M	367m NE	Unspecified Tank	1969	172978
M	368m NE	Unspecified Tank	1989	181268
M	368m NE	Unspecified Tank	1989	181268
M	369m NE	Unspecified Tank	1976	181268
S	404m SW	Tanks	1976	184474
S	405m SW	Tanks	1988	184474
S	406m SW	Unspecified Tank	1995	173014
AC	424m NE	Unspecified Tank	1977	193112
AC	425m NE	Unspecified Tank	1971	193112
Y	429m SE	Unspecified Tank	1989	179833
Y	429m SE	Unspecified Tank	1989	179833
Y	429m SE	Unspecified Tank	1976	179833
Y	430m SE	Unspecified Tank	1996	179833
AE	448m N	Tanks	1977	169232
AE	450m N	Tanks	1989	179592
AE	450m N	Tanks	1977	179592
AE	450m N	Tanks	1977	179592
AE	450m N	Tanks	1971	179685
AE	451m N	Tanks	1998	179592
AD	471m E	Unspecified Tank	1989	179824
AD	471m E	Unspecified Tank	1989	179824
AD	472m E	Unspecified Tank	1995	180233
AD	475m E	Unspecified Tank	1976	191091
Y	475m SE	Unspecified Tank	1989	178356
Y	475m SE	Unspecified Tank	1989	178356
Y	476m SE	Unspecified Tank	1976	178356

ID	Location	Land Use	Date	Group ID
Y	477m SE	Unspecified Tank	1996	178356
AA	480m SW	Unspecified Tank	1976	187378
AA	482m SW	Unspecified Tank	1988	187378
AI	497m NW	Unspecified Tank	1982	190826
AI	497m NW	Unspecified Tank	1993	190826
AG	497m NE	Unspecified Tank	1920	172975
AI	498m NW	Unspecified Tank	1976	190826
4	498m SW	Unspecified Tank	1961	173013

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**67**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 23**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Electricity Substation**	**1976**	**112302**
A	**On site**	**Electricity Substation**	**1987**	**112302**
A	**On site**	**Electricity Substation**	**1993**	**112302**
B	64m S	Electricity Substation	1987	103036
B	64m S	Electricity Substation	1976	103036
B	65m S	Electricity Substation	1993	103036
B	71m W	Gas Works	1920	100731
B	77m S	Electricity Transformer	1969	99577
B	84m SW	Gas Works	1993	110327
B	85m SW	Gas Works	1987	110327
B	85m SW	Gas Works	1976	110327
B	95m SW	Gasholders	1993	104765

ID	Location	Land Use	Date	Group ID
B	95m SW	Gas Holders	1987	99984
B	95m SW	Gasholders	1976	104765
B	126m SW	Gasometer	1920	99151
B	139m SW	Gasometer	1920	99152
B	147m SW	Electricity Substation	1987	105603
B	147m SW	Electricity Substation	1993	105603
B	148m SW	Electricity Substation	1976	105603
C	149m NE	Electricity Substation	1987	106793
C	150m NE	Electricity Transformer	1969	99593
C	150m NE	Electricity Substation	1976	106793
C	150m NE	Electricity Substation	1993	109481
B	153m W	Gas Works	1976	110327
B	153m W	Gas Works	1995	110327
B	153m W	Gas Works	1998	107107
B	156m W	Gas Works	1982	102407
G	196m W	Electricity Transformer	1982	109430
G	196m W	Electricity Transformer	1976	109430
G	197m W	Electricity Substation	1995	108363
G	197m W	Electricity Substation	1998	108363
H	227m E	Electricity Substation	1989	107142
H	227m E	Electricity Substation	1989	107142
H	227m E	Electricity Substation	1976	107142
H	228m E	Electricity Transformer	1969	99592
H	228m E	Electricity Substation	1995	107142
L	268m SE	Electricity Transformer	1969	99578
L	269m SE	Electricity Substation	1976	103955
L	270m SE	Electricity Substation	1993	103955
P	328m E	Electricity Substation	1989	110728

ID	Location	Land Use	Date	Group ID
P	328m E	Electricity Substation	1989	110728
P	328m E	Electricity Substation	1995	110728
P	329m E	Electricity Substation	1976	110728
N	333m W	Electricity Substation	1998	97415
T	379m SW	Electricity Substation	1995	97414
T	379m SW	Electricity Transformer	1976	109535
T	380m SW	Electricity Transformer	1982	109535
W	397m S	Electricity Substation	1976	112702
W	397m S	Electricity Substation	1993	112702
X	398m W	Electricity Transformer	1976	112621
X	398m W	Electricity Substation	1995	107960
X	398m W	Electricity Substation	1998	107960
Y	399m SE	Electricity Substation	1989	108232
Y	399m SE	Electricity Substation	1989	108232
X	399m W	Electricity Transformer	1982	112621
Y	399m SE	Electricity Substation	1976	108232
Y	400m SE	Electricity Substation	1996	113263
X	402m W	Electricity Substation	1969	97413
Y	413m SE	Electricity Transformer	1969	99580
AC	415m NE	Electricity Substation	1988	103763
AC	416m NE	Electricity Substation	1977	103763
AC	417m NE	Electricity Substation	1971	104023
AC	428m NE	Electricity Substation	1992	97416
S	439m SW	Electricity Transformer	1969	106680
S	439m SW	Electricity Substation	1995	97433
S	440m SW	Electricity Transformer	1976	106680
S	441m SW	Electricity Transformer	1988	106680

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	36

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

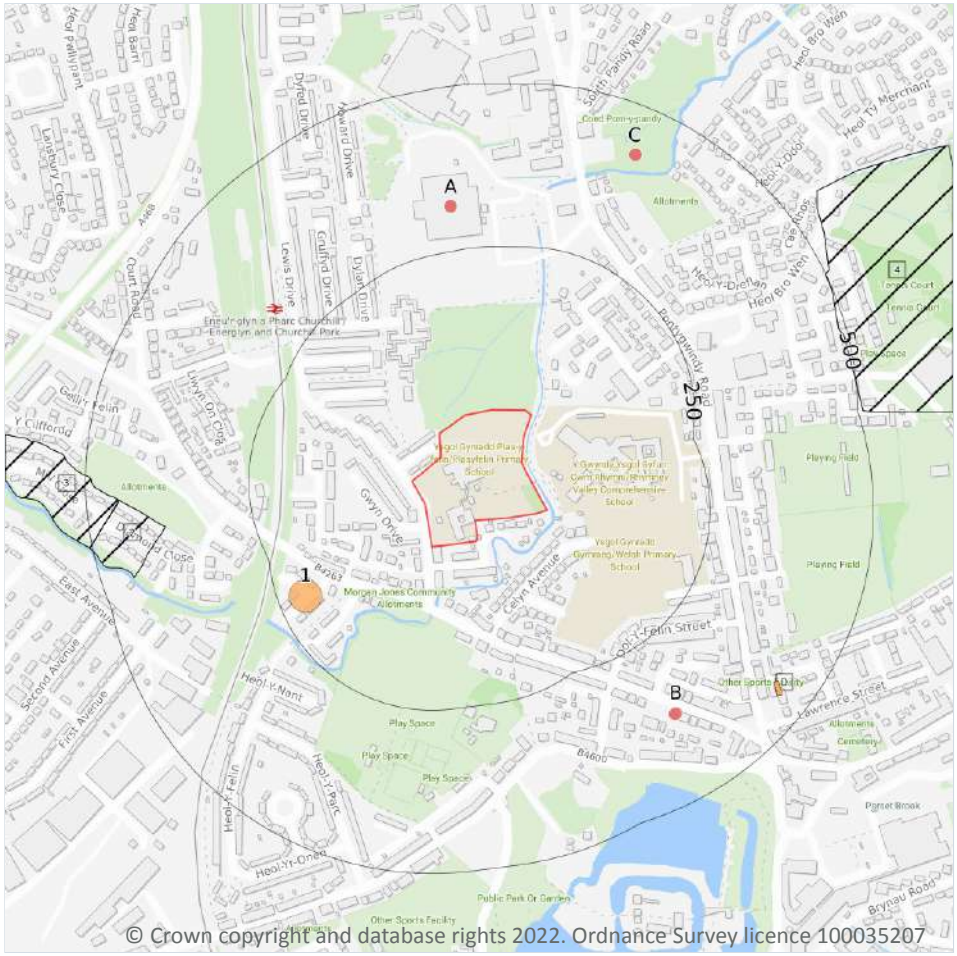
Features are displayed on the Past land use - un-grouped map on **page 23**

ID	Location	Land Use	Date	Group ID
B	39m SW	Garage	1993	32740
B	43m SW	Garage	1987	35992
B	44m SW	Garage	1976	32601
B	45m SW	Garage	1969	35992
I	229m E	Garage	1989	36159
I	229m E	Garage	1989	36159
I	229m E	Garage	1976	36159
I	230m E	Garage	1969	34366
I	233m E	Garage	1995	34142
P	344m E	Garage	1989	34910
P	344m E	Garage	1989	34910
P	344m E	Garage	1961	32553
P	345m E	Garage	1976	32709
P	345m E	Garage	1995	34528
P	372m E	Garage	1969	33852
Y	402m SE	Garage	1961	36707

ID	Location	Land Use	Date	Group ID
Y	402m SE	Garage	1969	36707
AB	405m SE	Garage	1976	32772
AB	407m SE	Garage	1989	35747
AB	407m SE	Garage	1989	35747
AB	408m SE	Garage	1996	35747
AB	410m SE	Garage	1961	35838
AB	410m SE	Garage	1969	35838
AB	411m SE	Garage	1989	35747
AB	411m SE	Garage	1989	35747
AB	412m SE	Garage	1976	34027
AB	412m SE	Garage	1996	35747
Y	413m SE	Garage	1989	36916
Y	413m SE	Garage	1989	36916
Y	413m SE	Garage	1976	35804
Y	415m SE	Garage	1996	35804
Y	430m SE	Garage	1989	36050
Y	430m SE	Garage	1989	36050
Y	431m SE	Garage	1976	36050
Y	433m SE	Garage	1961	33813
AA	458m SW	Garage	1976	32079

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	3

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 36**

ID	Location	Details		
2	384m W	Site Address: Mill Road Licence Holder Address: Mill Road, Caerphilly	Waste Licence: Yes Site Reference: 16 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 22/07/1981 Licence Surrender: 31/12/1983	Operator: - Licence Holder: Griff Davis and Sons First Recorded 31/12/1981 Last Recorded: 31/12/1983
3	449m W	Site Address: Mill Road Licence Holder Address: -	Waste Licence: Yes Site Reference: - Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 31/12/1987 Licence Surrender: 31/12/1990	Operator: - Licence Holder: Griff Davies First Recorded 31/12/1987 Last Recorded: 31/12/1990
4	488m E	Site Address: Virginia Park Licence Holder Address: -	Waste Licence: Yes Site Reference: - Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 31/12/1975 Licence Surrender: 31/12/1980	Operator: - Licence Holder: Rhymney Valley District Council First Recorded 31/12/1975 Last Recorded: 31/12/1980

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	4

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 36**

ID	Location	Address	Further Details	Date
1	183m SW	Site Address: Former Bus Depot, Mill Road, CAERPHILLY, Mid Glamorgan, CF83 3F	Type of Site: Recycling Centre (Conversion) Planning application reference: 5/5/93/0010 Description: An application (ref: 5/5/93/0010) for Detailed Planning permission was submitted to Caerphilly B.C. on 11th January 1993. Data source: Historic Planning Application Data Type: Point	01/05/1993
D	435m SE	Site Address: N/A	Type of Site: Scrap Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1989
D	435m SE	Site Address: N/A	Type of Site: Scrap Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1989
D	436m SE	Site Address: N/A	Type of Site: Scrap Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1975

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	8

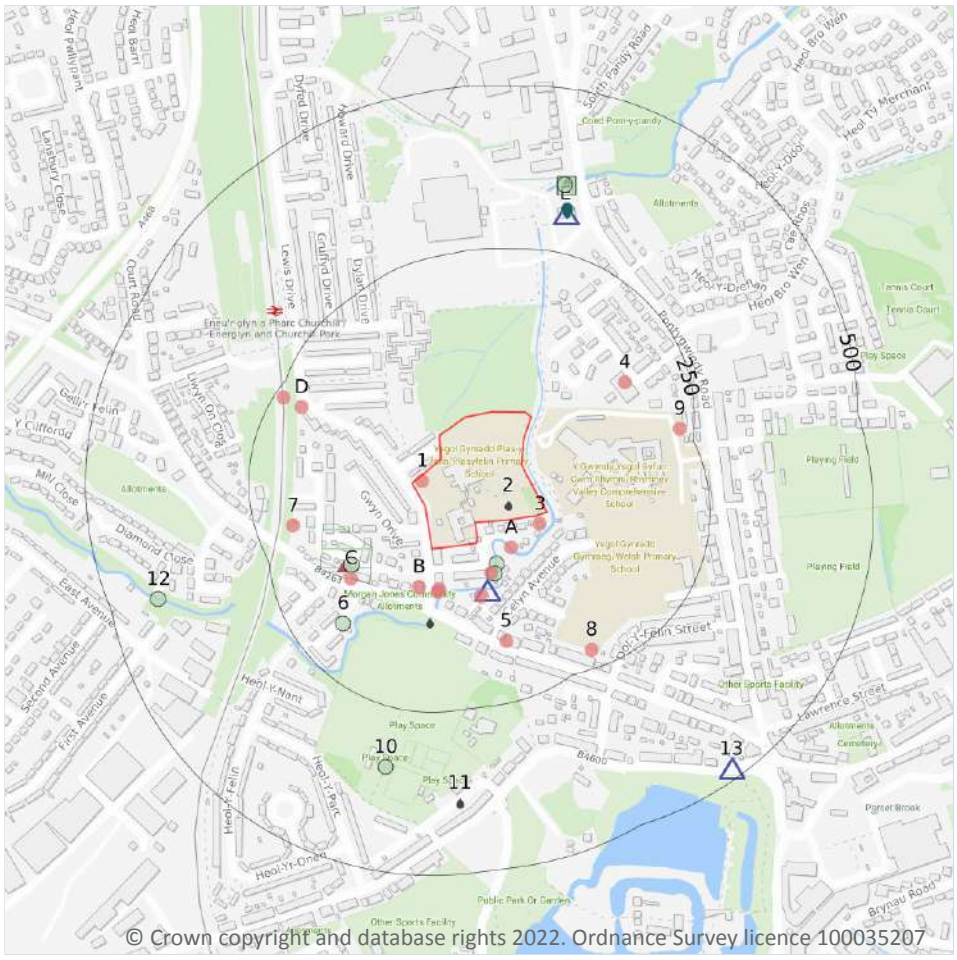
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 36**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	317m N	Asda Stores Ltd, Pontygwindy Road, Caerphilly, Caerffili, CF83 3SX	NRW-WME003711	Treating waste exemption	Waste Exemption - Non-Agricultural	Crushing waste fluorescent tubes
A	318m N	Asda Stores Limited, ASDA CAERPHILLY, Pontygwindy Road, Caerphilly, CF83 3SX	NRW-WME058487	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
B	369m SE	Speedy Asset Services Limited, Speedy Hire, 3-9 Mill Road, Caerphilly, Caerffili, CF83 3FD	NRW-WME042263	Storing waste exemption	Not on a farm	Storage of waste in secure containers
B	369m SE	Speedy Asset Services Limited, Speedy Hire, 3-9 Mill Road, Caerphilly, Caerffili, CF83 3FD	NRW-WME042263	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	369m SE	Speedy Asset Services Limited, Speedy Hire, 3-9 Mill Road, Caerphilly, Caerffili, CF833FD	NRW-WME026906	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
B	369m SE	Speedy Asset Services Limited, Speedy Hire, 3-9 Mill Road, Caerphilly, Caerffili, CF833FD	NRW-WME026906	Treating waste exemption	Not on a farm	Sorting mixed waste
C	424m NE	Cyfoeth Naturiol Cymru / Natural Resources Wales, (Rear of) Pontygwindy Inn, 222 Pontygwindy Road, Caerphilly, Caerffili, CF83 3HR	NRW-WME068937	Disposing of waste exemption	Not on a farm	Deposit of waste from dredging of inland waters
C	424m NE	Cyfoeth Naturiol Cymru / Natural Resources Wales, (Rear of) Pontygwindy Inn, 222 Pontygwindy Road, Caerphilly, Caerffili, CF83 3HR	NRW-WME068937	Using waste exemption	Not on a farm	Use of waste in construction

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m	16

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Company	Address	Activity	Category
1	**On site**	**Electricity Sub Station**	**Gwent, CF83**	**Electrical Features**	**Infrastructure and Facilities**
3	14m SE	Sylric Press	26, Morgan Street, Caerphilly, Gwent, CF83 3FQ	Published Goods	Industrial Products

ID	Location	Company	Address	Activity	Category
A	42m SE	Sewage Pumping Station	Gwent, CF83	Waste Storage, Processing and Disposal	Infrastructure and Facilities
A	51m S	Central Cars Cardiff	23, Morgan Street, Caerphilly, Gwent, CF83 3FQ	Vehicle Hire and Rental	Hire Services
B	61m SW	Caerphilly Van Centre	Caenant House, Mill Road, Caerphilly, Gwent, CF83 3FE	New Vehicles	Motoring
B	62m S	Day's Valeting	1, Caenant Road, Caerphilly, Gwent, CF83 3FP	Vehicle Cleaning Services	Personal, Consumer and Other Services
B	67m S	Electricity Sub Station	Gwent, CF83	Electrical Features	Infrastructure and Facilities
A	81m S	Works	Gwent, CF83	Unspecified Works Or Factories	Industrial Features
C	132m SW	Tank	Gwent, CF83	Tanks (Generic)	Industrial Features
4	153m NE	Caerphilly Fire Station	Caerphilly Fire Station, Waunfach Street, Caerphilly, Gwent, CF83 3HL	Fire Brigade Stations	Central and Local Government
5	157m S	Discount Auto Spares	78, Mill Road, Caerphilly, Gwent, CF83 3FH	Vehicle Parts and Accessories	Motoring
7	193m W	Gas Governor	Gwent, CF83	Gas Features	Infrastructure and Facilities
D	206m W	Electricity Sub Station	Gwent, CF83	Electrical Features	Infrastructure and Facilities
8	221m SE	Electricity Sub Station	Gwent, CF83	Electrical Features	Infrastructure and Facilities
9	228m E	Electricity Sub Station	Gwent, CF83	Electrical Features	Infrastructure and Facilities
D	236m NW	Energlyn & Churchill Park Rail Station	Gwent, CF83	Railway Stations, Junctions and Halts	Public Transport, Stations and Infrastructure

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	3

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Company	Address	LPG	Status
A	75m S	OBSOLETE	Mill Road, Caerphilly, Caerphilly, CF83 3F	Not Applicable	Obsolete
E	310m N	ASDA	Pontygwindy Road, Pwllypant, Caerphilly, Caerphilly, CF83 3SX	No	Open
13	484m SE	OBSOLETE	Piccadilly Square, Caerphilly, Caerphilly, CF83 1PB	Not Applicable	Obsolete

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	**1**

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Company	Address	Operational status	Tier
C	91m SW	British Gas	British Gas, Gasworks, Mill Road, Caerphilly, CF8 3FE	Historical NIHHS Site	-

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	**0**

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	**1**

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Details	
C	134m SW	Application reference number: Not Available Application status: Approved Application date: 25/11/1992 Address: Transco PLC, Caerphilly Holder Station, Mill Road, Caerphilly, Mid Glamorgan, Wales, CF83 3FF	Details: Natural Gas Storage Site. Enforcement: Data requested, not received. Date of enforcement: Data requested, not received. Comment: Data requested, not received.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	1

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Address	Details	
E	313m N	ASDA Stores Ltd, Pontygwindy Road, Caephilly, CF83 3SX	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m **6**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Address	Details	
2	**On site**	**RES DEVMT PS OFF MORGAN ST, RESEDENTIAL DEVELOPMENT, OFF MORGAN STREET, Caerphilly, WALES**	**Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AN0287201 Permit Version: 1 Receiving Water: Nant Yr Aber**	**Status: Effective Issue date: 22/02/1999 Effective Date: 22/02/1999 Revocation Date: -**
B	114m S	CAERPHILLY-M/J PARK SWO	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AN0016501 Permit Version: 1 Receiving Water: NANT-YR-ABER	Status: Surrendered Issue date: 07/10/1986 Effective Date: 07/10/1986 Revocation Date: -
B	114m S	CAERPHILLY-M/J PARK SWO	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AN0016502 Permit Version: 1 Receiving Water: NANT-YR-ABER	Status: Effective Issue date: 07/10/1986 Effective Date: 07/10/1986 Revocation Date: -
E	357m N	GLADFELTER CAERPHILLY LIMITED, GLADFELTER CAERPHILLY LIMIRED, PONTYGWINDY INDUSTRIAL ESTATE C, CAERPHILLY, CF83 3HU	Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: AN0263601 Permit Version: 1 Receiving Water: NANT YR ABER	Status: SURRENDERED UNDER EPR 2010 Issue date: 13/08/1997 Effective Date: 13/08/1997 Revocation Date: 13/06/2011
E	358m N	GLATFELTER CAERPHILLY LTD, PONTYGWINDY INDUSTRIAL ESTATE, CAERPHILLY, WALES, CF83 3HU	Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: AN0380401 Permit Version: 1 Receiving Water: NANT YR ABER	Status: SURRENDERED UNDER EPR 2010 Issue date: 07/04/2005 Effective Date: 07/04/2005 Revocation Date: 13/06/2011
11	391m S	86 Nantgarw Rd CSO, R/O 86 Nantgarw Rd, Caerphilly, CF83 1AP	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AN0016502 Permit Version: 2 Receiving Water: NANT-YR-ABER	Status: Effective Issue date: 07/08/2019 Effective Date: 07/08/2019 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	1

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Name	Status	Receiving Water	Authorised Substances
E	353m N	Van Leer Metallised Products, Pontygwindy Ind Est	Active	Nant Yr Aber	Chromium, Copper, Zinc

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	**8**

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Details	
A	44m S	Incident Date: 09/04/2001 Incident Identification: 1987 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
A	53m S	Incident Date: 13/07/2013 Incident Identification: 1132692 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: - Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
C	125m SW	Incident Date: 11/10/2002 Incident Identification: 114181 Pollutant: Specific Waste Materials Pollutant Description: Other Specific Waste Material	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
C	125m SW	Incident Date: 11/10/2002 Incident Identification: 114181 Pollutant: Contaminated Water Pollutant Description: Other Contaminated Water	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6	177m SW	Incident Date: 31/03/2002 Incident Identification: 67880 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
10	341m S	Incident Date: 21/07/2004 Incident Identification: 252494 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
E	354m N	Incident Date: 28/05/2018 Incident Identification: 1802920 Pollutant: Pollutant Not Identified Pollutant Description: Pollutant Not Identified	Water Impact: Category 2 (Significant) Land Impact: No Details Air Impact: No Details
12	426m W	Incident Date: 05/06/2003 Incident Identification: 163449 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

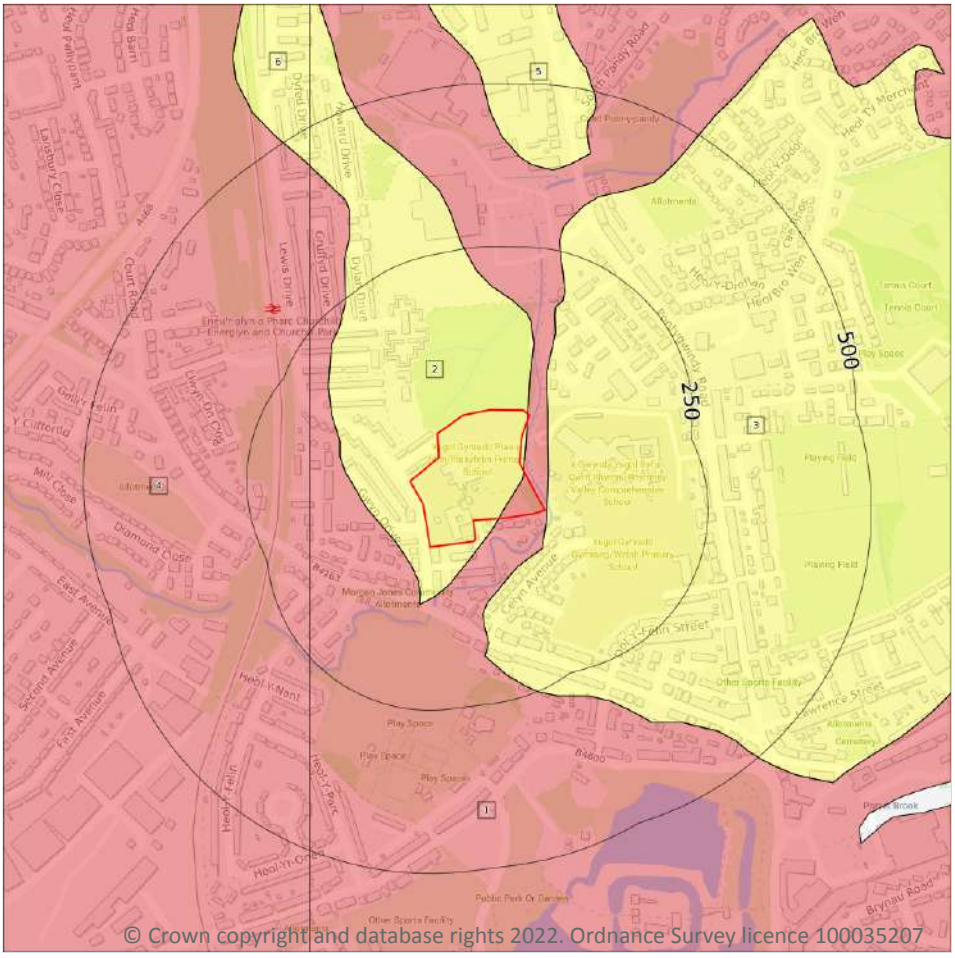
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	6

Aquifer status of groundwater held within superficial geology.

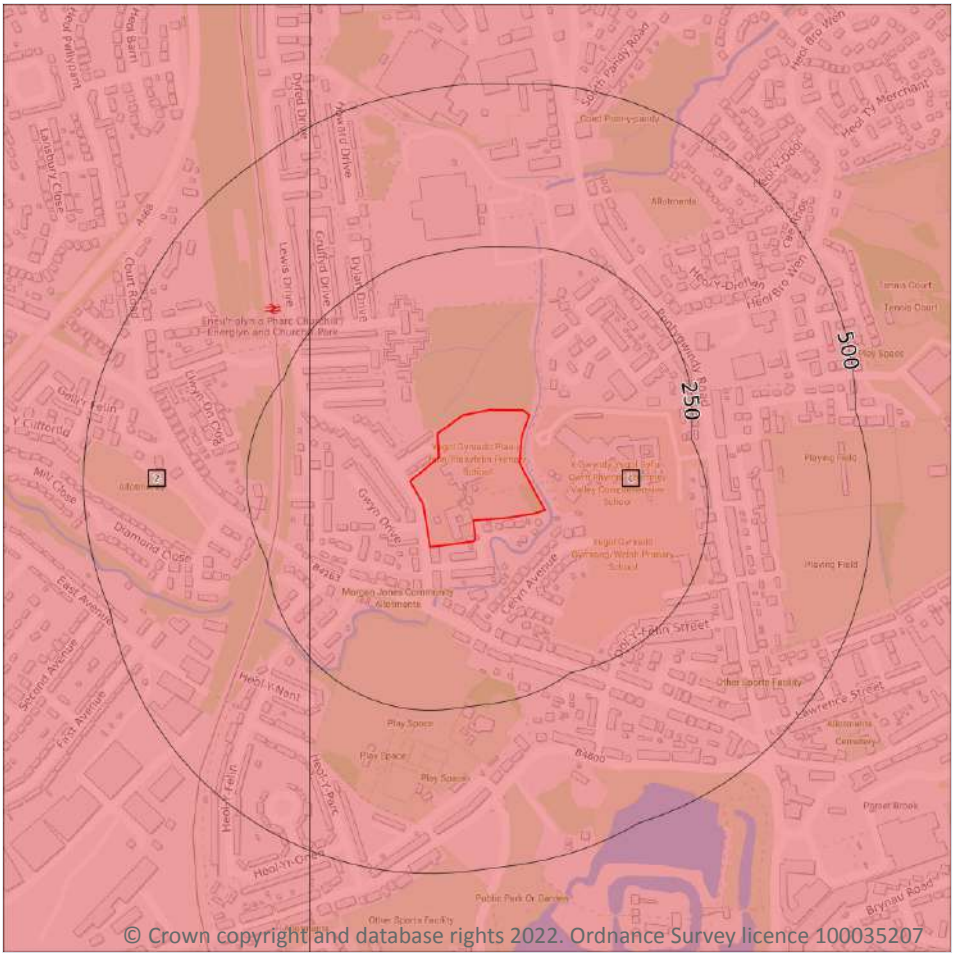
Features are displayed on the Hydrogeology map on **page 49**

ID	Location	Designation	Description
1	On site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

ID	Location	Designation	Description
3	3m SE	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	153m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	371m N	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
6	448m NW	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m **2**

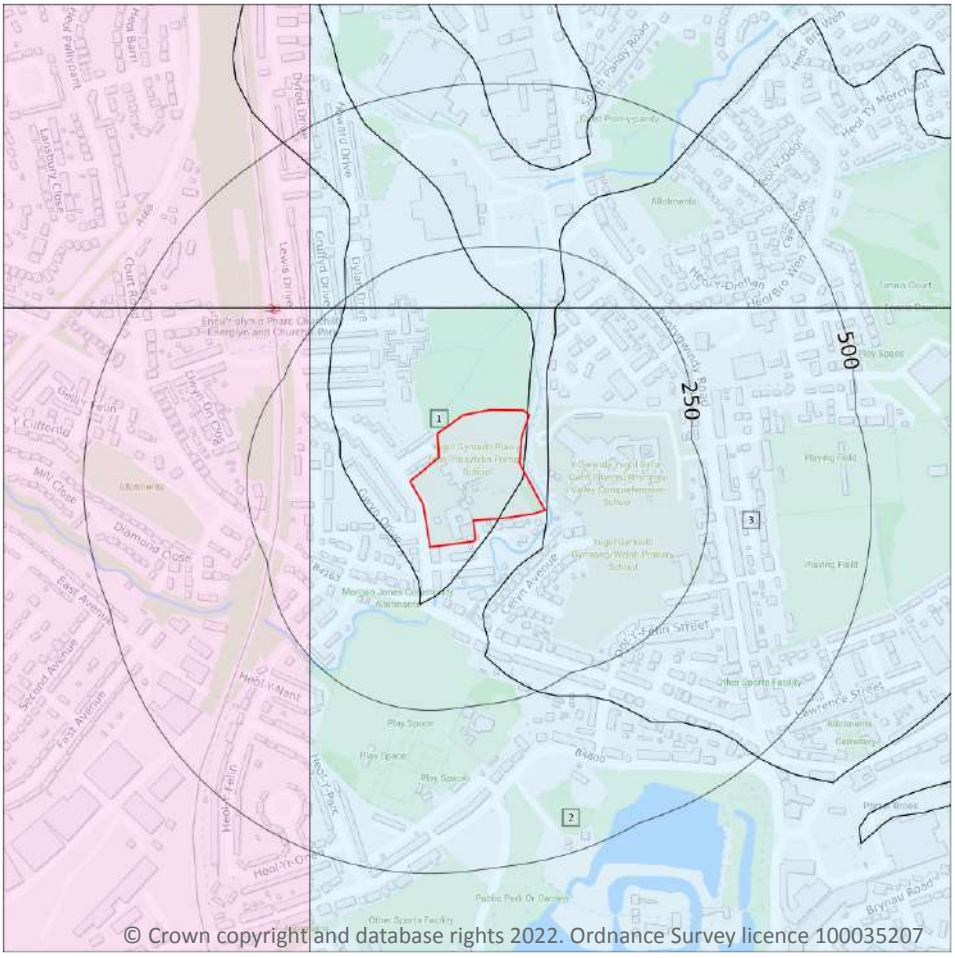
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 51**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
2	153m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	3

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 53**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year**	**Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Medium**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
2	**On site**	**Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year**	**Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Medium**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
3	3m SE	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Medium	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones

- Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	6

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 55**

ID	Location	Details	
-	1372m SW	Status: Historical Licence No: 21/57/12/0099 Details: Process Water Direct Source: EAW Groundwater Point: BOREHOLE "C"AT CLARKSON KNITTING Data Type: Point Name: Clarkson Knitting Limited Easting: 314270 Northing: 186610	Annual Volume (m^3): 227273 Max Daily Volume (m^3): 750 Original Application No: - Original Start Date: 06/11/2000 Expiry Date: - Issue No: 1 Version Start Date: 06/11/2000 Version End Date: -
-	1400m SW	Status: Historical Licence No: 21/57/12/0099 Details: Process Water Direct Source: EAW Groundwater Point: BOREHOLE "A"AT CLARKSON KNITTING Data Type: Point Name: Clarkson Knitting Limited Easting: 314240 Northing: 186600	Annual Volume (m^3): 227273 Max Daily Volume (m^3): 750 Original Application No: - Original Start Date: 06/11/2000 Expiry Date: - Issue No: 1 Version Start Date: 06/11/2000 Version End Date: -
-	1402m SW	Status: Historical Licence No: 21/57/12/0099 Details: Process Water Direct Source: EAW Groundwater Point: BOREHOLE "B"AT CLARKSON KNITTING Data Type: Point Name: Clarkson Knitting Limited Easting: 314270 Northing: 186570	Annual Volume (m^3): 227273 Max Daily Volume (m^3): 750 Original Application No: - Original Start Date: 06/11/2000 Expiry Date: - Issue No: 1 Version Start Date: 06/11/2000 Version End Date: -
-	1469m SW	Status: Historical Licence No: 21/57/12/0062 Details: Process Water Direct Source: EAW Groundwater Point: BOREHOLE AT CLARKSON KNITTING LTD, WESTERN IND. EST. Data Type: Point Name: Clarkson Knitting Limited Easting: 314170 Northing: 186570	Annual Volume (m^3): 63637 Max Daily Volume (m^3): 181.82 Original Application No: - Original Start Date: 18/07/1974 Expiry Date: - Issue No: 101 Version Start Date: 01/12/2000 Version End Date: -
-	1755m E	Status: Historical Licence No: 15/47/010/G/105 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: TREGRAY VILLA WELL Data Type: Point Name: Mr P R & Mrs M A Bradley & Mr G P & Mrs K E Bradley Easting: 317020 Northing: 188330	Annual Volume (m^3): 35040 Max Daily Volume (m^3): 96 Original Application No: - Original Start Date: 14/10/2008 Expiry Date: 31/03/2026 Issue No: 101 Version Start Date: 14/10/2008 Version End Date: -

ID	Location	Details	
-	1807m E	Status: Historical Licence No: 15/47/010/G/105 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: TREGRAY VILLA BOREHOLE Data Type: Point Name: Mr P R & Mrs M A Bradley & Mr G P & Mrs K E Bradley Easting: 317080 Northing: 188310	Annual Volume (m^3): 35040 Max Daily Volume (m^3): 96 Original Application No: - Original Start Date: 14/10/2008 Expiry Date: 31/03/2026 Issue No: 101 Version Start Date: 14/10/2008 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**0**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	**0**

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	**0**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

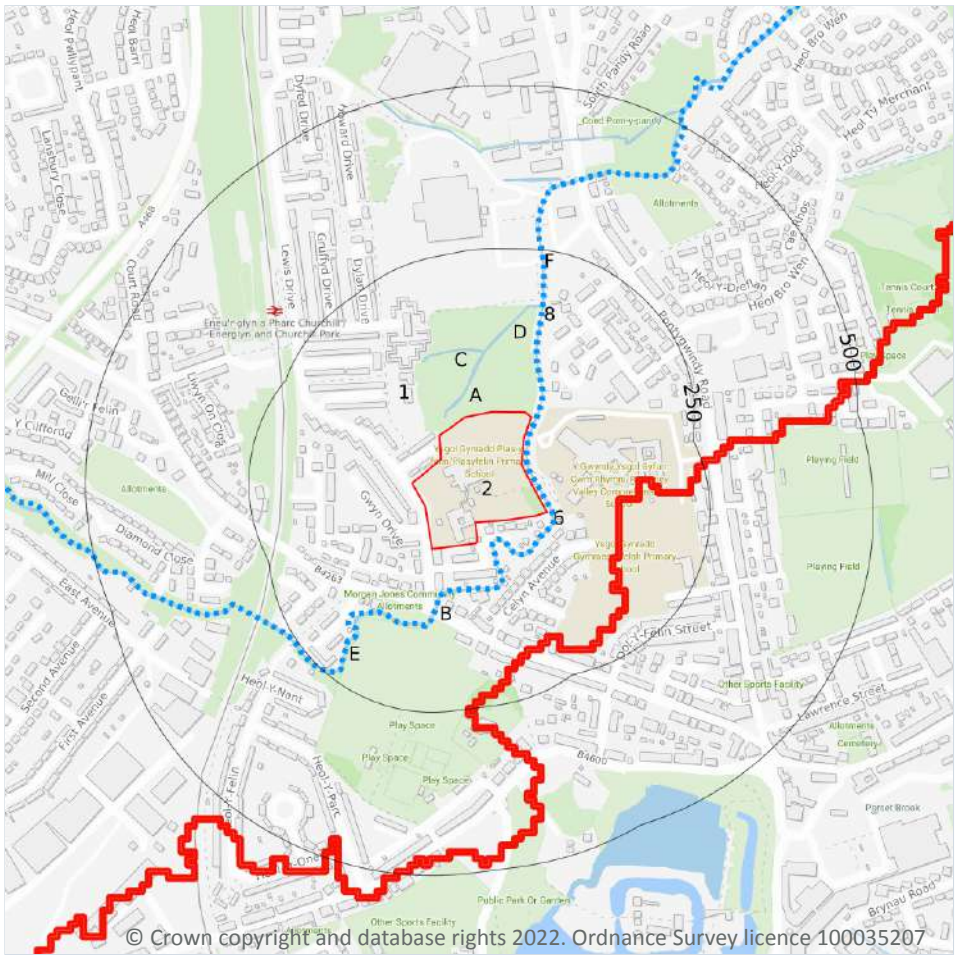
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	10

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Type of water feature	Ground level	Permanence	Name
6	5m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber

ID	Location	Type of water feature	Ground level	Permanence	Name
A	17m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	86m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	87m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber
C	92m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	92m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	93m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber
E	103m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber
8	165m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	166m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**6**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 59**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**River WB catchment**	**Nant y Aber - source to conf Rhymney R**	**GB109057027170**	**Rhymney**	**South East Valleys**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
5	6m NE	River	Nant y Aber - source to conf Rhymney R	GB109057027170	Good	Good	Good	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

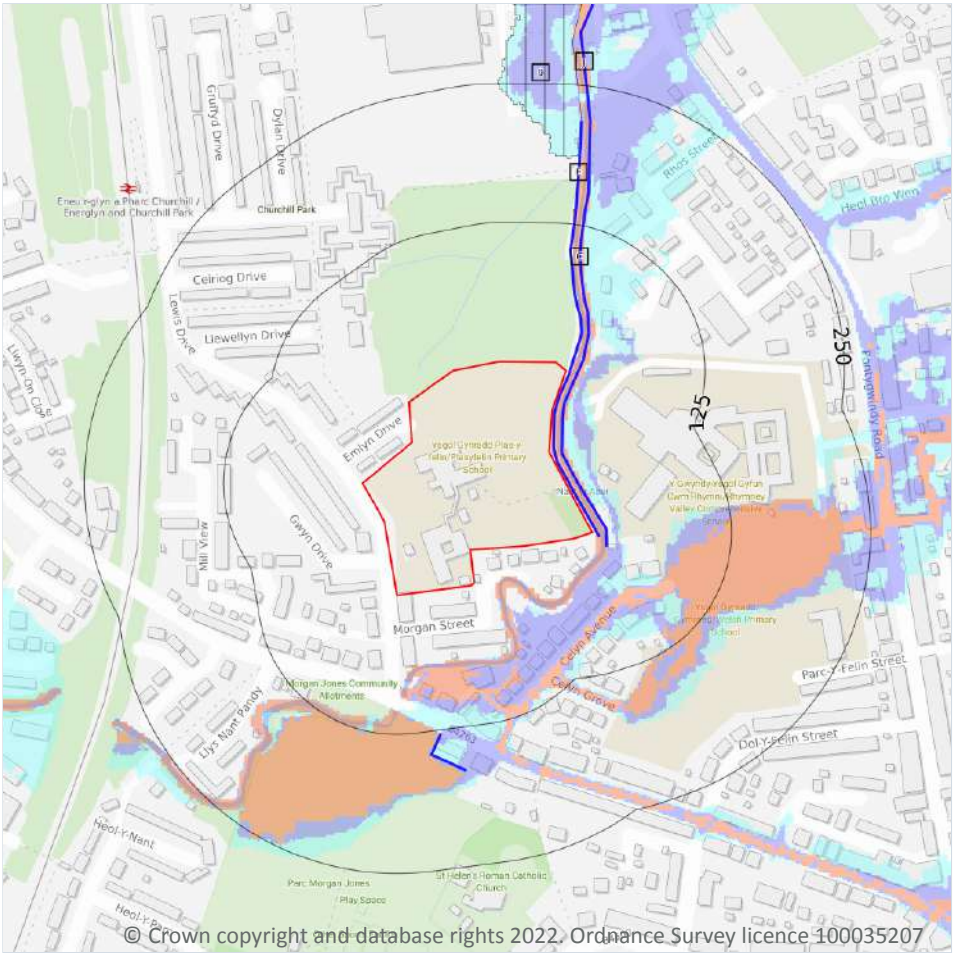
Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
2	**On site**	**SE Valleys Carboniferous Coal Measures**	**GB40902G201900**	**Poor**	**Poor**	**Good**	**2017**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



7.1 Risk of flooding from rivers and the sea

Records within 50m	80

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 63**

Distance	Flood risk category
On site	**High**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	**0**

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	**9**

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

Features are displayed on the River and coastal flooding map on **page 63**

ID	Location	Update
A	2m NE	27/05/2022
A	8m NE	27/05/2022
A	10m E	27/05/2022
A	39m NE	27/05/2022
C	64m NE	27/05/2022
E	127m N	27/05/2022
A	128m S	27/05/2022
E	135m NE	27/05/2022
J	220m N	27/05/2022

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	4

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 63**

ID	Location	
E	127m N	Area benefiting from flood defences
E	158m N	Area benefiting from flood defences
E	174m N	Area benefiting from flood defences
9	184m N	Area benefiting from flood defences

This data is sourced from the Environment Agency and Natural Resources Wales.

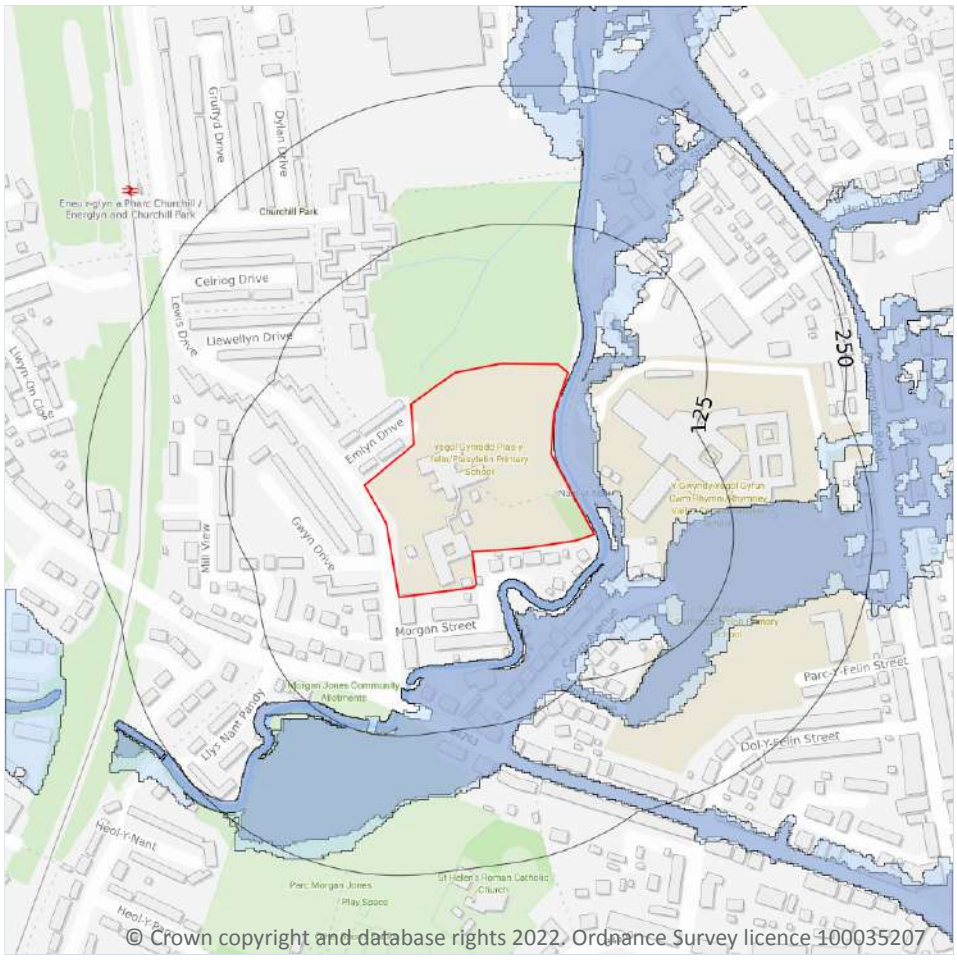
7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 63**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

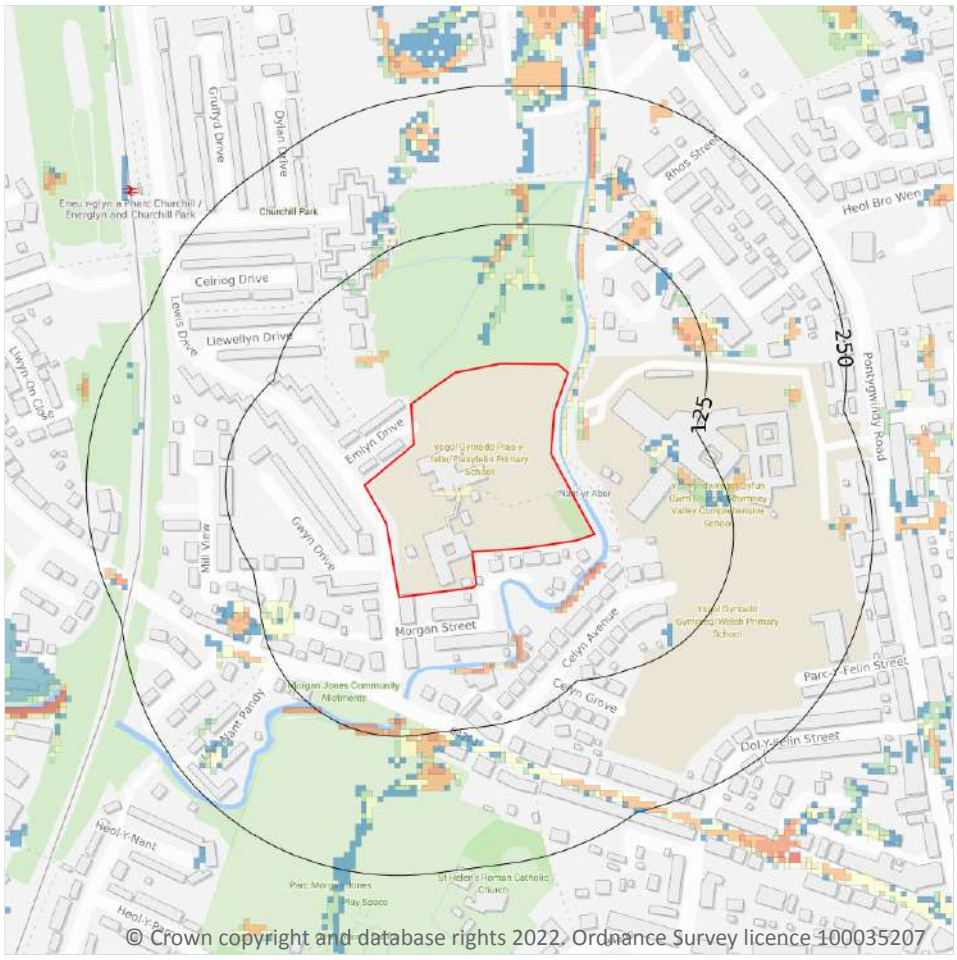
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 63**

Location	Type
On site	**Zone 3 - (Fluvial Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



8.1 Surface water flooding

Highest risk on site	**1 in 100 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, Greater than 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 68**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding

9.1 Groundwater flooding

Highest risk on site	**Low**
Highest risk within 50m	**Moderate**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 70**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

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Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	3

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 71**

ID	Location	Name	Data source
-	1372m W	GWAUN GLEDYR	Natural Resources Wales

ID	Location	Name	Data source
-	1644m N	LLANBRADACH QUARRY	Natural Resources Wales
-	1937m SW	GWAUN GLEDYR	Natural Resources Wales

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	41

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 71**

ID	Location	Name	Woodland Type
1	387m NE	Unknown	Ancient Semi Natural Woodland
2	537m N	Unknown	Ancient Semi Natural Woodland
3	553m W	Unknown	Ancient Semi Natural Woodland
4	562m NW	Unknown	Ancient Semi Natural Woodland
5	704m W	Unknown	Ancient Semi Natural Woodland
6	721m N	Unknown	Ancient Woodland Site of Unknown Category
7	758m NE	Unknown	Ancient Semi Natural Woodland
A	808m N	Unknown	Ancient Woodland Site of Unknown Category
8	845m NE	Unknown	Ancient Semi Natural Woodland
A	863m N	Unknown	Ancient Semi Natural Woodland
A	879m N	Unknown	Ancient Semi Natural Woodland
9	1081m W	Unknown	Ancient Semi Natural Woodland
10	1144m W	Unknown	Ancient Semi Natural Woodland
11	1151m NE	Unknown	Ancient Semi Natural Woodland

ID	Location	Name	Woodland Type
B	1164m NE	Unknown	Ancient Semi Natural Woodland
B	1212m NE	Unknown	Ancient Semi Natural Woodland
12	1272m NE	Unknown	Ancient Semi Natural Woodland
-	1360m N	Unknown	Restored Ancient Woodland Site
-	1463m E	Unknown	Ancient Semi Natural Woodland
-	1473m N	Unknown	Ancient Semi Natural Woodland
-	1485m S	Unknown	Ancient Semi Natural Woodland
-	1551m SE	Unknown	Plantation on Ancient Woodland Site
-	1555m W	Unknown	Ancient Semi Natural Woodland
-	1600m NW	Unknown	Ancient Semi Natural Woodland
-	1612m E	Unknown	Ancient Semi Natural Woodland
-	1619m S	Unknown	Ancient Semi Natural Woodland
-	1649m E	Unknown	Ancient Semi Natural Woodland
-	1720m SW	Unknown	Ancient Semi Natural Woodland
-	1720m W	Unknown	Ancient Semi Natural Woodland
-	1721m S	Unknown	Plantation on Ancient Woodland Site
-	1744m N	Unknown	Ancient Semi Natural Woodland
-	1766m SE	Unknown	Ancient Semi Natural Woodland
-	1780m S	Unknown	Plantation on Ancient Woodland Site
-	1798m SE	Unknown	Ancient Semi Natural Woodland
-	1848m SE	Unknown	Plantation on Ancient Woodland Site
-	1873m SE	Unknown	Plantation on Ancient Woodland Site
-	1874m E	Unknown	Ancient Semi Natural Woodland
-	1881m E	Unknown	Ancient Semi Natural Woodland
-	1965m N	Unknown	Ancient Semi Natural Woodland
-	1981m NW	Unknown	Ancient Semi Natural Woodland
-	1983m W	Unknown	Restored Ancient Woodland Site

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units

10.17 SSSI Impact Risk Zones

Records on site	0

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	1

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 78**

ID	Location	Name	Grade	Reference Number	Listed date
1	157m E	St Ilan Comprehensive School, Set back from Pontygwindy Road to the N of the town centre.	II	21384	18/02/1999

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations

12.1 Agricultural Land Classification

Records within 250m	0

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

This data is sourced from Natural Resources Wales.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m	0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

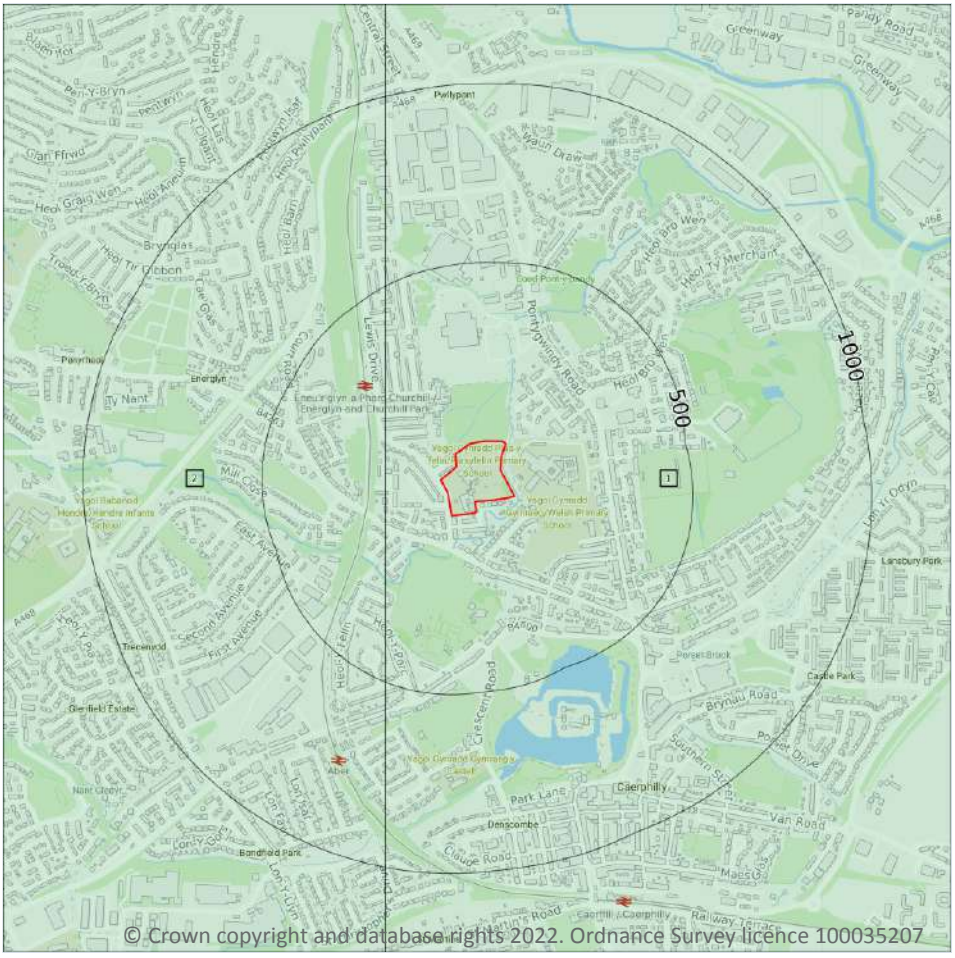
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 84**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**No coverage**	**ST18NE**
2	153m W	No coverage	Full	Full	Full	ST18NW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

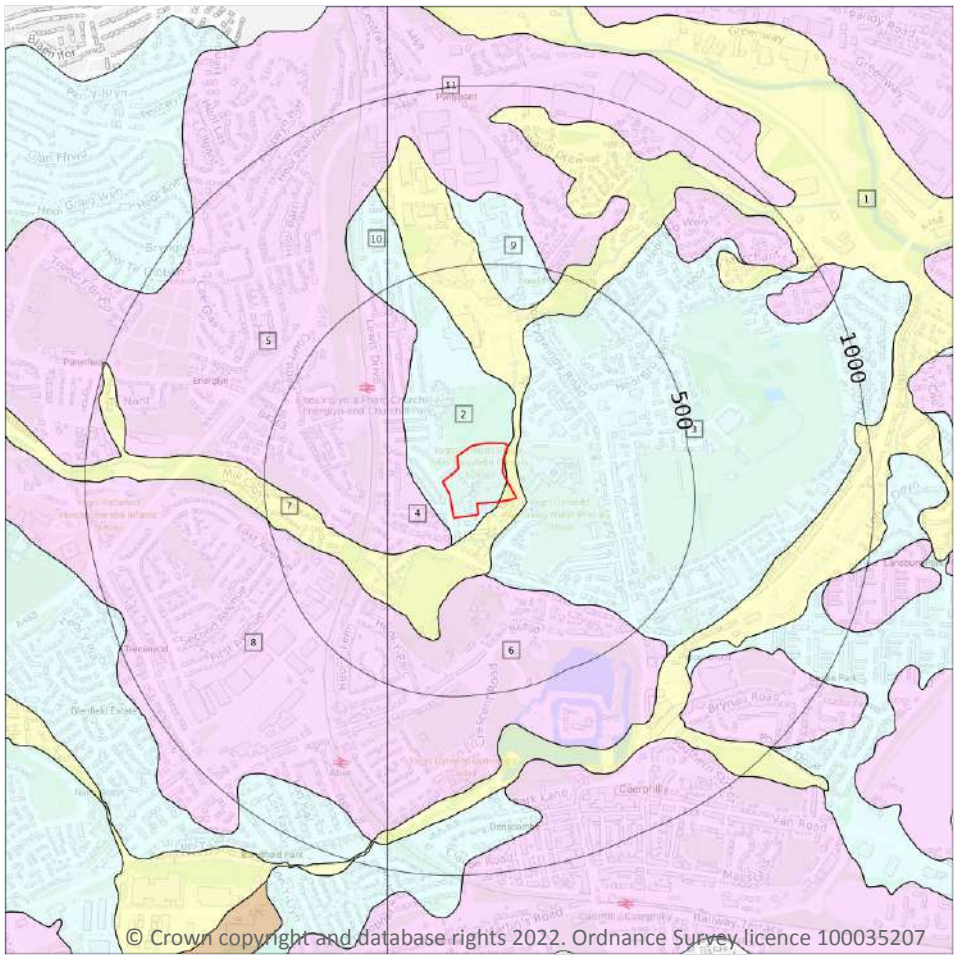
14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **11**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 86**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALV-XCZSV**	**Alluvium - Clay, Silt, Sand And Gravel**	**Clay, Silt, Sand And Gravel**
2	**On site**	**TILLD-DMTN**	**Till, Devensian - Diamicton**	**Diamicton**
3	24m E	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton

ID	Location	LEX Code	Description	Rock description
4	31m SW	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
5	153m W	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
6	168m S	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
7	210m SW	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
8	305m SW	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
9	378m N	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
10	461m NW	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
11	468m N	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

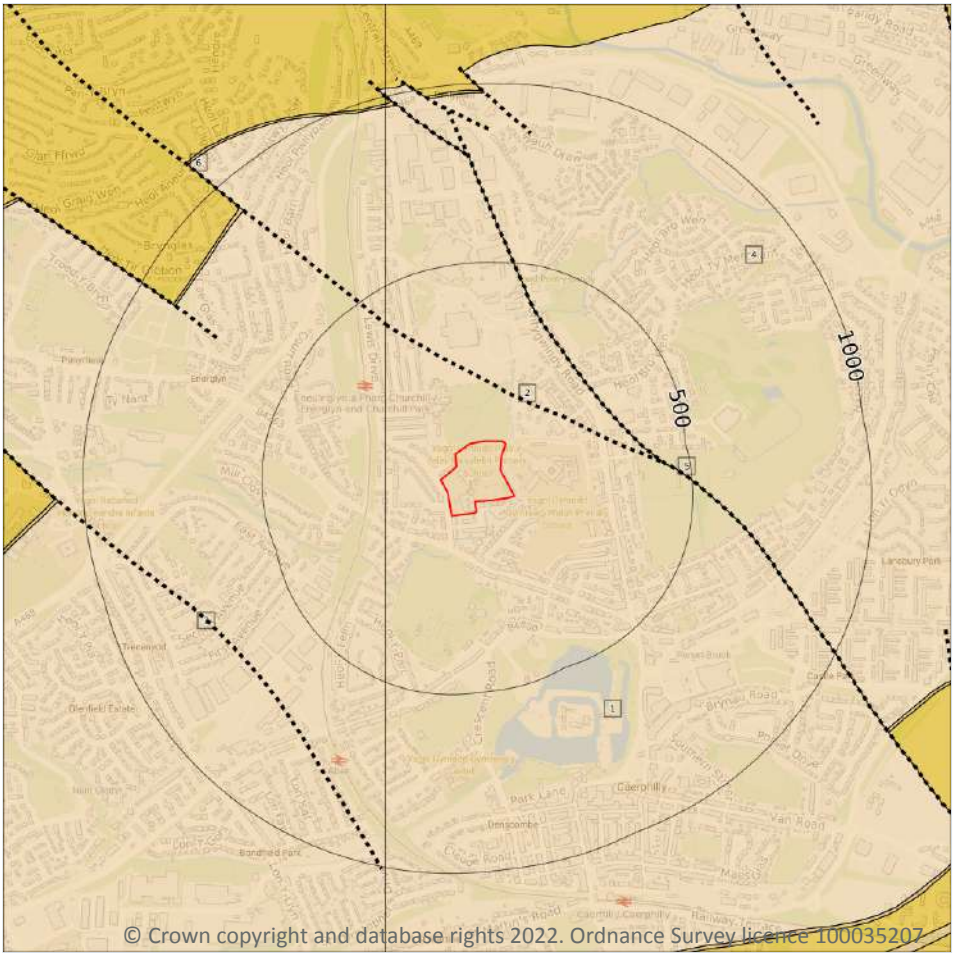
14.4 Landslip (10k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **3**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 88**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**GDB-MDSS**	**Grovesend Formation - Mudstone, Siltstone And Sandstone**	**Westphalian D Sub-age**
3	153m W	GDB-MDSS	Grovesend Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age
4	281m NE	GDB-MDSS	Grovesend Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	**3**

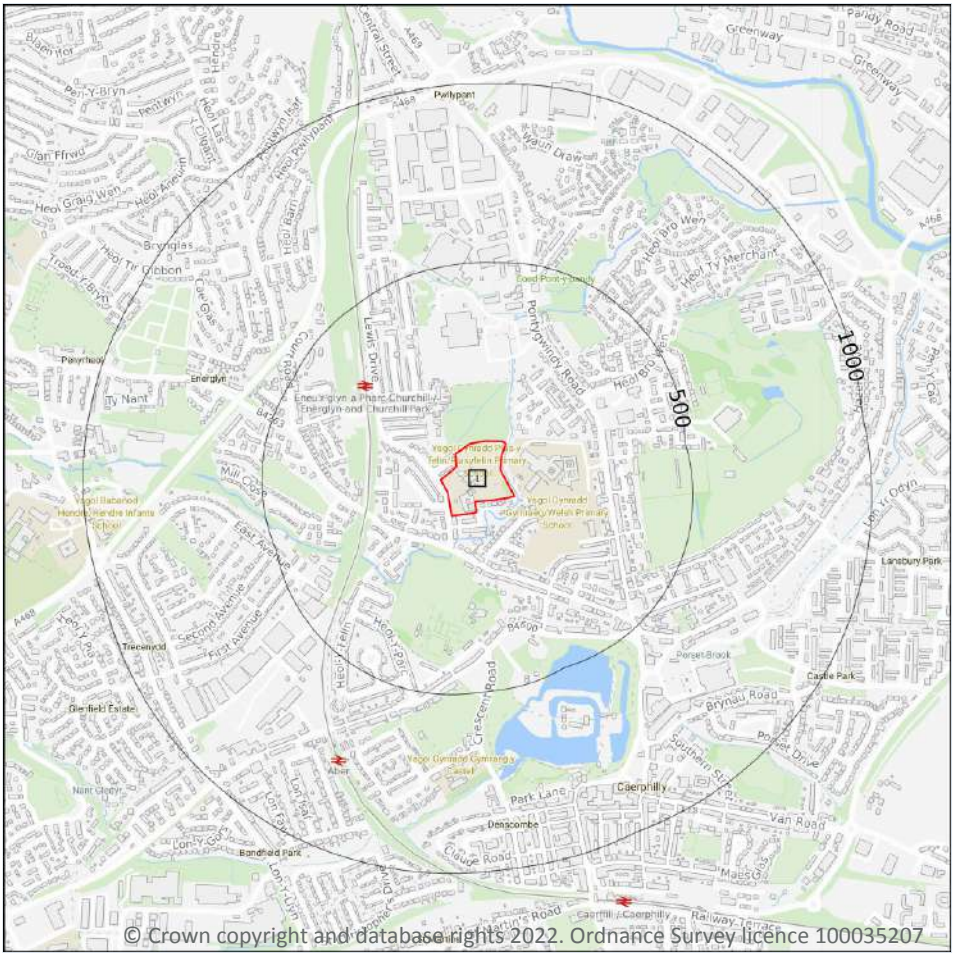
Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 88**

ID	Location	Category	Description
2	130m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
5	281m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
6	408m NW	FAULT	Normal fault, inferred; crossmarks on downthrow side

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme. Where 50k data is not available, this area has been filled in with 625k scale data.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 90**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW249_newport_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

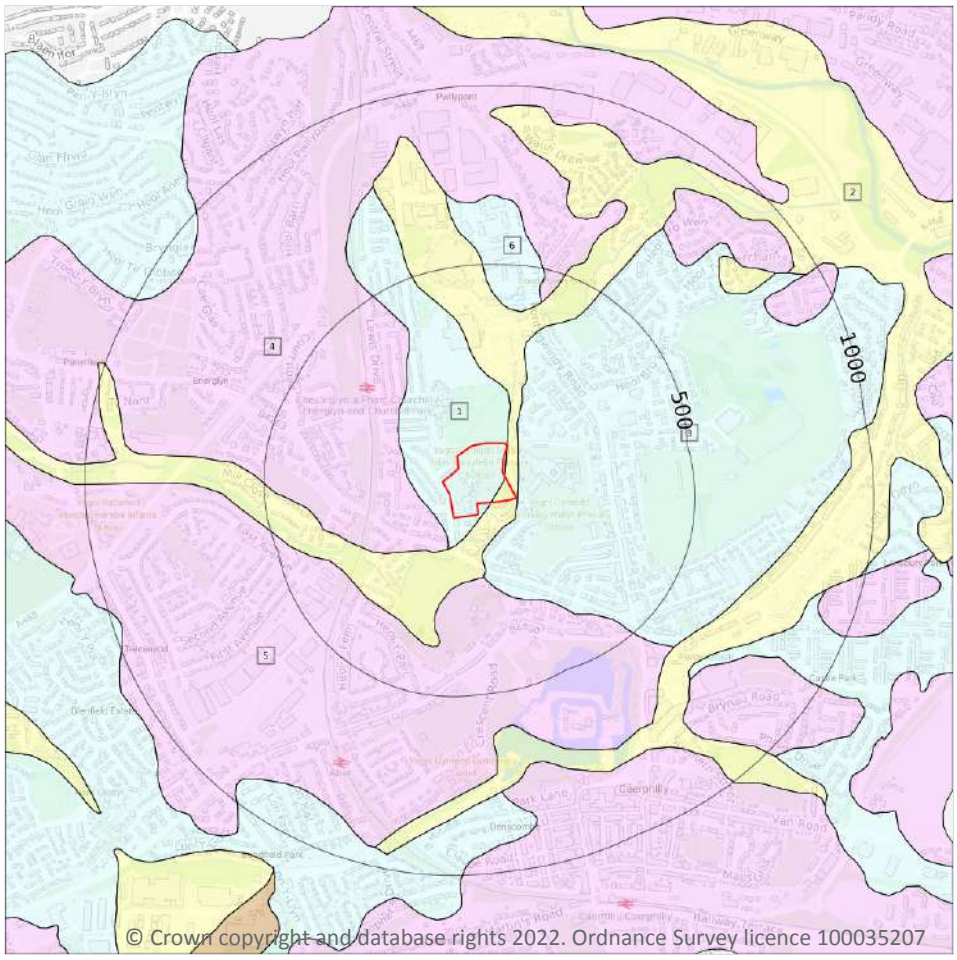
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **6**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 92**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**TILL, DEVENSIAN**	**DIAMICTON**
2	**On site**	**ALV-XCZSV**	**ALLUVIUM**	**CLAY, SILT, SAND AND GRAVEL**
3	3m SE	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

ID	Location	LEX Code	Description	Rock description
4	40m SW	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
5	176m S	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
6	371m N	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	**4**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**High**	**Very Low**
On site	**Mixed**	**High**	**Low**
3m SE	Mixed	High	Low
40m SW	Intergranular	Very High	High

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

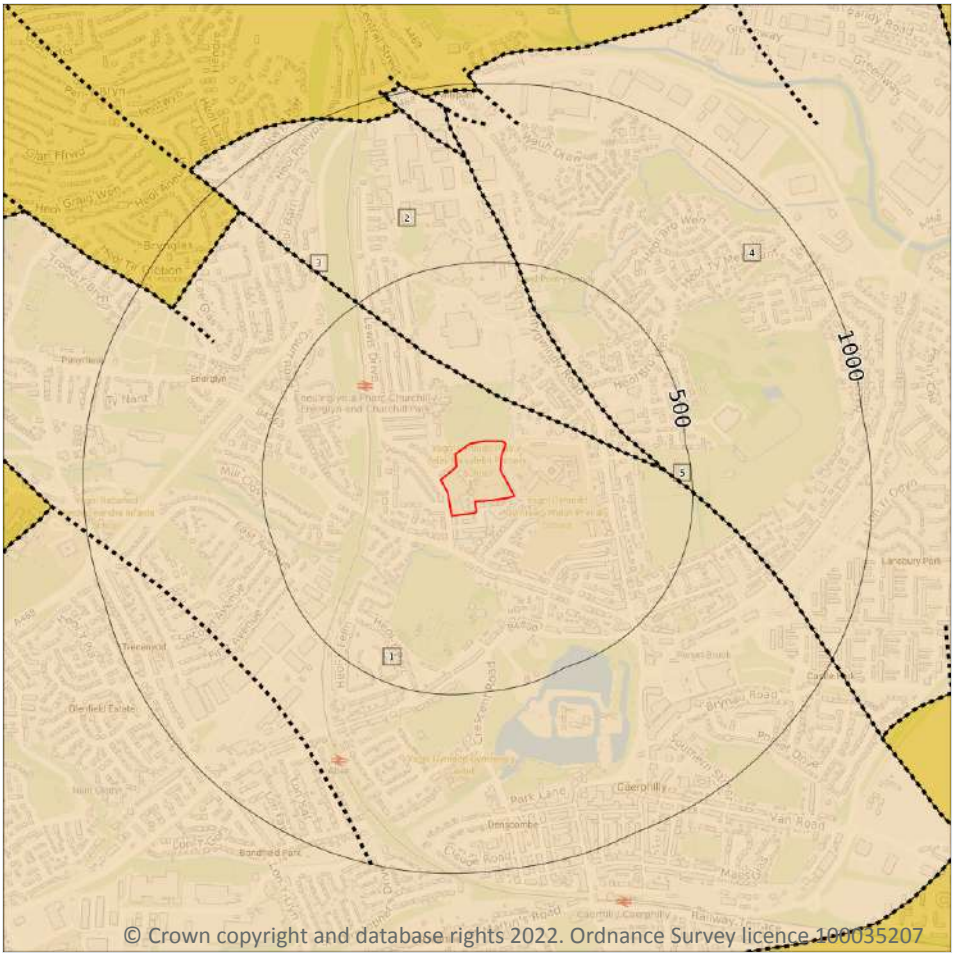
15.7 Landslip permeability (50k)

Records within 50m	**0**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m **3**

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 94**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**GDB-MDSS**	**GROVESEND FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE**	**WESTPHALIAN**
2	111m NE	GDB-MDSS	GROVESEND FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

ID	Location	LEX Code	Description	Rock age
4	273m NE	GDB-MDSS	GROVESEND FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Moderate**	**Low**

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	**2**

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 94**

ID	Location	Category	Description
3	111m NE	FAULT	Fault, inferred, displacement unknown
5	273m NE	FAULT	Fault, inferred, displacement unknown

This data is sourced from the British Geological Survey.

16 Boreholes

16.1 BGS Boreholes

Records within 250m	4

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

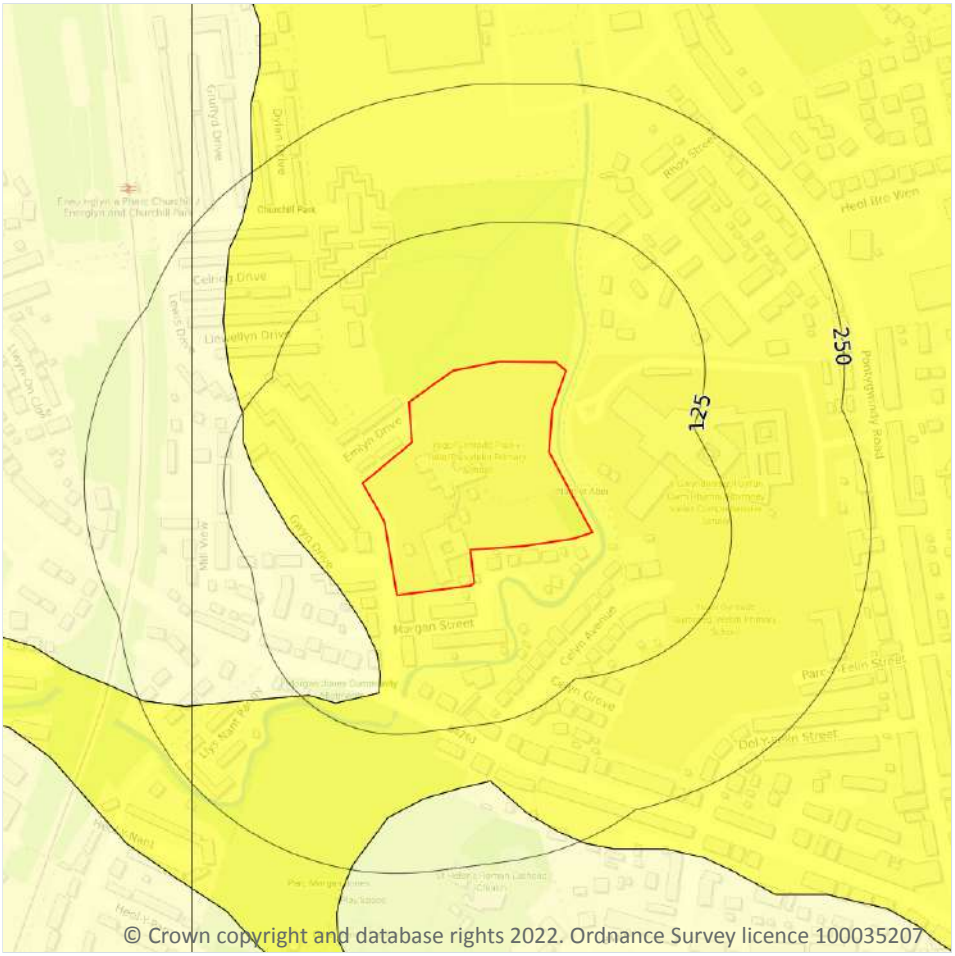
Features are displayed on the Boreholes map on **page 96**

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	238m SW	314970 187530	MILL ROAD BUS DEPT EXTN. 3	8.0	N	380739
A	238m SW	314970 187530	MILL ROAD BUS DEPT EXTN. 1	5.0	N	380737
A	238m SW	314970 187530	MILL ROAD BUS DEPT EXTN. 4	8.0	N	380740

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	238m SW	314970 187530	MILL ROAD BUS DEPT EXTN. 2	7.4	N	380738

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	2

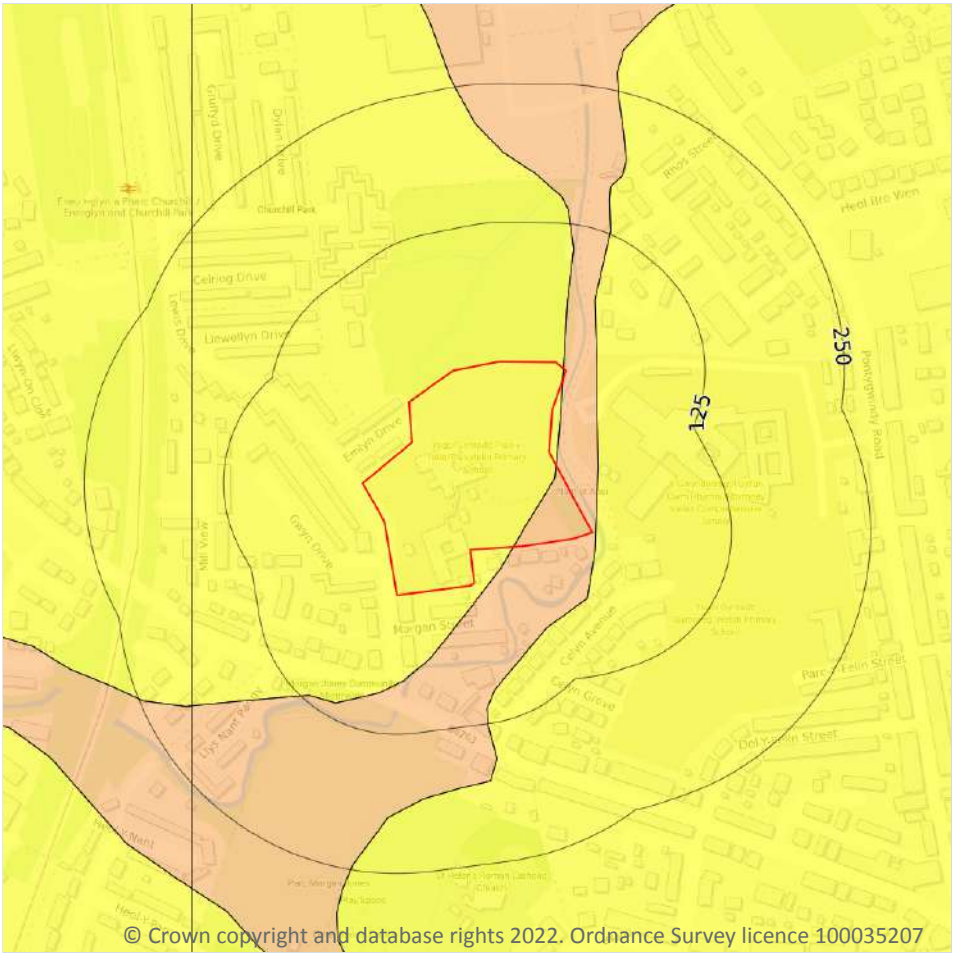
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 98**

Location	Hazard rating	Details
On site	**Very low**	**Ground conditions predominantly low plasticity.**
40m SW	Negligible	Ground conditions predominantly non-plastic.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	3

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

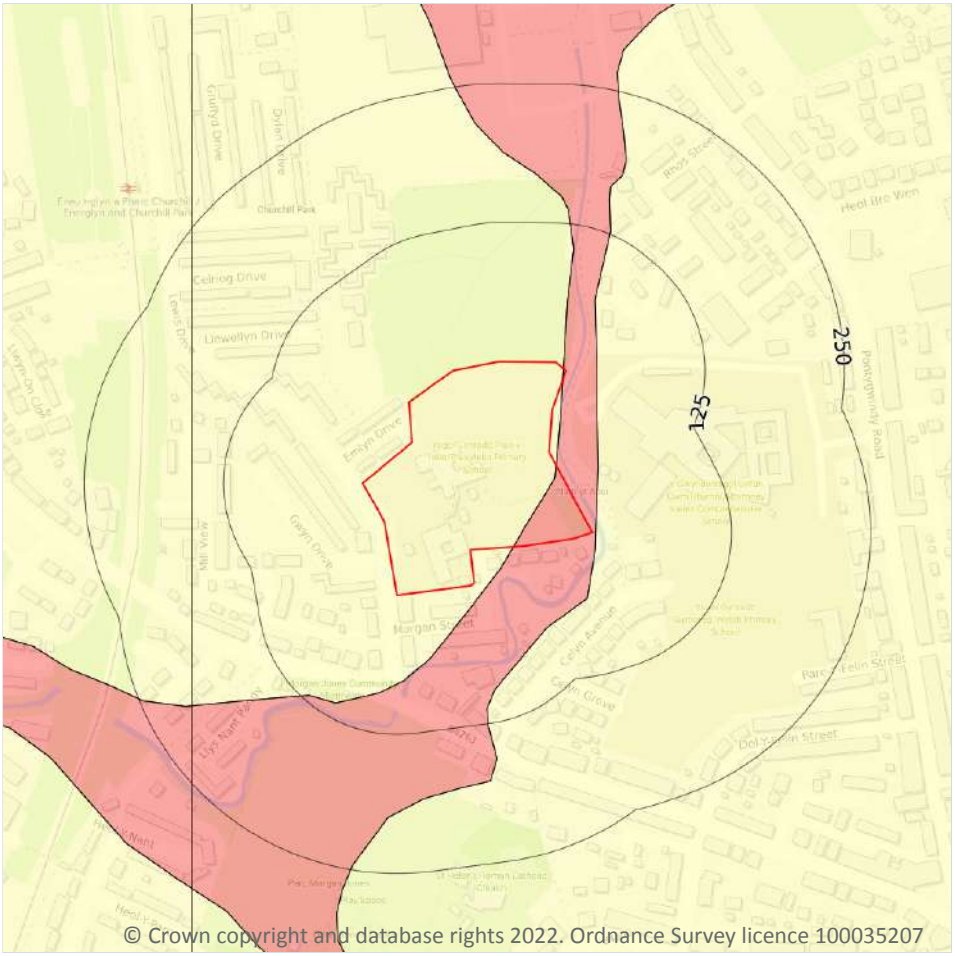
Features are displayed on the Natural ground subsidence - Running sands map on **page 99**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
On site	**Low**	**Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.**
3m SE	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	3

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

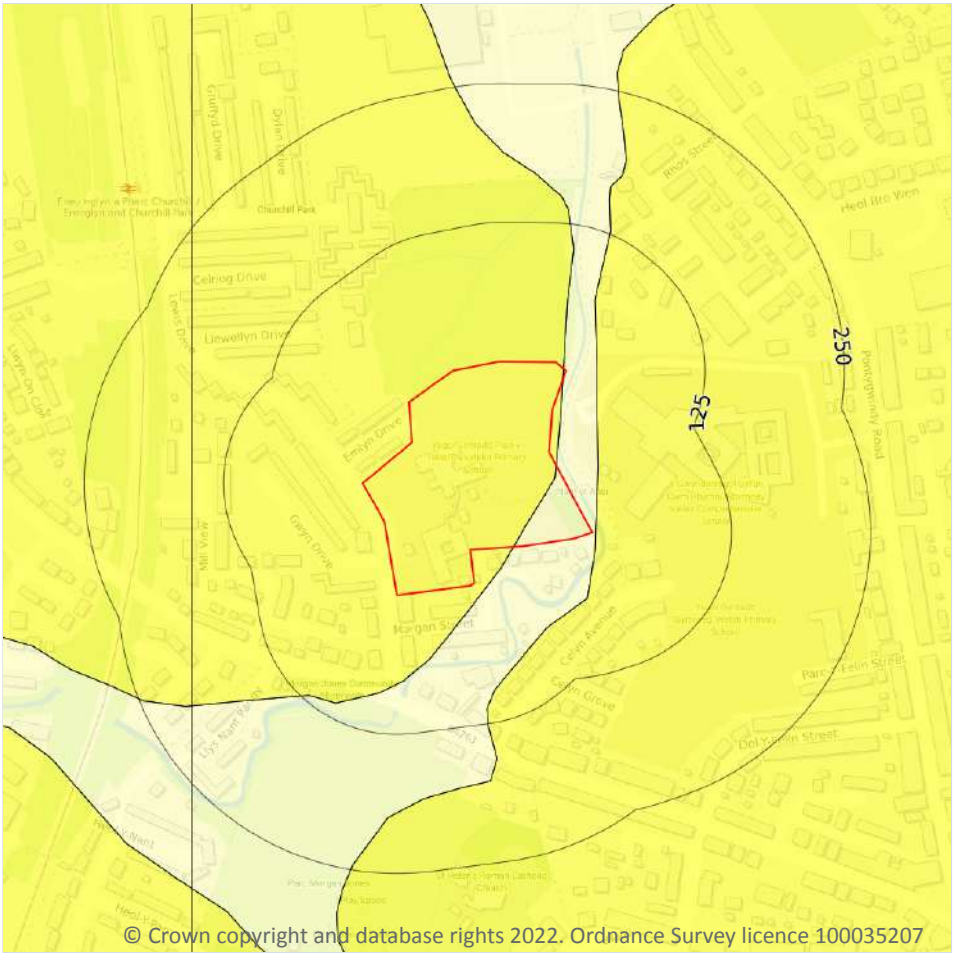
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 101**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**

Location	Hazard rating	Details
3m SE	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	3

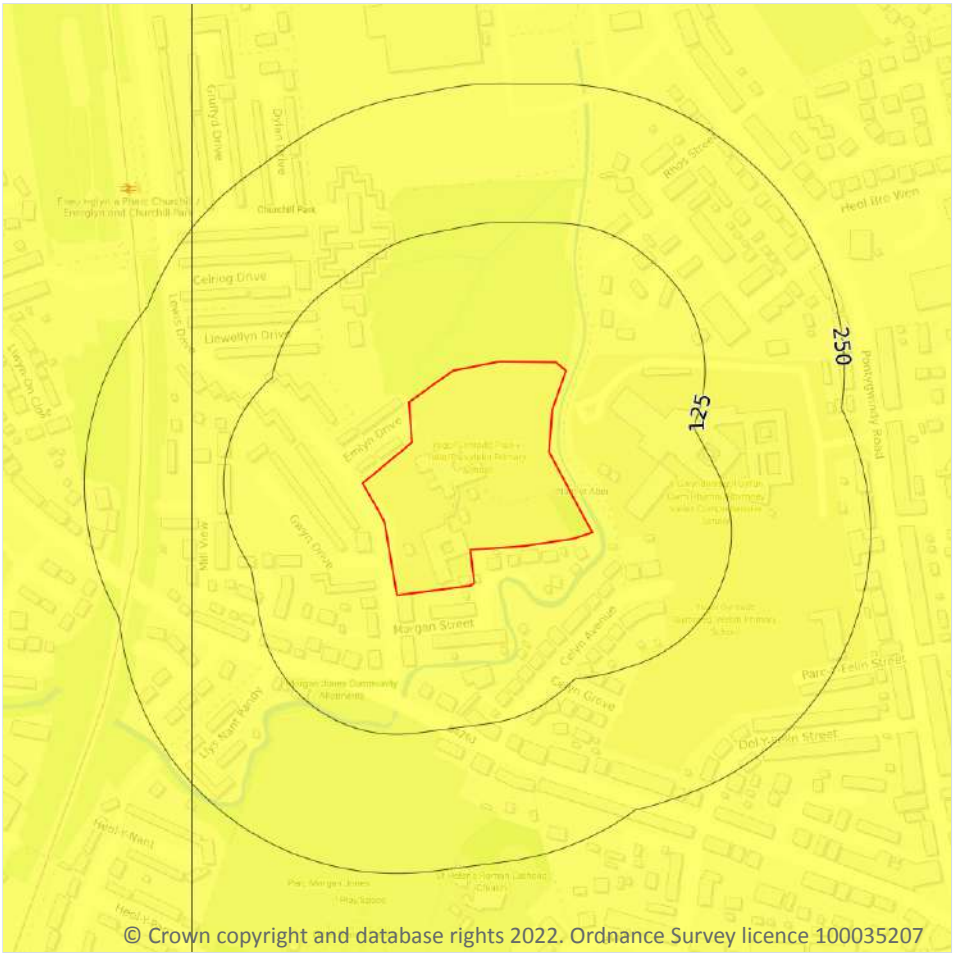
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 103**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**
3m SE	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



17.5 Landslides

Records within 50m	1

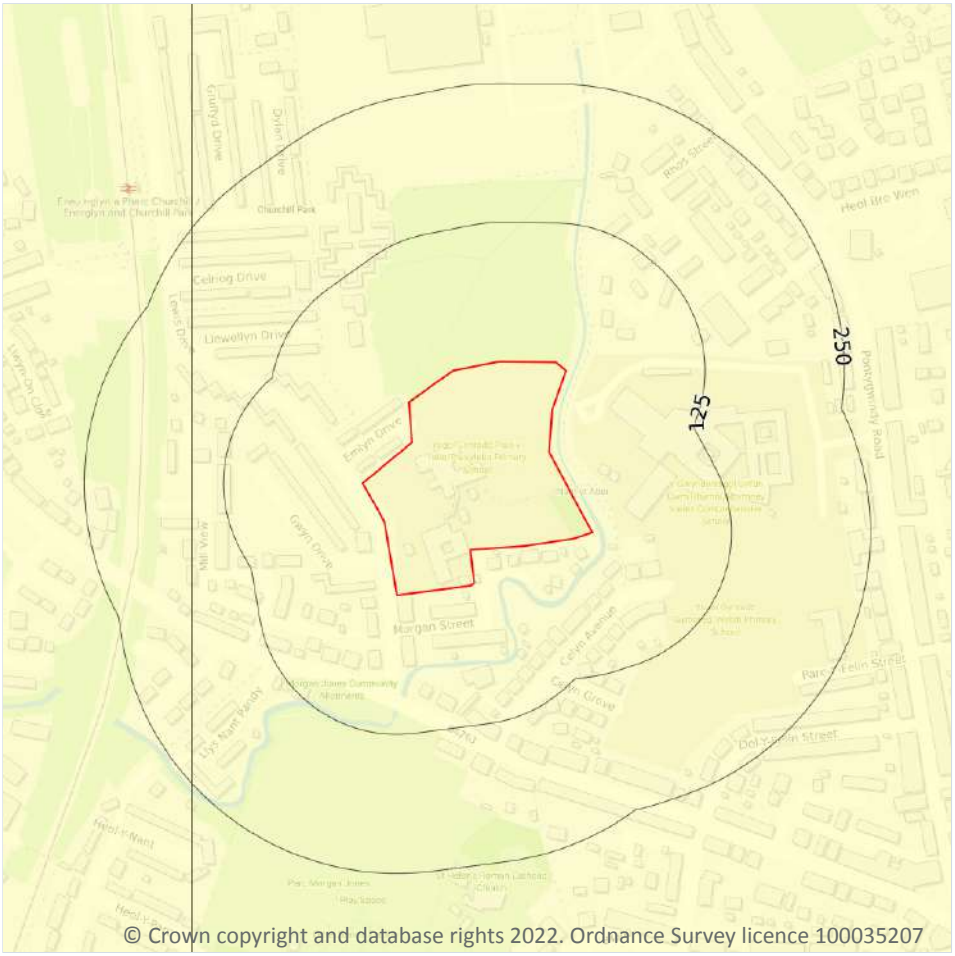
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 105**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m	1

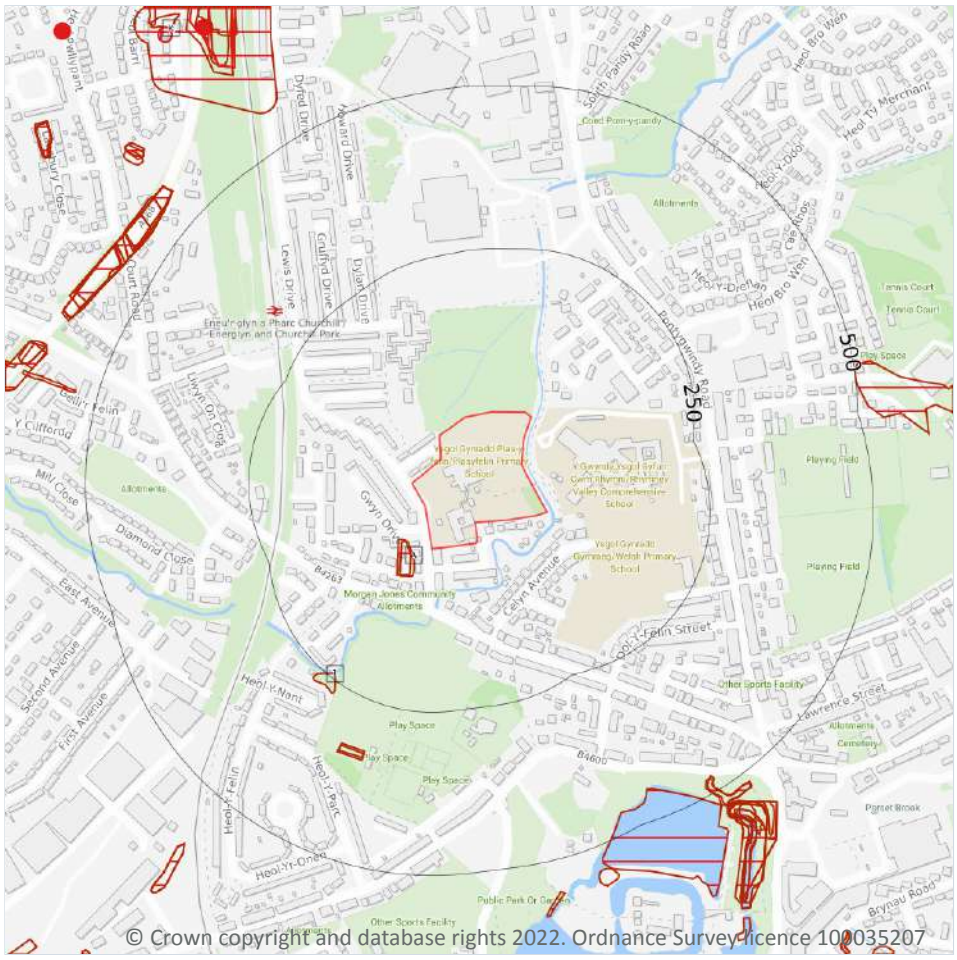
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 106**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities

Non Coal Mining

- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	3

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 108**

ID	Location	Land Use	Year of mapping	Mapping scale
A	31m SW	Pond	1899	1:10560
A	34m SW	Pond	1875	1:10560
1	243m SW	Unspecified Pit	1969	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	20

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining, ground workings and natural cavities map on **page 108**

ID	Location	Land Use	Year of mapping	Mapping scale
I	641m NW	Disused Colliery	1898	1:10560
-	668m W	Disused Colliery	1948	1:10560
-	668m W	Disused Colliery	1915	1:10560
-	668m W	Disused Colliery	1922	1:10560
K	733m NW	Old Coal Level	1898	1:10560
-	806m W	Disused Colliery	1899	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
-	810m W	Colliery	1875	1:10560
-	844m SW	Old Coal Shafts	1915	1:10560
-	844m SW	Old Coal Shafts	1922	1:10560
O	845m NW	Old Coal Shaft	1898	1:10560
-	854m W	Unspecified Old Shaft	1915	1:10560
-	854m W	Unspecified Old Shaft	1922	1:10560
-	861m W	Unspecified Shaft	1875	1:10560
-	880m NW	Unspecified Shaft	1875	1:10560
-	976m NW	Unspecified Old Shaft	1948	1:10560
-	977m NW	Air Shaft	1875	1:10560
-	978m NW	Air Shaft	1898	1:10560
-	978m NW	Old Air Shaft	1922	1:10560
-	980m NW	Old Air Shaft	1915	1:10560
-	997m E	Disused Colliery	1899	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	**0**

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	**0**

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	1

Areas which could be affected by past, current or future coal mining.

Location	Details
On site	**The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.**

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

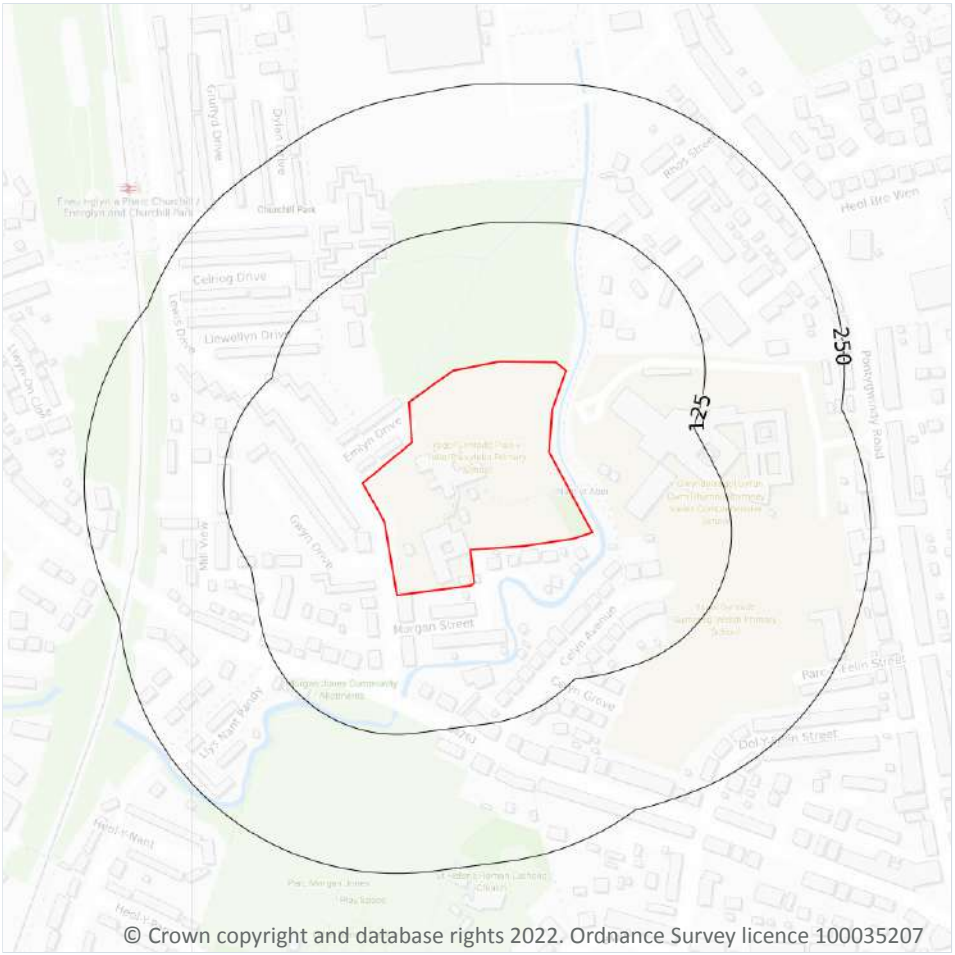
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 113**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None**

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	4

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
3m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
40m SW	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

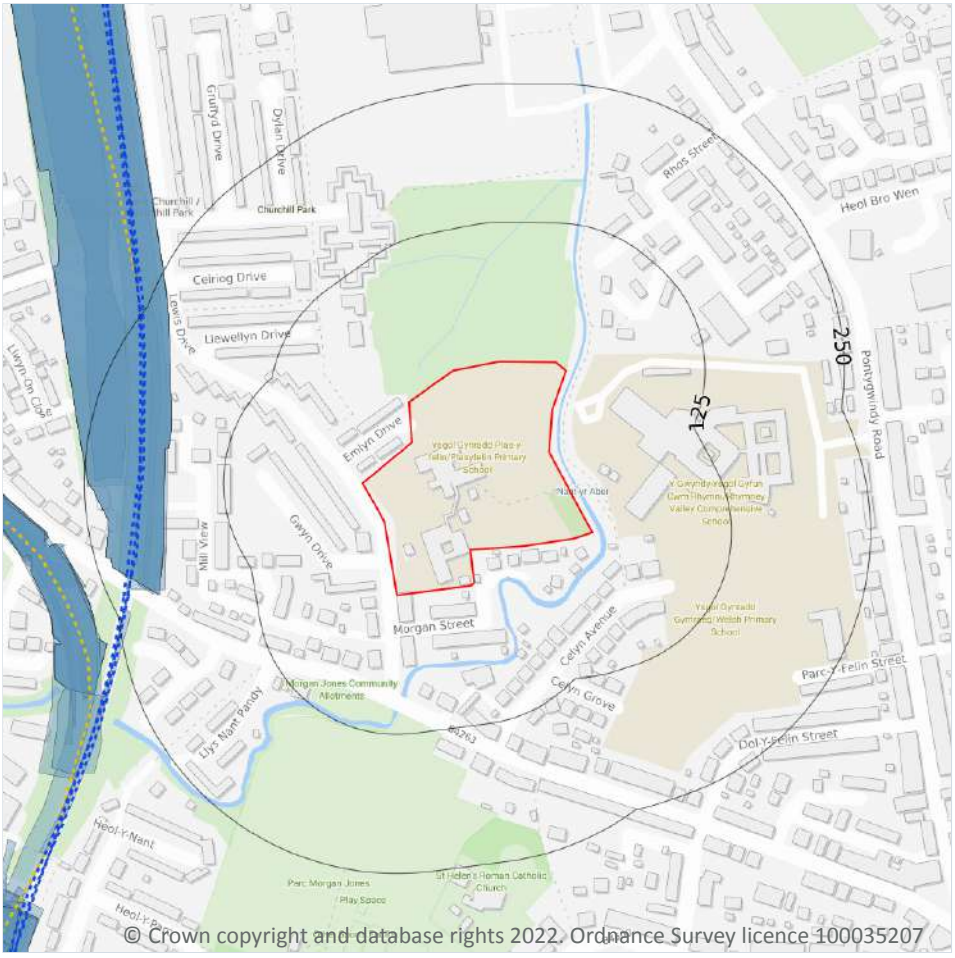
20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	9

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 115**

Location	Land Use	Year of mapping	Mapping scale
176m W	Railway	1889	-
176m W	Railway Sidings	1947	10560
177m W	Railway Sidings	1948	10560
177m W	Railway Sidings	1915	10560
177m W	Railway Sidings	1922	10560
188m W	Railway Sidings	1937	2500
216m W	Railway Sidings	1920	2500
216m W	Railway Sidings	1937	2500
238m W	Railway Sidings	1900	2500

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	7

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

Features are displayed on the Railway infrastructure and projects map on **page 115**

Location	Name	Type
197m W	Rhymney Line	rail
200m W	Not given	Multi Track
201m W	Rhymney Line	rail
224m W		rail
227m W	Rhymney Line	rail
234m W	Rhymney Line	rail
238m W	Rhymney Line	rail

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/.

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

PLASYFELIN PRIMARY SCHOOL, PLASYFELIN PRIMARY SCHOOL, LEWIS DRIVE, CAERPHILLY, CF83 3FT

Order Details

Date: 05/12/2022

Your ref: 7008935_Plas_y_Felin_

Our Ref: GS-9241210

Site Details

Location: 315230 187729

Area: 2.69 ha

Authority: Caerffili - Caerphilly County Borough Council

Summary of findings p. 2

OS MasterMap site plan p.13

Aerial image p. 8

groundsure.com/insightuserguide

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	Historical industrial land uses	0	1	32	49	-
18	1.2	Historical tanks	0	0	18	20	-
19	1.3	Historical energy features	1	0	18	18	-
21	1.4	Historical petrol stations	0	0	0	0	-
21	1.5	Historical garages	0	3	3	15	-
22	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
23	2.1	Historical industrial land uses	0	1	50	77	-
28	2.2	Historical tanks	0	0	31	40	-
31	2.3	Historical energy features	3	0	33	31	-
34	2.4	Historical petrol stations	0	0	0	0	-
34	2.5	Historical garages	0	4	5	27	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
36	3.1	Active or recent landfill	0	0	0	0	-
36	3.2	Historical landfill (BGS records)	0	0	0	0	-
37	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
37	3.4	Historical landfill (EA/NRW records)	0	0	0	3	-
38	3.5	Historical waste sites	0	0	1	3	-
38	3.6	Licensed waste sites	0	0	0	0	-
39	3.7	Waste exemptions	0	0	0	8	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
40	4.1	Recent industrial land uses	1	2	13	-	-
42	4.2	Current or recent petrol stations	0	0	1	2	-
42	4.3	Electricity cables	0	0	0	0	-
42	4.4	Gas pipelines	0	0	0	0	-
42	4.5	Sites determined as Contaminated Land	0	0	0	0	-

43	4.6	Control of Major Accident Hazards (COMAH)	0	0	1	0	-
43	4.7	Regulated explosive sites	0	0	0	0	-
43	4.8	Hazardous substance storage/usage	0	0	1	0	-
44	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
44	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
44	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	1	-
44	4.12	Radioactive Substance Authorisations	0	0	0	0	-
45	4.13	Licensed Discharges to controlled waters	1	0	2	3	-
46	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
46	4.15	Pollutant release to public sewer	0	0	0	0	-
46	4.16	List 1 Dangerous Substances	0	0	0	0	-
46	4.17	List 2 Dangerous Substances	0	0	0	1	-
47	4.18	Pollution Incidents (EA/NRW)	0	1	4	3	-
48	4.19	Pollution inventory substances	0	0	0	0	-
48	4.20	Pollution inventory waste transfers	0	0	0	0	-
48	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
49	5.1	Superficial aquifer	Identified (within 500m)				
51	5.2	Bedrock aquifer	Identified (within 500m)				
53	5.3	Groundwater vulnerability	Identified (within 50m)				
54	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
54	5.5	Groundwater vulnerability- local information	None (within 0m)				
55	5.6	Groundwater abstractions	0	0	0	0	6
57	5.7	Surface water abstractions	0	0	0	0	0
57	5.8	Potable abstractions	0	0	0	0	0
57	5.9	Source Protection Zones	0	0	0	0	-
58	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
59	6.1	Water Network (OS MasterMap)	0	2	8	-	-

60	6.2	Surface water features	0	3	3	-	-
61	6.3	WFD Surface water body catchments	1	-	-	-	-
61	6.4	WFD Surface water bodies	0	1	0	-	-
61	6.5	WFD Groundwater bodies	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
63	7.1	Risk of flooding from rivers and the sea	High (within 50m)				
64	7.2	Historical Flood Events	0	0	0	-	-
64	7.3	Flood Defences	0	4	5	-	-
65	7.4	Areas Benefiting from Flood Defences	0	0	4	-	-
65	7.5	Flood Storage Areas	0	0	0	-	-
66	7.6	Flood Zone 2	Identified (within 50m)				
67	7.7	Flood Zone 3	Identified (within 50m)				
Page	Section	Surface water flooding					
68	8.1	Surface water flooding	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding					
70	9.1	Groundwater flooding	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
71	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	3
72	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
72	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
72	10.4	Special Protection Areas (SPA)	0	0	0	0	0
72	10.5	National Nature Reserves (NNR)	0	0	0	0	0
73	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
73	10.7	Designated Ancient Woodland	0	0	0	1	40
75	10.8	Biosphere Reserves	0	0	0	0	0
75	10.9	Forest Parks	0	0	0	0	0
75	10.10	Marine Conservation Zones	0	0	0	0	0
75	10.11	Green Belt	0	0	0	0	0
75	10.12	Proposed Ramsar sites	0	0	0	0	0

76	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
76	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
76	10.15	Nitrate Sensitive Areas	0	0	0	0	0
76	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
77	10.17	SSSI Impact Risk Zones	0	-	-	-	-
77	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
78	11.1	World Heritage Sites	0	0	0	-	-
79	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
79	11.3	National Parks	0	0	0	-	-
79	**11.4**	**Listed Buildings**	0	0	1	-	-
80	11.5	Conservation Areas	0	0	0	-	-
80	11.6	Scheduled Ancient Monuments	0	0	0	-	-
80	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
81	12.1	Agricultural Land Classification	None (within 250m)				
81	12.2	Open Access Land	0	0	0	-	-
81	12.3	Tree Felling Licences	0	0	0	-	-
81	12.4	Environmental Stewardship Schemes	0	0	0	-	-
82	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
83	13.1	Priority Habitat Inventory	0	0	0	-	-
83	13.2	Habitat Networks	0	0	0	-	-
83	13.3	Open Mosaic Habitat	0	0	0	-	-
83	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
84	**14.1**	**10k Availability**	Identified (within 500m)				
85	14.2	Artificial and made ground (10k)	0	0	0	0	-
86	**14.3**	**Superficial geology (10k)**	2	2	3	4	-

87	14.4	Landslip (10k)	0	0	0	0	-
88	14.5	Bedrock geology (10k)	1	0	1	1	-
89	14.6	Bedrock faults and other linear features (10k)	0	0	1	2	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
90	15.1	50k Availability	Identified (within 500m)				
91	15.2	Artificial and made ground (50k)	0	0	0	0	-
91	15.3	Artificial ground permeability (50k)	0	0	-	-	-
92	15.4	Superficial geology (50k)	2	2	1	1	-
93	15.5	Superficial permeability (50k)	Identified (within 50m)				
93	15.6	Landslip (50k)	0	0	0	0	-
93	15.7	Landslip permeability (50k)	None (within 50m)				
94	15.8	Bedrock geology (50k)	1	0	1	1	-
95	15.9	Bedrock permeability (50k)	Identified (within 50m)				
95	15.10	Bedrock faults and other linear features (50k)	0	0	1	1	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
96	16.1	BGS Boreholes	0	0	4	-	-
Page	Section	Natural ground subsidence					
98	17.1	Shrink swell clays	Very low (within 50m)				
99	17.2	Running sands	Low (within 50m)				
101	17.3	Compressible deposits	Moderate (within 50m)				
103	17.4	Collapsible deposits	Very low (within 50m)				
105	17.5	Landslides	Very low (within 50m)				
106	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
108	18.1	Natural cavities	0	0	0	0	-
109	18.2	BritPits	0	0	0	0	-
109	18.3	Surface ground workings	0	2	1	-	-
109	18.4	Underground workings	0	0	0	0	20
110	18.5	Historical Mineral Planning Areas	0	0	0	0	-

110	18.6	Non-coal mining	0	0	0	0	0
111	18.7	Mining cavities	0	0	0	0	0
111	18.8	JPB mining areas	None (within 0m)				
111	**18.9**	**Coal mining**	Identified (within 0m)				
111	18.10	Brine areas	None (within 0m)				
112	18.11	Gypsum areas	None (within 0m)				
112	18.12	Tin mining	None (within 0m)				
112	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
113	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
114	**20.1**	**BGS Estimated Background Soil Chemistry**	2	2	-	-	-
114	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
114	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
115	21.1	Underground railways (London)	0	0	0	-	-
115	21.2	Underground railways (Non-London)	0	0	0	-	-
116	21.3	Railway tunnels	0	0	0	-	-
116	**21.4**	**Historical railway and tunnel features**	0	0	9	-	-
116	21.5	Royal Mail tunnels	0	0	0	-	-
117	21.6	Historical railways	0	0	0	-	-
117	**21.7**	**Railways**	0	0	7	-	-
117	21.8	Crossrail 1	0	0	0	0	-
118	21.9	Crossrail 2	0	0	0	0	-
118	21.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 14/04/2020

Site Area: 2.69ha

Recent site history - 2017 aerial photograph

Capture Date: 25/05/2017

Site Area: 2.69ha

Recent site history - 2014 aerial photograph

Capture Date: 23/07/2014

Site Area: 2.69ha

Recent site history - 2009 aerial photograph

Capture Date: 12/10/2009

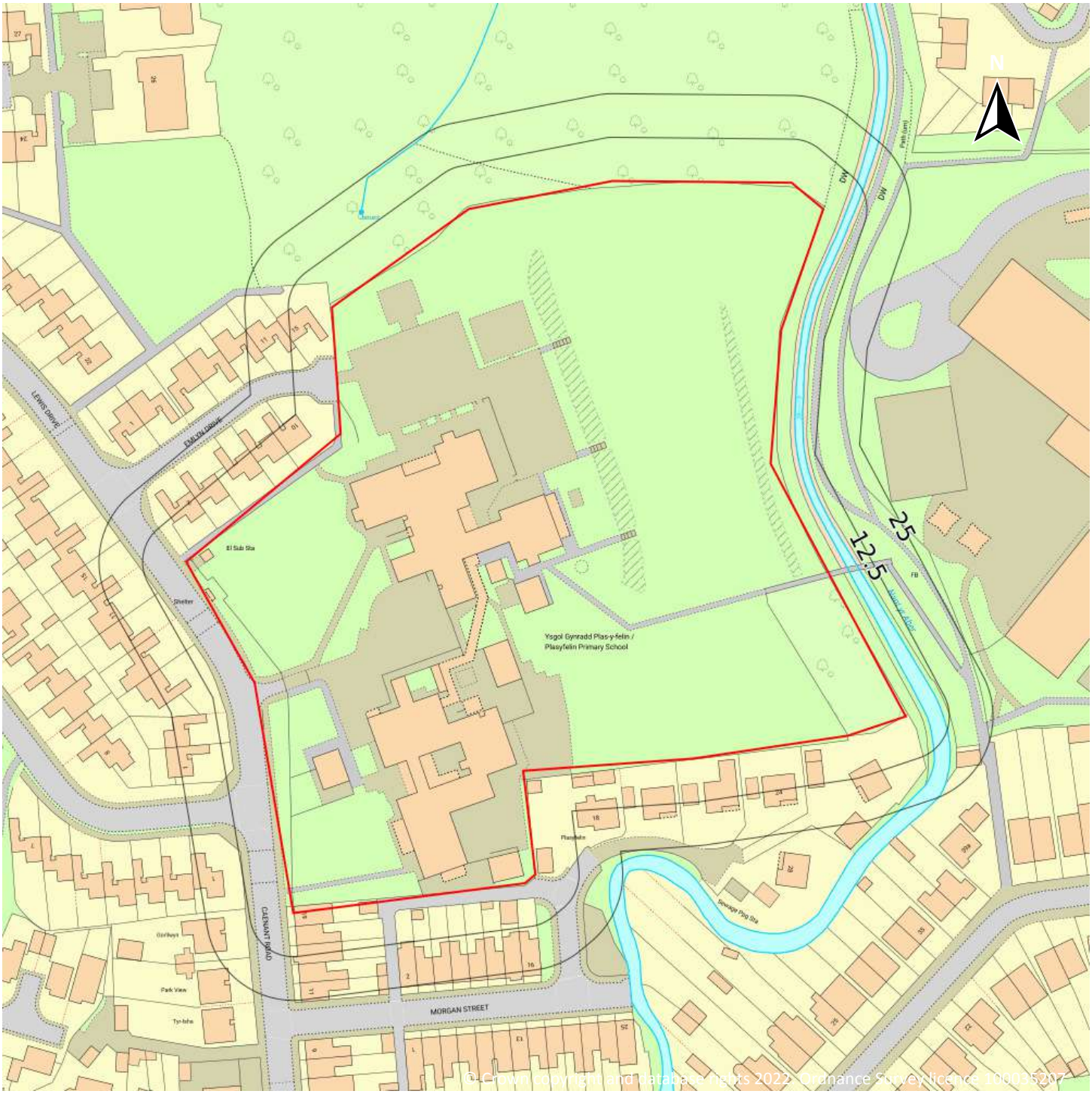
Site Area: 2.69ha

Recent site history - 2000 aerial photograph

Capture Date: 21/07/2000

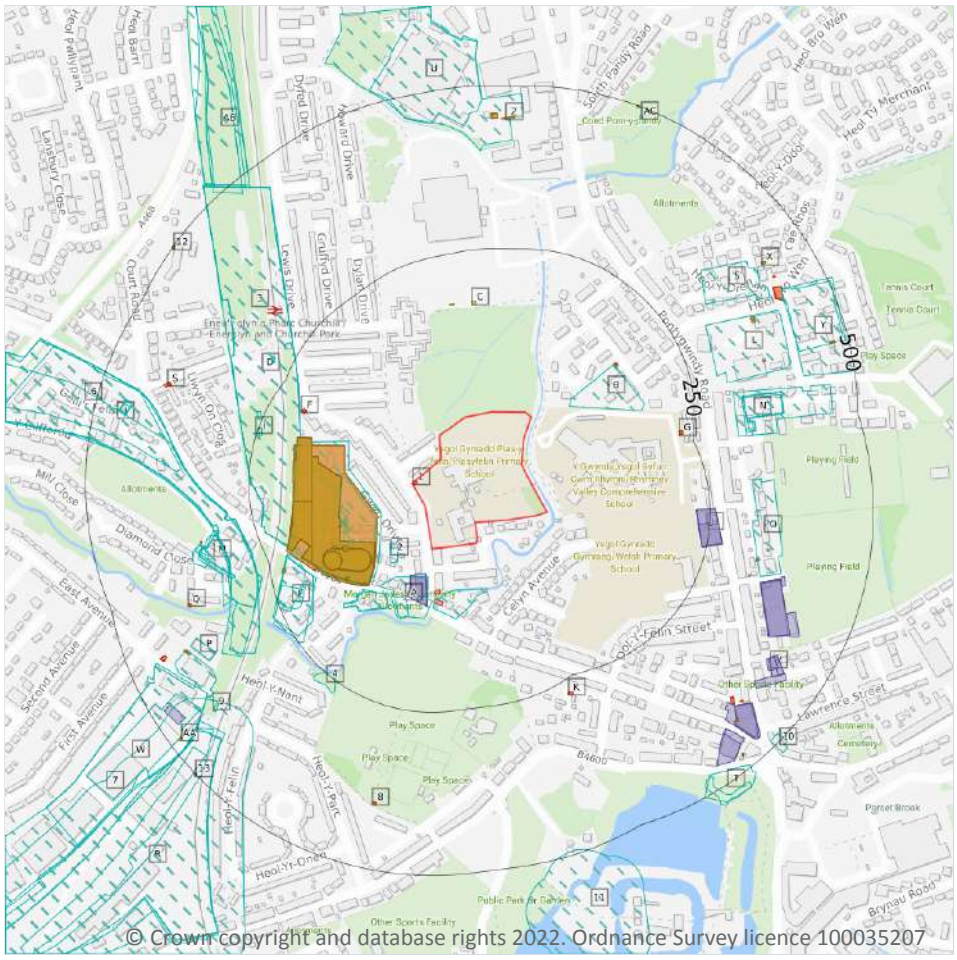
Site Area: 2.69ha

OS MasterMap site plan



Site Area: 2.69ha

1 Past land use



1.1 Historical industrial land uses

Records within 500m	82

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	43m SW	Corn Mill	1875	1174936

ID	Location	Land use	Dates present	Group ID
2	51m SW	Unspecified Mill	1969	1165921
B	61m NE	Fire Station	1969 - 1992	1261242
A	64m W	Gas Works	1915 - 1922	1270028
A	67m S	Unspecified Works	1978 - 1992	1243201
A	75m W	Unspecified Works	1969	1267074
A	85m SW	Unspecified Mill	1899	1165924
A	85m SW	Unspecified Works	1978 - 1992	1263211
A	97m SW	Unspecified Tank	1969 - 1992	1217061
A	99m SW	Woollen Mill	1899	1173676
A	99m SW	Disused Woollen Mill	1915 - 1922	1201113
A	106m W	Unspecified Commercial/Industrial	1960	1256459
A	113m SW	Unspecified Commercial/Industrial	1947	1250772
A	114m W	Unspecified Tank	1960	1215127
A	120m W	Unspecified Tank	1948	1223648
A	120m W	Unspecified Tank	1915 - 1922	1238997
A	120m SW	Unspecified Tanks	1915 - 1922	1228580
A	120m SW	Unspecified Tank	1947	1175803
A	121m W	Unspecified Tank	1947	1216736
A	129m SW	Unspecified Tank	1969 - 1992	1199961
A	129m SW	Unspecified Tank	1948 - 1960	1232892
A	134m SW	Gasometer	1915 - 1922	1235419
A	135m SW	Unspecified Tank	1947	1229210
A	139m SW	Unspecified Old Tanks	1947	1175125
3	176m W	Railway Sidings	1947 - 1948	1226398
D	177m W	Railway Sidings	1922	1254728
D	177m W	Railway Sidings	1915	1254759
E	183m SW	Disused Woollen Mill	1947 - 1948	1252281
E	187m SW	Unspecified Depot	1992	1230295

ID	Location	Land use	Dates present	Group ID
E	197m SW	Unspecified Depot	1978	1216450
E	203m SW	Laundry	1915 - 1922	1213669
I	241m W	Railway Building	1947 - 1948	1251344
4	243m SW	Unspecified Pit	1969	1186101
I	251m W	Goods Shed	1915 - 1948	1242541
D	262m NW	Railway Building	1978 - 1992	1193192
J	264m SW	Railway Sidings	1948 - 1965	1231667
J	264m SW	Railway Sidings	1915 - 1922	1253563
J	268m W	Railway Sidings	1947	1248111
J	269m SW	Railway Sidings	1899	1215867
D	275m NW	Railway Building	1948	1196842
D	275m NW	Railway Building	1915 - 1922	1212313
L	292m NE	Unspecified Factory	1969	1173331
M	304m W	Unspecified Mill	1875	1165923
M	304m W	Disused Woollen Mill	1915 - 1922	1210835
M	304m W	Woollen Mill	1899	1173675
M	307m W	Unspecified Works	1978 - 1992	1192669
N	311m E	Unspecified Factory	1978 - 1992	1219695
O	315m E	Unspecified Works	1969	1178908
5	318m NE	Unspecified Factory	1969 - 1978	1198937
N	324m E	Glove Factory	1948	1182012
N	326m E	Unspecified Factory	1960	1214166
N	326m E	Unspecified Factory	1969	1257685
M	330m W	Disused Woollen Mill	1948	1253857
M	331m W	Disused Woollen Mill	1947	1222476
6	354m W	Unspecified Factory	1978 - 1992	1261669
P	368m SW	Unspecified Works	1978 - 1992	1255187
R	382m SW	Goods Yard	1965 - 1968	1258249

ID	Location	Land use	Dates present	Group ID
7	384m SW	Unspecified Commercial/Industrial	1978 - 1992	1248647
U	401m N	Unspecified Commercial/Industrial	1992	1159110
9	403m SW	Railway Building	1915 - 1922	1217143
W	409m SW	Unspecified Works	1965 - 1968	1268483
Y	421m E	Unspecified Factory	1978 - 1992	1255795
Y	422m NE	Unspecified Factory	1969	1208678
R	425m SW	Railway Sidings	1947	1242096
W	430m SW	Railway Building	1948	1172051
R	434m SW	Railway Sidings	1915 - 1922	1240491
R	434m SW	Railway Sidings	1978	1236952
R	435m SW	Railway Sidings	1948 - 1968	1228966
U	440m N	Unspecified Works	1978	1178910
J	445m W	Railway Building	1948	1216415
J	446m W	Railway Building	1947	1232458
J	447m W	Railway Building	1915 - 1922	1210695
R	469m SW	Railway Sidings	1899	1192506
T	473m SE	Brewery	1899	1174580
T	476m SE	Unspecified Ground Workings	1969 - 1978	1201381
AB	478m NW	Railway Sidings	1916	1227125
AB	478m NW	Railway Sidings	1922	1193067
AB	482m NW	Railway Sidings	1915	1213261
AC	483m NE	Unspecified Tank	1916	1175804
AB	484m NW	Railway Sidings	1947 - 1948	1217220
10	489m SE	Malthouse	1899	1171588
11	494m S	Horn Works	1899 - 1922	1229166

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	38

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	71m W	Gas Works	1920	190150
A	84m SW	Gas Works	1976 - 1995	193314
A	85m SW	Gas Works	1987	187422
A	94m SW	Tanks	1961 - 1969	180211
A	95m SW	Gasholders	1976 - 1993	192739
A	95m SW	Gas Holders	1987	178133
A	126m SW	Gasometer	1920	170754
A	126m SW	Unspecified Tank	1937	173016
A	127m W	Unspecified Tank	1920 - 1937	188759
A	134m SW	Unspecified Tank	1976 - 1993	183958
A	139m SW	Gasometer	1920	170755
A	139m SW	Unspecified Tank	1937	173015
A	145m SW	Unspecified Tank	1920 - 1937	181670
A	153m W	Gas Works	1998	189414
A	156m W	Gas Works	1982	178733
C	166m N	Unspecified Tank	1977 - 1989	186903
C	172m N	Unspecified Tank	1977 - 1989	184368
E	227m SW	Tanks	1982	169279
O	324m E	Unspecified Tank	1961 - 1969	192503
O	342m E	Unspecified Tank	1961	173017
L	365m E	Unspecified Tank	1976 - 1989	191307

ID	Location	Land use	Dates present	Group ID
L	367m NE	Unspecified Tank	1969	172978
L	368m NE	Unspecified Tank	1976 - 1989	181268
P	404m SW	Tanks	1976 - 1988	184474
P	406m SW	Unspecified Tank	1995	173014
X	424m NE	Unspecified Tank	1971 - 1977	193112
T	429m SE	Unspecified Tank	1976 - 1996	179833
Z	448m N	Tanks	1977	169232
Z	450m N	Tanks	1977 - 1998	179592
Z	450m N	Tanks	1971	179685
Y	471m E	Unspecified Tank	1989	179824
Y	472m E	Unspecified Tank	1995	180233
Y	475m E	Unspecified Tank	1976	191091
T	475m SE	Unspecified Tank	1976 - 1996	178356
AA	480m SW	Unspecified Tank	1976 - 1988	187378
12	497m NW	Unspecified Tank	1976 - 1993	190826
AC	497m NE	Unspecified Tank	1920	172975
13	498m SW	Unspecified Tank	1961	173013

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**37**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Electricity Substation**	**1976 - 1993**	**112302**

ID	Location	Land use	Dates present	Group ID
A	64m S	Electricity Substation	1976 - 1993	103036
A	71m W	Gas Works	1920	100731
A	77m S	Electricity Transformer	1969	99577
A	84m SW	Gas Works	1976 - 1995	110327
A	95m SW	Gasholders	1976 - 1993	104765
A	95m SW	Gas Holders	1987	99984
A	126m SW	Gasometer	1920	99151
A	139m SW	Gasometer	1920	99152
A	147m SW	Electricity Substation	1976 - 1993	105603
B	149m NE	Electricity Substation	1976 - 1987	106793
B	150m NE	Electricity Transformer	1969	99593
B	150m NE	Electricity Substation	1993	109481
A	153m W	Gas Works	1998	107107
A	156m W	Gas Works	1982	102407
F	196m W	Electricity Transformer	1976 - 1982	109430
F	197m W	Electricity Substation	1995 - 1998	108363
G	227m E	Electricity Substation	1976 - 1995	107142
G	228m E	Electricity Transformer	1969	99592
K	268m SE	Electricity Transformer	1969	99578
K	269m SE	Electricity Substation	1976 - 1993	103955
O	328m E	Electricity Substation	1976 - 1995	110728
M	333m W	Electricity Substation	1998	97415
Q	379m SW	Electricity Substation	1995	97414
Q	379m SW	Electricity Transformer	1976 - 1982	109535
8	397m S	Electricity Substation	1976 - 1993	112702
S	398m W	Electricity Transformer	1976 - 1982	112621
S	398m W	Electricity Substation	1995 - 1998	107960
T	399m SE	Electricity Substation	1976 - 1989	108232

ID	Location	Land use	Dates present	Group ID
T	400m SE	Electricity Substation	1996	113263
S	402m W	Electricity Substation	1969	97413
T	413m SE	Electricity Transformer	1969	99580
X	415m NE	Electricity Substation	1977 - 1988	103763
X	417m NE	Electricity Substation	1971	104023
X	428m NE	Electricity Substation	1992	97416
P	439m SW	Electricity Transformer	1969 - 1988	106680
P	439m SW	Electricity Substation	1995	97433

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	**0**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	**21**

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	39m SW	Garage	1993	32740
A	43m SW	Garage	1969 - 1987	35992
A	44m SW	Garage	1976	32601

ID	Location	Land use	Dates present	Group ID
H	229m E	Garage	1976 - 1989	36159
H	230m E	Garage	1969	34366
H	233m E	Garage	1995	34142
O	344m E	Garage	1989	34910
O	344m E	Garage	1961	32553
O	345m E	Garage	1976	32709
O	345m E	Garage	1995	34528
O	372m E	Garage	1969	33852
T	402m SE	Garage	1961 - 1969	36707
V	405m SE	Garage	1976	32772
V	407m SE	Garage	1989 - 1996	35747
V	410m SE	Garage	1961 - 1969	35838
V	412m SE	Garage	1976	34027
T	413m SE	Garage	1989	36916
T	413m SE	Garage	1976 - 1996	35804
T	430m SE	Garage	1976 - 1989	36050
T	433m SE	Garage	1961	33813
AA	458m SW	Garage	1976	32079

This data is sourced from Ordnance Survey / Groundsure.

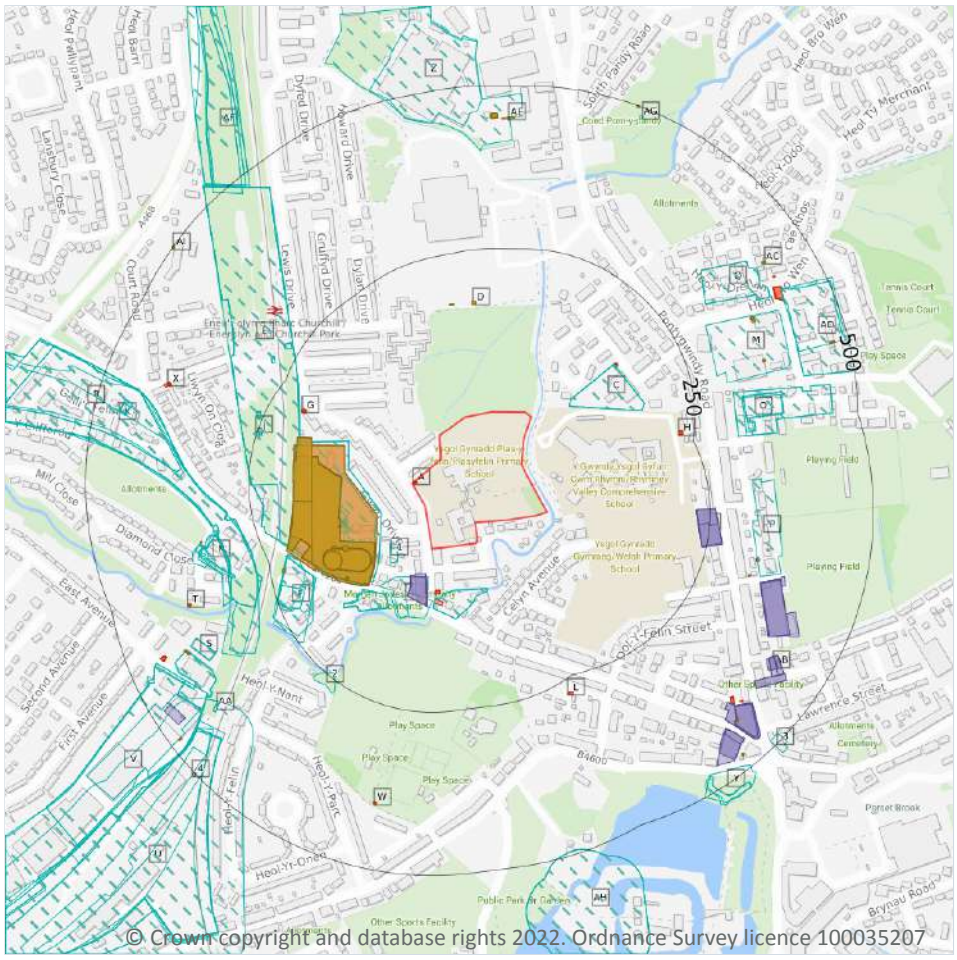
1.6 Historical military land

Records within 500m	**0**

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m	128

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 23**

ID	Location	Land Use	Date	Group ID
B	43m SW	Corn Mill	1875	1174936
1	51m SW	Unspecified Mill	1969	1165921
C	61m NE	Fire Station	1992	1261242

ID	Location	Land Use	Date	Group ID
C	61m NE	Fire Station	1969	1261242
C	61m NE	Fire Station	1978	1261242
B	64m W	Gas Works	1922	1270028
B	64m W	Gas Works	1915	1270028
B	67m S	Unspecified Works	1992	1243201
B	67m S	Unspecified Works	1978	1243201
B	75m W	Unspecified Works	1969	1267074
B	85m SW	Unspecified Mill	1899	1165924
B	85m SW	Unspecified Works	1992	1263211
B	85m SW	Unspecified Works	1978	1263211
B	97m SW	Unspecified Tank	1992	1217061
B	97m SW	Unspecified Tank	1969	1217061
B	97m SW	Unspecified Tank	1978	1217061
B	99m SW	Woollen Mill	1899	1173676
B	99m SW	Disused Woollen Mill	1922	1201113
B	99m SW	Disused Woollen Mill	1915	1201113
B	106m W	Unspecified Commercial/Industrial	1960	1256459
B	113m SW	Unspecified Commercial/Industrial	1947	1250772
B	114m W	Unspecified Tank	1960	1215127
B	120m W	Unspecified Tank	1922	1238997
B	120m W	Unspecified Tank	1948	1223648
B	120m W	Unspecified Tank	1915	1238997
B	120m SW	Unspecified Tanks	1922	1228580
B	120m SW	Unspecified Tanks	1915	1228580
B	120m SW	Unspecified Tank	1947	1175803
B	121m W	Unspecified Tank	1947	1216736
B	129m SW	Unspecified Tank	1992	1199961
B	129m SW	Unspecified Tank	1969	1199961

ID	Location	Land Use	Date	Group ID
B	129m SW	Unspecified Tank	1960	1232892
B	129m SW	Unspecified Tank	1978	1199961
B	134m SW	Gasometer	1922	1235419
B	134m SW	Gasometer	1915	1235419
B	134m SW	Unspecified Tank	1948	1232892
B	135m SW	Unspecified Tank	1947	1229210
B	139m SW	Unspecified Old Tanks	1947	1175125
E	176m W	Railway Sidings	1947	1226398
E	177m W	Railway Sidings	1922	1254728
E	177m W	Railway Sidings	1948	1226398
E	177m W	Railway Sidings	1915	1254759
F	183m SW	Disused Woollen Mill	1948	1252281
F	185m SW	Disused Woollen Mill	1947	1252281
F	187m SW	Unspecified Depot	1992	1230295
F	197m SW	Unspecified Depot	1978	1216450
F	203m SW	Laundry	1922	1213669
F	203m SW	Laundry	1915	1213669
J	241m W	Railway Building	1947	1251344
J	242m W	Railway Building	1948	1251344
2	243m SW	Unspecified Pit	1969	1186101
J	251m W	Goods Shed	1947	1242541
J	252m W	Goods Shed	1922	1242541
J	252m W	Goods Shed	1948	1242541
J	252m W	Goods Shed	1915	1242541
E	262m NW	Railway Building	1992	1193192
E	262m NW	Railway Building	1978	1193192
K	264m SW	Railway Sidings	1922	1253563
K	264m SW	Railway Sidings	1948	1231667

ID	Location	Land Use	Date	Group ID
K	264m SW	Railway Sidings	1915	1253563
K	268m W	Railway Sidings	1947	1248111
K	269m SW	Railway Sidings	1899	1215867
E	275m NW	Railway Building	1922	1212313
E	275m NW	Railway Building	1948	1196842
E	275m NW	Railway Building	1915	1212313
M	292m NE	Unspecified Factory	1969	1173331
N	304m W	Unspecified Mill	1875	1165923
N	304m W	Disused Woollen Mill	1922	1210835
N	304m W	Disused Woollen Mill	1915	1210835
N	304m W	Woollen Mill	1899	1173675
N	307m W	Unspecified Works	1992	1192669
N	307m W	Unspecified Works	1978	1192669
O	311m E	Unspecified Factory	1992	1219695
O	311m E	Unspecified Factory	1978	1219695
P	315m E	Unspecified Works	1969	1178908
Q	318m NE	Unspecified Factory	1969	1198937
Q	318m NE	Unspecified Factory	1978	1198937
O	324m E	Glove Factory	1948	1182012
O	326m E	Unspecified Factory	1969	1257685
O	326m E	Unspecified Factory	1960	1214166
N	330m W	Disused Woollen Mill	1948	1253857
N	331m W	Disused Woollen Mill	1947	1222476
R	349m W	Railway Sidings	1965	1231667
R	354m W	Unspecified Factory	1992	1261669
R	354m W	Unspecified Factory	1978	1261669
S	368m SW	Unspecified Works	1992	1255187
S	368m SW	Unspecified Works	1978	1255187

ID	Location	Land Use	Date	Group ID
U	382m SW	Goods Yard	1965	1258249
V	384m SW	Unspecified Commercial/Industrial	1978	1248647
V	385m SW	Unspecified Commercial/Industrial	1992	1248647
Z	401m N	Unspecified Commercial/Industrial	1992	1159110
AA	403m SW	Railway Building	1922	1217143
AA	403m SW	Railway Building	1915	1217143
AA	409m SW	Unspecified Works	1965	1268483
AA	409m SW	Unspecified Works	1968	1268483
AD	421m E	Unspecified Factory	1992	1255795
AD	421m E	Unspecified Factory	1978	1255795
AD	422m NE	Unspecified Factory	1969	1208678
U	425m SW	Railway Sidings	1947	1242096
V	428m SW	Unspecified Works	1965	1268483
V	428m SW	Unspecified Works	1968	1268483
V	430m SW	Railway Building	1948	1172051
U	434m SW	Railway Sidings	1922	1240491
U	434m SW	Railway Sidings	1915	1240491
U	434m SW	Railway Sidings	1978	1236952
U	435m SW	Railway Sidings	1948	1228966
Z	440m N	Unspecified Works	1978	1178910
U	441m SW	Railway Sidings	1965	1228966
U	441m SW	Railway Sidings	1968	1228966
K	445m W	Railway Building	1948	1216415
K	446m W	Railway Building	1947	1232458
K	447m W	Railway Building	1922	1210695
K	447m W	Railway Building	1915	1210695
U	469m SW	Railway Sidings	1899	1192506
Y	473m SE	Brewery	1899	1174580

ID	Location	Land Use	Date	Group ID
Y	476m SE	Unspecified Ground Workings	1978	1201381
Y	477m SE	Unspecified Ground Workings	1969	1201381
AF	478m NW	Railway Sidings	1916	1227125
AF	478m NW	Railway Sidings	1948	1226398
AF	478m NW	Railway Sidings	1922	1193067
AF	482m NW	Railway Sidings	1915	1213261
AG	483m NE	Unspecified Tank	1916	1175804
AF	484m NW	Railway Sidings	1948	1217220
AF	485m NW	Railway Sidings	1947	1217220
3	489m SE	Malthouse	1899	1171588
AH	494m S	Horn Works	1915	1229166
AH	494m S	Horn Works	1899	1229166
AH	494m S	Horn Works	1922	1229166

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**71**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 23**

ID	Location	Land Use	Date	Group ID
B	71m W	Gas Works	1920	190150
B	84m SW	Gas Works	1993	193314
B	85m SW	Gas Works	1987	187422
B	85m SW	Gas Works	1976	193314
B	94m SW	Tanks	1961	180211
B	94m SW	Tanks	1969	180211
B	95m SW	Gasholders	1993	192739

ID	Location	Land Use	Date	Group ID
B	95m SW	Gas Holders	1987	178133
B	95m SW	Gasholders	1976	192739
B	126m SW	Gasometer	1920	170754
B	126m SW	Unspecified Tank	1937	173016
B	127m W	Unspecified Tank	1920	188759
B	127m W	Unspecified Tank	1937	188759
B	134m SW	Unspecified Tank	1993	183958
B	135m SW	Unspecified Tank	1987	183958
B	136m SW	Unspecified Tank	1976	183958
B	139m SW	Gasometer	1920	170755
B	139m SW	Unspecified Tank	1937	173015
B	145m SW	Unspecified Tank	1920	181670
B	145m SW	Unspecified Tank	1937	181670
B	153m W	Gas Works	1976	193314
B	153m W	Gas Works	1995	193314
B	153m W	Gas Works	1998	189414
B	156m W	Gas Works	1982	178733
D	166m N	Unspecified Tank	1977	186903
D	167m N	Unspecified Tank	1989	186903
D	167m N	Unspecified Tank	1977	186903
D	172m N	Unspecified Tank	1977	184368
D	173m N	Unspecified Tank	1989	184368
D	173m N	Unspecified Tank	1977	184368
F	227m SW	Tanks	1982	169279
P	324m E	Unspecified Tank	1961	192503
P	324m E	Unspecified Tank	1969	192503
P	342m E	Unspecified Tank	1961	173017
M	365m E	Unspecified Tank	1989	191307

ID	Location	Land Use	Date	Group ID
M	365m E	Unspecified Tank	1989	191307
M	366m E	Unspecified Tank	1976	191307
M	367m NE	Unspecified Tank	1969	172978
M	368m NE	Unspecified Tank	1989	181268
M	368m NE	Unspecified Tank	1989	181268
M	369m NE	Unspecified Tank	1976	181268
S	404m SW	Tanks	1976	184474
S	405m SW	Tanks	1988	184474
S	406m SW	Unspecified Tank	1995	173014
AC	424m NE	Unspecified Tank	1977	193112
AC	425m NE	Unspecified Tank	1971	193112
Y	429m SE	Unspecified Tank	1989	179833
Y	429m SE	Unspecified Tank	1989	179833
Y	429m SE	Unspecified Tank	1976	179833
Y	430m SE	Unspecified Tank	1996	179833
AE	448m N	Tanks	1977	169232
AE	450m N	Tanks	1989	179592
AE	450m N	Tanks	1977	179592
AE	450m N	Tanks	1977	179592
AE	450m N	Tanks	1971	179685
AE	451m N	Tanks	1998	179592
AD	471m E	Unspecified Tank	1989	179824
AD	471m E	Unspecified Tank	1989	179824
AD	472m E	Unspecified Tank	1995	180233
AD	475m E	Unspecified Tank	1976	191091
Y	475m SE	Unspecified Tank	1989	178356
Y	475m SE	Unspecified Tank	1989	178356
Y	476m SE	Unspecified Tank	1976	178356

ID	Location	Land Use	Date	Group ID
Y	477m SE	Unspecified Tank	1996	178356
AA	480m SW	Unspecified Tank	1976	187378
AA	482m SW	Unspecified Tank	1988	187378
AI	497m NW	Unspecified Tank	1982	190826
AI	497m NW	Unspecified Tank	1993	190826
AG	497m NE	Unspecified Tank	1920	172975
AI	498m NW	Unspecified Tank	1976	190826
4	498m SW	Unspecified Tank	1961	173013

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**67**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 23**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Electricity Substation**	**1976**	**112302**
A	**On site**	**Electricity Substation**	**1987**	**112302**
A	**On site**	**Electricity Substation**	**1993**	**112302**
B	64m S	Electricity Substation	1987	103036
B	64m S	Electricity Substation	1976	103036
B	65m S	Electricity Substation	1993	103036
B	71m W	Gas Works	1920	100731
B	77m S	Electricity Transformer	1969	99577
B	84m SW	Gas Works	1993	110327
B	85m SW	Gas Works	1987	110327
B	85m SW	Gas Works	1976	110327
B	95m SW	Gasholders	1993	104765

ID	Location	Land Use	Date	Group ID
B	95m SW	Gas Holders	1987	99984
B	95m SW	Gasholders	1976	104765
B	126m SW	Gasometer	1920	99151
B	139m SW	Gasometer	1920	99152
B	147m SW	Electricity Substation	1987	105603
B	147m SW	Electricity Substation	1993	105603
B	148m SW	Electricity Substation	1976	105603
C	149m NE	Electricity Substation	1987	106793
C	150m NE	Electricity Transformer	1969	99593
C	150m NE	Electricity Substation	1976	106793
C	150m NE	Electricity Substation	1993	109481
B	153m W	Gas Works	1976	110327
B	153m W	Gas Works	1995	110327
B	153m W	Gas Works	1998	107107
B	156m W	Gas Works	1982	102407
G	196m W	Electricity Transformer	1982	109430
G	196m W	Electricity Transformer	1976	109430
G	197m W	Electricity Substation	1995	108363
G	197m W	Electricity Substation	1998	108363
H	227m E	Electricity Substation	1989	107142
H	227m E	Electricity Substation	1989	107142
H	227m E	Electricity Substation	1976	107142
H	228m E	Electricity Transformer	1969	99592
H	228m E	Electricity Substation	1995	107142
L	268m SE	Electricity Transformer	1969	99578
L	269m SE	Electricity Substation	1976	103955
L	270m SE	Electricity Substation	1993	103955
P	328m E	Electricity Substation	1989	110728

ID	Location	Land Use	Date	Group ID
P	328m E	Electricity Substation	1989	110728
P	328m E	Electricity Substation	1995	110728
P	329m E	Electricity Substation	1976	110728
N	333m W	Electricity Substation	1998	97415
T	379m SW	Electricity Substation	1995	97414
T	379m SW	Electricity Transformer	1976	109535
T	380m SW	Electricity Transformer	1982	109535
W	397m S	Electricity Substation	1976	112702
W	397m S	Electricity Substation	1993	112702
X	398m W	Electricity Transformer	1976	112621
X	398m W	Electricity Substation	1995	107960
X	398m W	Electricity Substation	1998	107960
Y	399m SE	Electricity Substation	1989	108232
Y	399m SE	Electricity Substation	1989	108232
X	399m W	Electricity Transformer	1982	112621
Y	399m SE	Electricity Substation	1976	108232
Y	400m SE	Electricity Substation	1996	113263
X	402m W	Electricity Substation	1969	97413
Y	413m SE	Electricity Transformer	1969	99580
AC	415m NE	Electricity Substation	1988	103763
AC	416m NE	Electricity Substation	1977	103763
AC	417m NE	Electricity Substation	1971	104023
AC	428m NE	Electricity Substation	1992	97416
S	439m SW	Electricity Transformer	1969	106680
S	439m SW	Electricity Substation	1995	97433
S	440m SW	Electricity Transformer	1976	106680
S	441m SW	Electricity Transformer	1988	106680

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	36

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

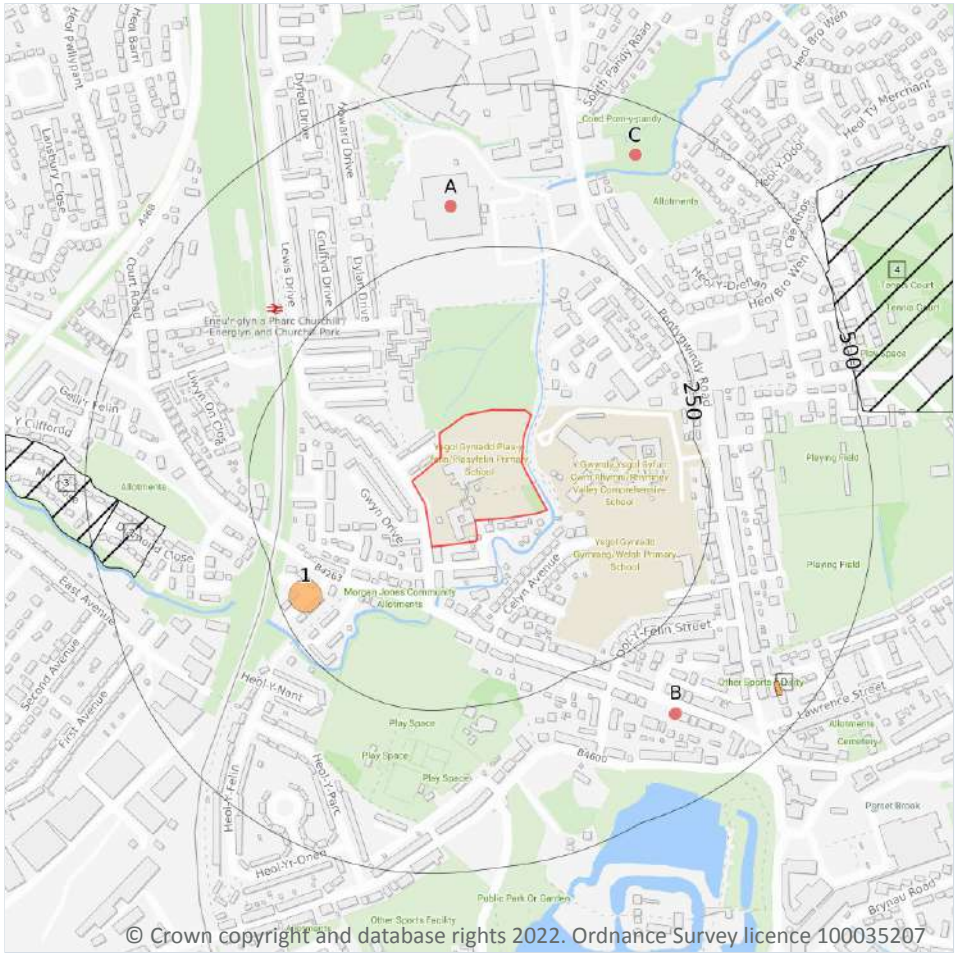
Features are displayed on the Past land use - un-grouped map on **page 23**

ID	Location	Land Use	Date	Group ID
B	39m SW	Garage	1993	32740
B	43m SW	Garage	1987	35992
B	44m SW	Garage	1976	32601
B	45m SW	Garage	1969	35992
I	229m E	Garage	1989	36159
I	229m E	Garage	1989	36159
I	229m E	Garage	1976	36159
I	230m E	Garage	1969	34366
I	233m E	Garage	1995	34142
P	344m E	Garage	1989	34910
P	344m E	Garage	1989	34910
P	344m E	Garage	1961	32553
P	345m E	Garage	1976	32709
P	345m E	Garage	1995	34528
P	372m E	Garage	1969	33852
Y	402m SE	Garage	1961	36707

ID	Location	Land Use	Date	Group ID
Y	402m SE	Garage	1969	36707
AB	405m SE	Garage	1976	32772
AB	407m SE	Garage	1989	35747
AB	407m SE	Garage	1989	35747
AB	408m SE	Garage	1996	35747
AB	410m SE	Garage	1961	35838
AB	410m SE	Garage	1969	35838
AB	411m SE	Garage	1989	35747
AB	411m SE	Garage	1989	35747
AB	412m SE	Garage	1976	34027
AB	412m SE	Garage	1996	35747
Y	413m SE	Garage	1989	36916
Y	413m SE	Garage	1989	36916
Y	413m SE	Garage	1976	35804
Y	415m SE	Garage	1996	35804
Y	430m SE	Garage	1989	36050
Y	430m SE	Garage	1989	36050
Y	431m SE	Garage	1976	36050
Y	433m SE	Garage	1961	33813
AA	458m SW	Garage	1976	32079

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	3

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 36**

ID	Location	Details		
2	384m W	Site Address: Mill Road Licence Holder Address: Mill Road, Caerphilly	Waste Licence: Yes Site Reference: 16 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 22/07/1981 Licence Surrender: 31/12/1983	Operator: - Licence Holder: Griff Davis and Sons First Recorded 31/12/1981 Last Recorded: 31/12/1983
3	449m W	Site Address: Mill Road Licence Holder Address: -	Waste Licence: Yes Site Reference: - Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 31/12/1987 Licence Surrender: 31/12/1990	Operator: - Licence Holder: Griff Davies First Recorded 31/12/1987 Last Recorded: 31/12/1990
4	488m E	Site Address: Virginia Park Licence Holder Address: -	Waste Licence: Yes Site Reference: - Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 31/12/1975 Licence Surrender: 31/12/1980	Operator: - Licence Holder: Rhymney Valley District Council First Recorded 31/12/1975 Last Recorded: 31/12/1980

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	4

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 36**

ID	Location	Address	Further Details	Date
1	183m SW	Site Address: Former Bus Depot, Mill Road, CAERPHILLY, Mid Glamorgan, CF83 3F	Type of Site: Recycling Centre (Conversion) Planning application reference: 5/5/93/0010 Description: An application (ref: 5/5/93/0010) for Detailed Planning permission was submitted to Caerphilly B.C. on 11th January 1993. Data source: Historic Planning Application Data Type: Point	01/05/1993
D	435m SE	Site Address: N/A	Type of Site: Scrap Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1989
D	435m SE	Site Address: N/A	Type of Site: Scrap Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1989
D	436m SE	Site Address: N/A	Type of Site: Scrap Yard Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1975

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	8

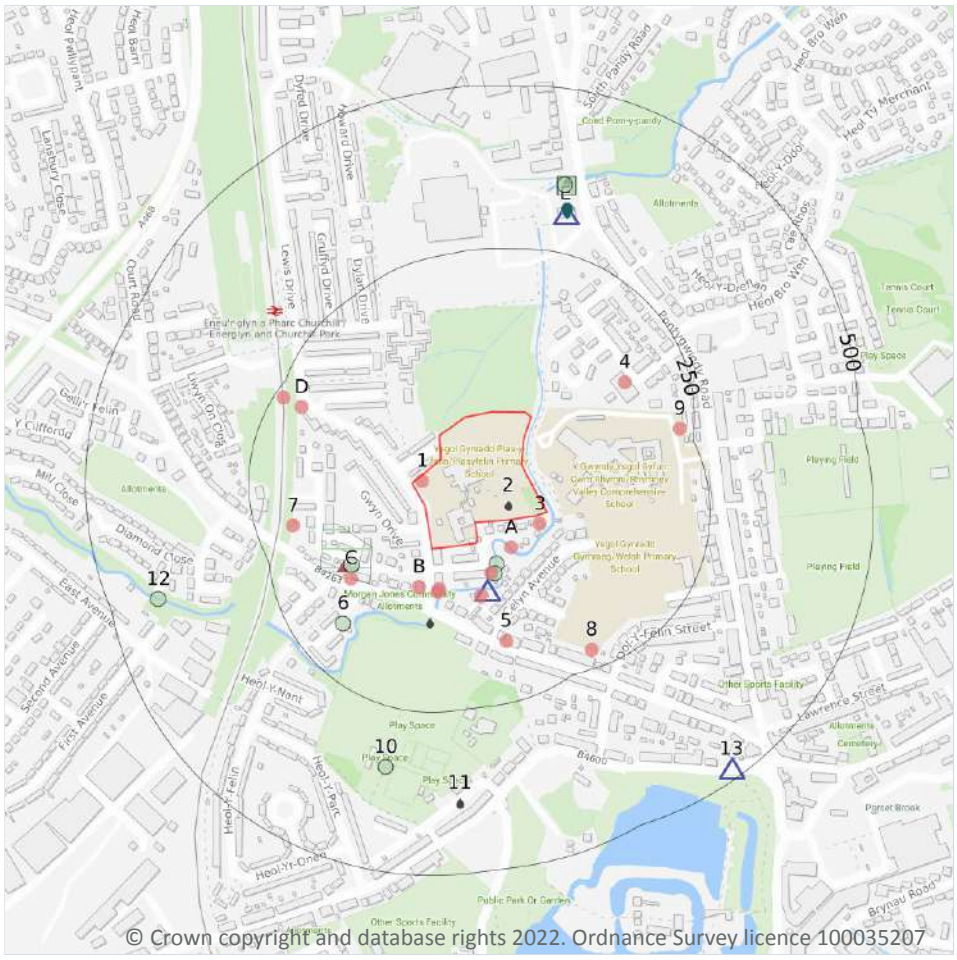
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 36**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	317m N	Asda Stores Ltd, Pontygwindy Road, Caerphilly, Caerffili, CF83 3SX	NRW-WME003711	Treating waste exemption	Waste Exemption - Non-Agricultural	Crushing waste fluorescent tubes
A	318m N	Asda Stores Limited, ASDA CAERPHILLY, Pontygwindy Road, Caerphilly, CF83 3SX	NRW-WME058487	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
B	369m SE	Speedy Asset Services Limited, Speedy Hire, 3-9 Mill Road, Caerphilly, Caerffili, CF83 3FD	NRW-WME042263	Storing waste exemption	Not on a farm	Storage of waste in secure containers
B	369m SE	Speedy Asset Services Limited, Speedy Hire, 3-9 Mill Road, Caerphilly, Caerffili, CF83 3FD	NRW-WME042263	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	369m SE	Speedy Asset Services Limited, Speedy Hire, 3-9 Mill Road, Caerphilly, Caerffili, CF833FD	NRW-WME026906	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
B	369m SE	Speedy Asset Services Limited, Speedy Hire, 3-9 Mill Road, Caerphilly, Caerffili, CF833FD	NRW-WME026906	Treating waste exemption	Not on a farm	Sorting mixed waste
C	424m NE	Cyfoeth Naturiol Cymru / Natural Resources Wales, (Rear of) Pontygwindy Inn, 222 Pontygwindy Road, Caerphilly, Caerffili, CF83 3HR	NRW-WME068937	Disposing of waste exemption	Not on a farm	Deposit of waste from dredging of inland waters
C	424m NE	Cyfoeth Naturiol Cymru / Natural Resources Wales, (Rear of) Pontygwindy Inn, 222 Pontygwindy Road, Caerphilly, Caerffili, CF83 3HR	NRW-WME068937	Using waste exemption	Not on a farm	Use of waste in construction

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m	16

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Company	Address	Activity	Category
1	**On site**	**Electricity Sub Station**	**Gwent, CF83**	**Electrical Features**	**Infrastructure and Facilities**
3	14m SE	Sylric Press	26, Morgan Street, Caerphilly, Gwent, CF83 3FQ	Published Goods	Industrial Products

ID	Location	Company	Address	Activity	Category
A	42m SE	Sewage Pumping Station	Gwent, CF83	Waste Storage, Processing and Disposal	Infrastructure and Facilities
A	51m S	Central Cars Cardiff	23, Morgan Street, Caerphilly, Gwent, CF83 3FQ	Vehicle Hire and Rental	Hire Services
B	61m SW	Caerphilly Van Centre	Caenant House, Mill Road, Caerphilly, Gwent, CF83 3FE	New Vehicles	Motoring
B	62m S	Day's Valeting	1, Caenant Road, Caerphilly, Gwent, CF83 3FP	Vehicle Cleaning Services	Personal, Consumer and Other Services
B	67m S	Electricity Sub Station	Gwent, CF83	Electrical Features	Infrastructure and Facilities
A	81m S	Works	Gwent, CF83	Unspecified Works Or Factories	Industrial Features
C	132m SW	Tank	Gwent, CF83	Tanks (Generic)	Industrial Features
4	153m NE	Caerphilly Fire Station	Caerphilly Fire Station, Waunfach Street, Caerphilly, Gwent, CF83 3HL	Fire Brigade Stations	Central and Local Government
5	157m S	Discount Auto Spares	78, Mill Road, Caerphilly, Gwent, CF83 3FH	Vehicle Parts and Accessories	Motoring
7	193m W	Gas Governor	Gwent, CF83	Gas Features	Infrastructure and Facilities
D	206m W	Electricity Sub Station	Gwent, CF83	Electrical Features	Infrastructure and Facilities
8	221m SE	Electricity Sub Station	Gwent, CF83	Electrical Features	Infrastructure and Facilities
9	228m E	Electricity Sub Station	Gwent, CF83	Electrical Features	Infrastructure and Facilities
D	236m NW	Energlyn & Churchill Park Rail Station	Gwent, CF83	Railway Stations, Junctions and Halts	Public Transport, Stations and Infrastructure

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	3

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Company	Address	LPG	Status
A	75m S	OBSOLETE	Mill Road, Caerphilly, Caerphilly, CF83 3F	Not Applicable	Obsolete
E	310m N	ASDA	Pontygwindy Road, Pwllypant, Caerphilly, Caerphilly, CF83 3SX	No	Open
13	484m SE	OBSOLETE	Piccadilly Square, Caerphilly, Caerphilly, CF83 1PB	Not Applicable	Obsolete

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	**1**

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Company	Address	Operational status	Tier
C	91m SW	British Gas	British Gas, Gasworks, Mill Road, Caerphilly, CF8 3FE	Historical NIHHS Site	-

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	**0**

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	**1**

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Details	
C	134m SW	Application reference number: Not Available Application status: Approved Application date: 25/11/1992 Address: Transco PLC, Caerphilly Holder Station, Mill Road, Caerphilly, Mid Glamorgan, Wales, CF83 3FF	Details: Natural Gas Storage Site. Enforcement: Data requested, not received. Date of enforcement: Data requested, not received. Comment: Data requested, not received.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	1

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Address	Details	
E	313m N	ASDA Stores Ltd, Pontygwindy Road, Caephilly, CF83 3SX	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m **6**

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Address	Details	
2	**On site**	**RES DEVMT PS OFF MORGAN ST, RESEDENTIAL DEVELOPMENT, OFF MORGAN STREET, Caerphilly, WALES**	**Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: AN0287201 Permit Version: 1 Receiving Water: Nant Yr Aber**	**Status: Effective Issue date: 22/02/1999 Effective Date: 22/02/1999 Revocation Date: -**
B	114m S	CAERPHILLY-M/J PARK SWO	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AN0016501 Permit Version: 1 Receiving Water: NANT-YR-ABER	Status: Surrendered Issue date: 07/10/1986 Effective Date: 07/10/1986 Revocation Date: -
B	114m S	CAERPHILLY-M/J PARK SWO	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AN0016502 Permit Version: 1 Receiving Water: NANT-YR-ABER	Status: Effective Issue date: 07/10/1986 Effective Date: 07/10/1986 Revocation Date: -
E	357m N	GLADFELTER CAERPHILLY LIMITED, GLADFELTER CAERPHILLY LIMIRED, PONTYGWINDY INDUSTRIAL ESTATE C, CAERPHILLY, CF83 3HU	Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: AN0263601 Permit Version: 1 Receiving Water: NANT YR ABER	Status: SURRENDERED UNDER EPR 2010 Issue date: 13/08/1997 Effective Date: 13/08/1997 Revocation Date: 13/06/2011
E	358m N	GLATFELTER CAERPHILLY LTD, PONTYGWINDY INDUSTRIAL ESTATE, CAERPHILLY, WALES, CF83 3HU	Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: AN0380401 Permit Version: 1 Receiving Water: NANT YR ABER	Status: SURRENDERED UNDER EPR 2010 Issue date: 07/04/2005 Effective Date: 07/04/2005 Revocation Date: 13/06/2011
11	391m S	86 Nantgarw Rd CSO, R/O 86 Nantgarw Rd, Caerphilly, CF83 1AP	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: AN0016502 Permit Version: 2 Receiving Water: NANT-YR-ABER	Status: Effective Issue date: 07/08/2019 Effective Date: 07/08/2019 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	1

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Name	Status	Receiving Water	Authorised Substances
E	353m N	Van Leer Metallised Products, Pontygwindy Ind Est	Active	Nant Yr Aber	Chromium, Copper, Zinc

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	**8**

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 40**

ID	Location	Details	
A	44m S	Incident Date: 09/04/2001 Incident Identification: 1987 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
A	53m S	Incident Date: 13/07/2013 Incident Identification: 1132692 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: - Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
C	125m SW	Incident Date: 11/10/2002 Incident Identification: 114181 Pollutant: Specific Waste Materials Pollutant Description: Other Specific Waste Material	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
C	125m SW	Incident Date: 11/10/2002 Incident Identification: 114181 Pollutant: Contaminated Water Pollutant Description: Other Contaminated Water	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6	177m SW	Incident Date: 31/03/2002 Incident Identification: 67880 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
10	341m S	Incident Date: 21/07/2004 Incident Identification: 252494 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
E	354m N	Incident Date: 28/05/2018 Incident Identification: 1802920 Pollutant: Pollutant Not Identified Pollutant Description: Pollutant Not Identified	Water Impact: Category 2 (Significant) Land Impact: No Details Air Impact: No Details
12	426m W	Incident Date: 05/06/2003 Incident Identification: 163449 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

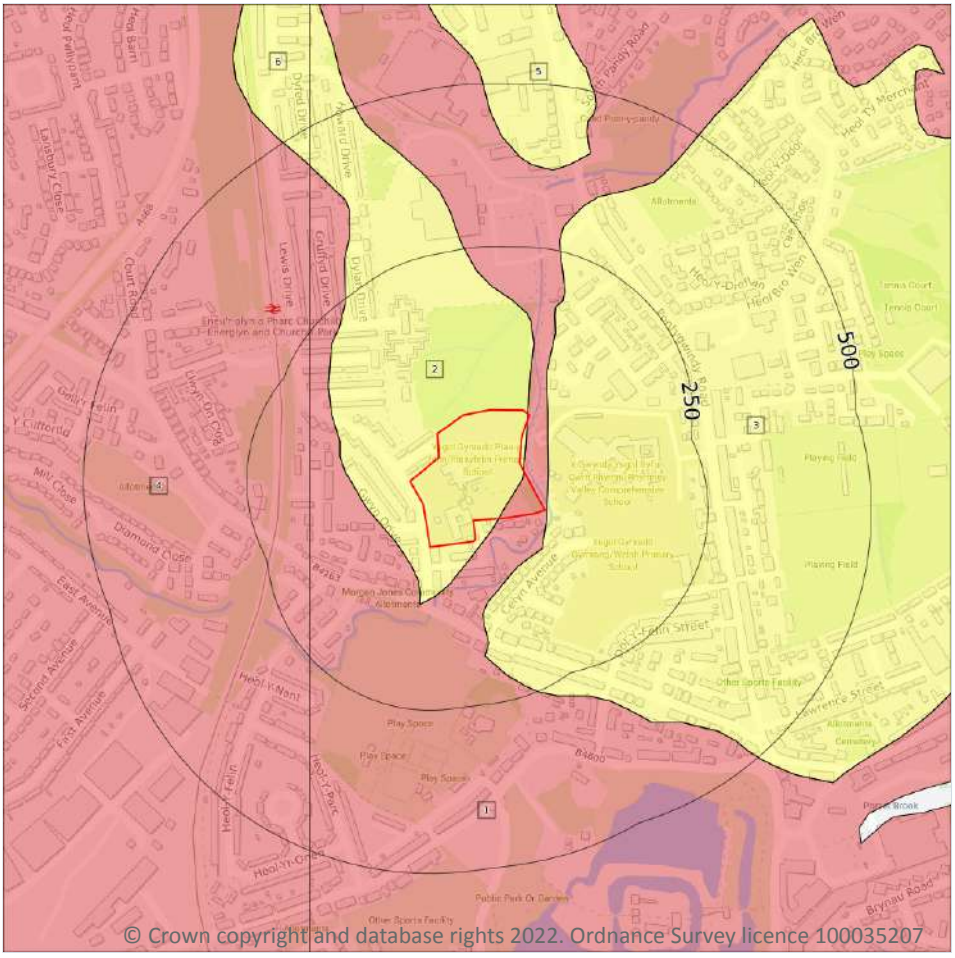
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	6

Aquifer status of groundwater held within superficial geology.

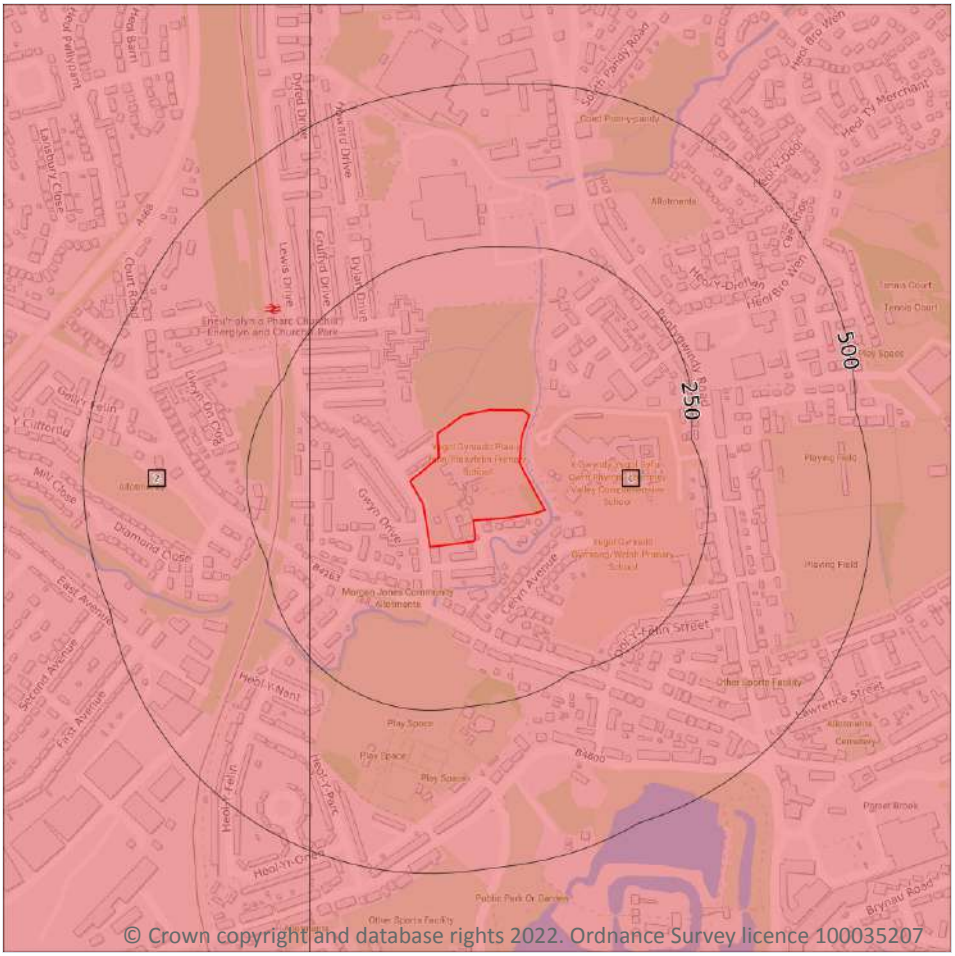
Features are displayed on the Hydrogeology map on **page 49**

ID	Location	Designation	Description
1	On site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

ID	Location	Designation	Description
3	3m SE	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	153m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	371m N	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
6	448m NW	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m **2**

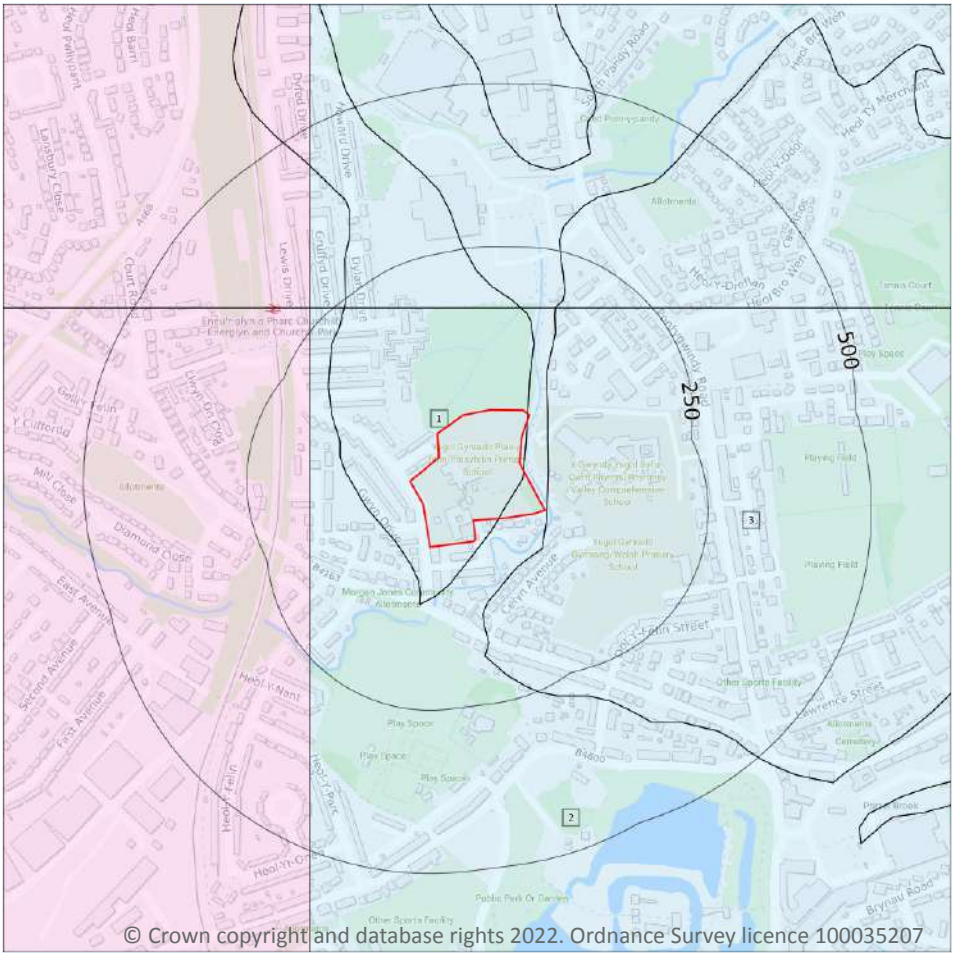
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 51**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
2	153m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	3

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 53**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year**	**Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Medium**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
2	**On site**	**Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year**	**Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Medium**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
3	3m SE	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Medium	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones

- Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	6

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 55**

ID	Location	Details	
-	1372m SW	Status: Historical Licence No: 21/57/12/0099 Details: Process Water Direct Source: EAW Groundwater Point: BOREHOLE "C"AT CLARKSON KNITTING Data Type: Point Name: Clarkson Knitting Limited Easting: 314270 Northing: 186610	Annual Volume (m^3): 227273 Max Daily Volume (m^3): 750 Original Application No: - Original Start Date: 06/11/2000 Expiry Date: - Issue No: 1 Version Start Date: 06/11/2000 Version End Date: -
-	1400m SW	Status: Historical Licence No: 21/57/12/0099 Details: Process Water Direct Source: EAW Groundwater Point: BOREHOLE "A"AT CLARKSON KNITTING Data Type: Point Name: Clarkson Knitting Limited Easting: 314240 Northing: 186600	Annual Volume (m^3): 227273 Max Daily Volume (m^3): 750 Original Application No: - Original Start Date: 06/11/2000 Expiry Date: - Issue No: 1 Version Start Date: 06/11/2000 Version End Date: -
-	1402m SW	Status: Historical Licence No: 21/57/12/0099 Details: Process Water Direct Source: EAW Groundwater Point: BOREHOLE "B"AT CLARKSON KNITTING Data Type: Point Name: Clarkson Knitting Limited Easting: 314270 Northing: 186570	Annual Volume (m^3): 227273 Max Daily Volume (m^3): 750 Original Application No: - Original Start Date: 06/11/2000 Expiry Date: - Issue No: 1 Version Start Date: 06/11/2000 Version End Date: -
-	1469m SW	Status: Historical Licence No: 21/57/12/0062 Details: Process Water Direct Source: EAW Groundwater Point: BOREHOLE AT CLARKSON KNITTING LTD, WESTERN IND. EST. Data Type: Point Name: Clarkson Knitting Limited Easting: 314170 Northing: 186570	Annual Volume (m^3): 63637 Max Daily Volume (m^3): 181.82 Original Application No: - Original Start Date: 18/07/1974 Expiry Date: - Issue No: 101 Version Start Date: 01/12/2000 Version End Date: -
-	1755m E	Status: Historical Licence No: 15/47/010/G/105 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: TREGRAY VILLA WELL Data Type: Point Name: Mr P R & Mrs M A Bradley & Mr G P & Mrs K E Bradley Easting: 317020 Northing: 188330	Annual Volume (m^3): 35040 Max Daily Volume (m^3): 96 Original Application No: - Original Start Date: 14/10/2008 Expiry Date: 31/03/2026 Issue No: 101 Version Start Date: 14/10/2008 Version End Date: -

ID	Location	Details	
-	1807m E	Status: Historical Licence No: 15/47/010/G/105 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: TREGRAY VILLA BOREHOLE Data Type: Point Name: Mr P R & Mrs M A Bradley & Mr G P & Mrs K E Bradley Easting: 317080 Northing: 188310	Annual Volume (m^3): 35040 Max Daily Volume (m^3): 96 Original Application No: - Original Start Date: 14/10/2008 Expiry Date: 31/03/2026 Issue No: 101 Version Start Date: 14/10/2008 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**0**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	**0**

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	**0**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

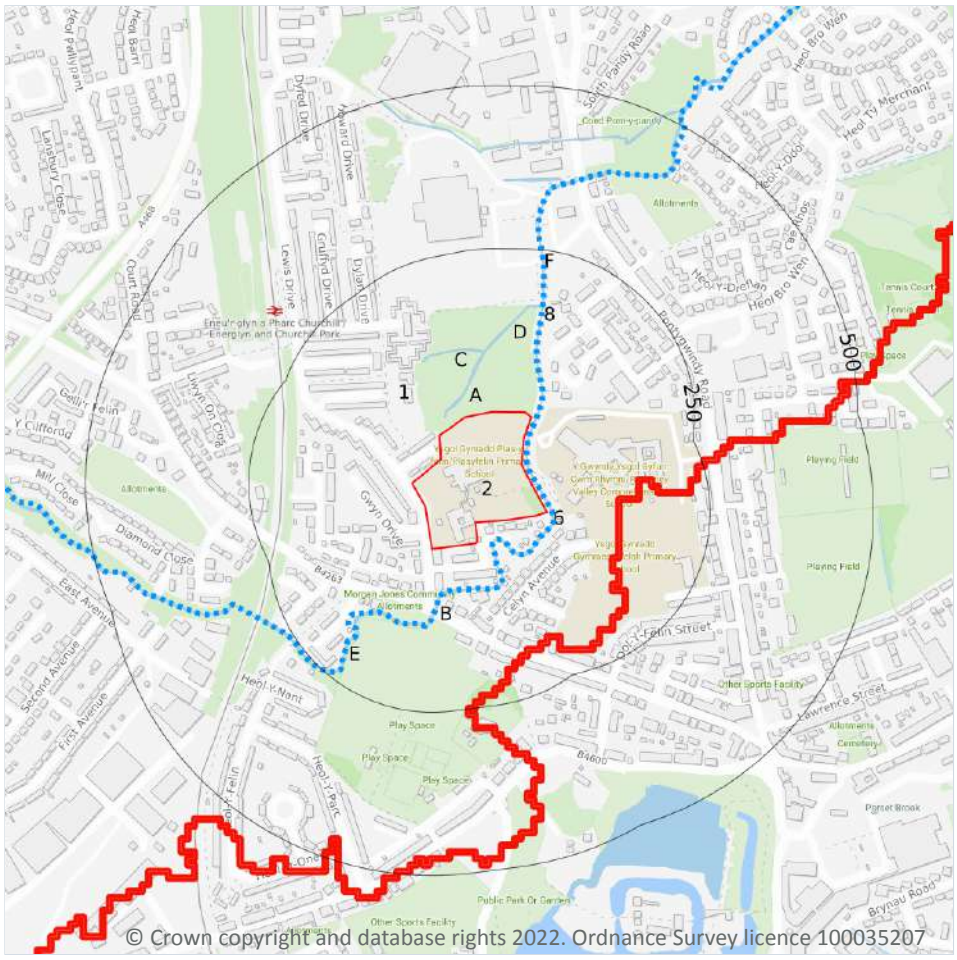
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	10

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Type of water feature	Ground level	Permanence	Name
6	5m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber

ID	Location	Type of water feature	Ground level	Permanence	Name
A	17m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	86m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	87m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber
C	92m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	92m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	93m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber
E	103m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber
8	165m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	166m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Nant yr Aber

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**6**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 59**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**River WB catchment**	**Nant y Aber - source to conf Rhymney R**	**GB109057027170**	**Rhymney**	**South East Valleys**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
5	6m NE	River	Nant y Aber - source to conf Rhymney R	GB109057027170	Good	Good	Good	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

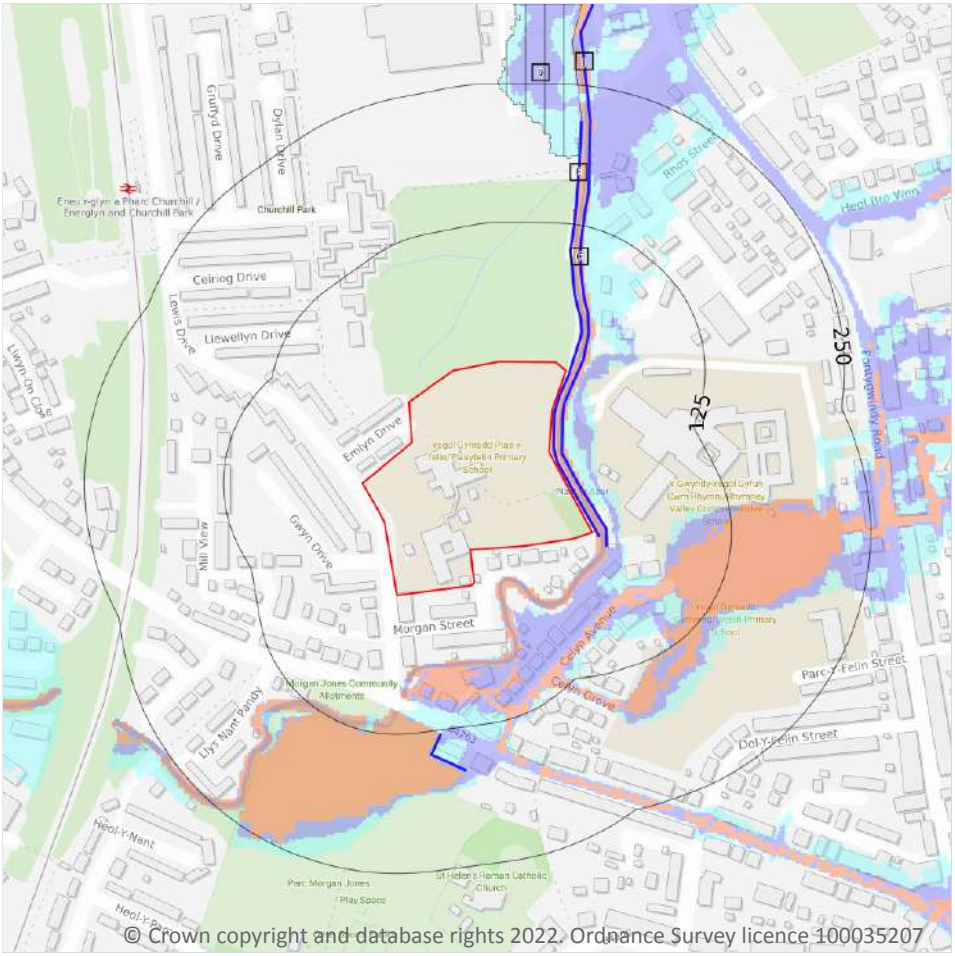
Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place.

Features are displayed on the Hydrology map on **page 59**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
2	**On site**	**SE Valleys Carboniferous Coal Measures**	**GB40902G201900**	**Poor**	**Poor**	**Good**	**2017**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



7.1 Risk of flooding from rivers and the sea

Records within 50m	80

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 63**

Distance	Flood risk category
On site	**High**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	**0**

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	**9**

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

Features are displayed on the River and coastal flooding map on **page 63**

ID	Location	Update
A	2m NE	27/05/2022
A	8m NE	27/05/2022
A	10m E	27/05/2022
A	39m NE	27/05/2022
C	64m NE	27/05/2022
E	127m N	27/05/2022
A	128m S	27/05/2022
E	135m NE	27/05/2022
J	220m N	27/05/2022

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	4

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 63**

ID	Location	
E	127m N	Area benefiting from flood defences
E	158m N	Area benefiting from flood defences
E	174m N	Area benefiting from flood defences
9	184m N	Area benefiting from flood defences

This data is sourced from the Environment Agency and Natural Resources Wales.

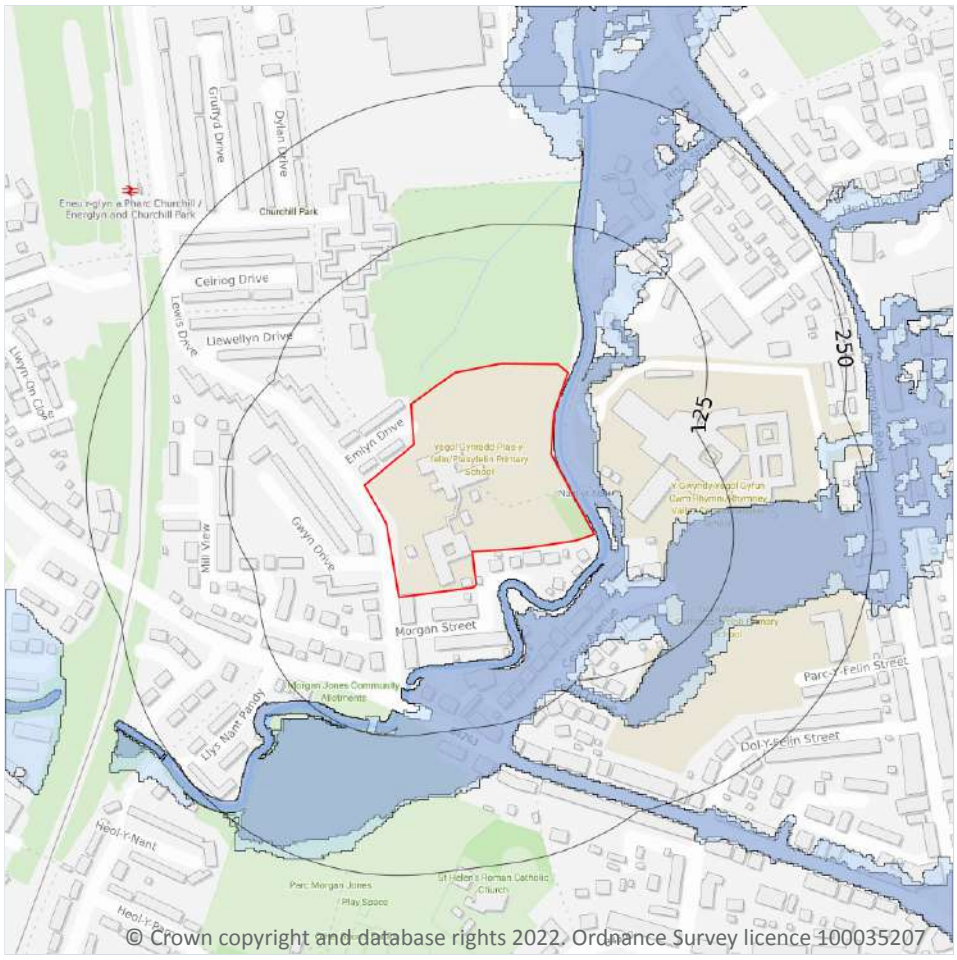
7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 63**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

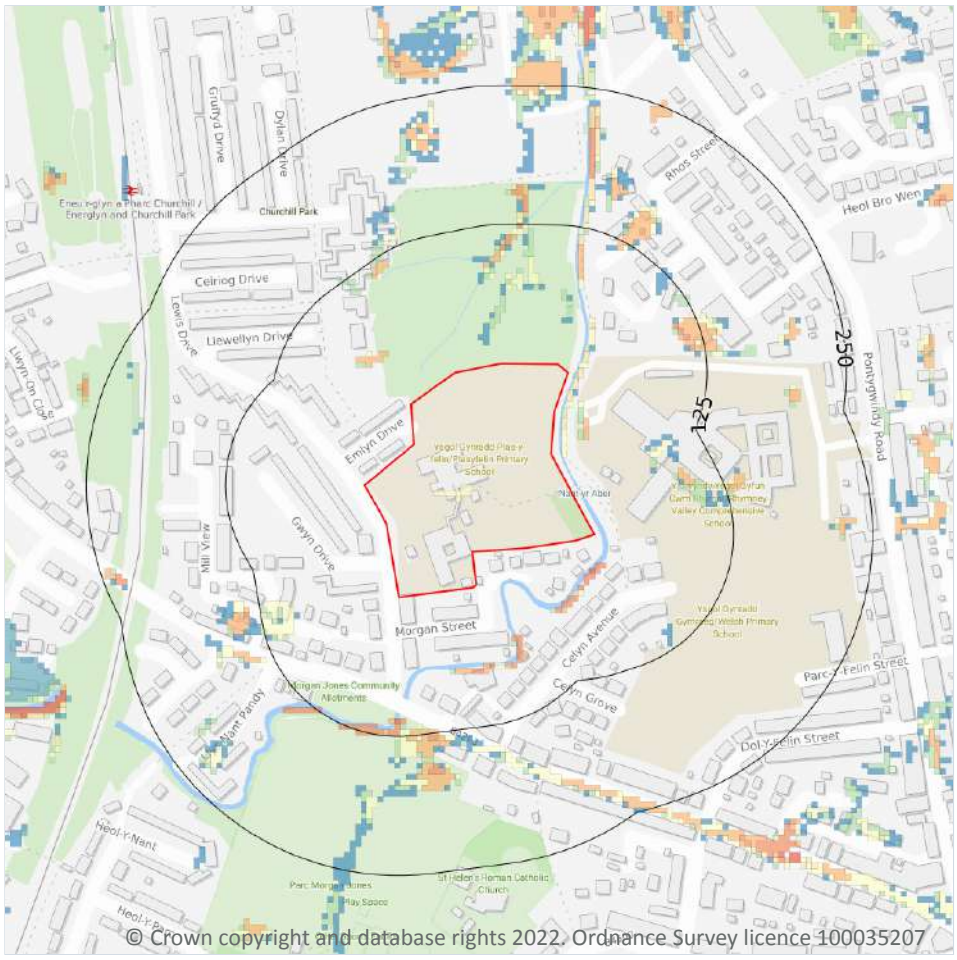
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 63**

Location	Type
On site	**Zone 3 - (Fluvial Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



8.1 Surface water flooding

Highest risk on site	**1 in 100 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, Greater than 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 68**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding

9.1 Groundwater flooding

Highest risk on site	**Low**
Highest risk within 50m	**Moderate**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 70**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

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Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	3

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 71**

ID	Location	Name	Data source
-	1372m W	GWAUN GLEDYR	Natural Resources Wales

ID	Location	Name	Data source
-	1644m N	LLANBRADACH QUARRY	Natural Resources Wales
-	1937m SW	GWAUN GLEDYR	Natural Resources Wales

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	41

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 71**

ID	Location	Name	Woodland Type
1	387m NE	Unknown	Ancient Semi Natural Woodland
2	537m N	Unknown	Ancient Semi Natural Woodland
3	553m W	Unknown	Ancient Semi Natural Woodland
4	562m NW	Unknown	Ancient Semi Natural Woodland
5	704m W	Unknown	Ancient Semi Natural Woodland
6	721m N	Unknown	Ancient Woodland Site of Unknown Category
7	758m NE	Unknown	Ancient Semi Natural Woodland
A	808m N	Unknown	Ancient Woodland Site of Unknown Category
8	845m NE	Unknown	Ancient Semi Natural Woodland
A	863m N	Unknown	Ancient Semi Natural Woodland
A	879m N	Unknown	Ancient Semi Natural Woodland
9	1081m W	Unknown	Ancient Semi Natural Woodland
10	1144m W	Unknown	Ancient Semi Natural Woodland
11	1151m NE	Unknown	Ancient Semi Natural Woodland

ID	Location	Name	Woodland Type
B	1164m NE	Unknown	Ancient Semi Natural Woodland
B	1212m NE	Unknown	Ancient Semi Natural Woodland
12	1272m NE	Unknown	Ancient Semi Natural Woodland
-	1360m N	Unknown	Restored Ancient Woodland Site
-	1463m E	Unknown	Ancient Semi Natural Woodland
-	1473m N	Unknown	Ancient Semi Natural Woodland
-	1485m S	Unknown	Ancient Semi Natural Woodland
-	1551m SE	Unknown	Plantation on Ancient Woodland Site
-	1555m W	Unknown	Ancient Semi Natural Woodland
-	1600m NW	Unknown	Ancient Semi Natural Woodland
-	1612m E	Unknown	Ancient Semi Natural Woodland
-	1619m S	Unknown	Ancient Semi Natural Woodland
-	1649m E	Unknown	Ancient Semi Natural Woodland
-	1720m SW	Unknown	Ancient Semi Natural Woodland
-	1720m W	Unknown	Ancient Semi Natural Woodland
-	1721m S	Unknown	Plantation on Ancient Woodland Site
-	1744m N	Unknown	Ancient Semi Natural Woodland
-	1766m SE	Unknown	Ancient Semi Natural Woodland
-	1780m S	Unknown	Plantation on Ancient Woodland Site
-	1798m SE	Unknown	Ancient Semi Natural Woodland
-	1848m SE	Unknown	Plantation on Ancient Woodland Site
-	1873m SE	Unknown	Plantation on Ancient Woodland Site
-	1874m E	Unknown	Ancient Semi Natural Woodland
-	1881m E	Unknown	Ancient Semi Natural Woodland
-	1965m N	Unknown	Ancient Semi Natural Woodland
-	1981m NW	Unknown	Ancient Semi Natural Woodland
-	1983m W	Unknown	Restored Ancient Woodland Site

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units

10.17 SSSI Impact Risk Zones

Records on site	0

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	1

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 78**

ID	Location	Name	Grade	Reference Number	Listed date
1	157m E	St Ilan Comprehensive School, Set back from Pontygwindy Road to the N of the town centre.	II	21384	18/02/1999

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations

12.1 Agricultural Land Classification

Records within 250m	0

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

This data is sourced from Natural Resources Wales.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m	0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

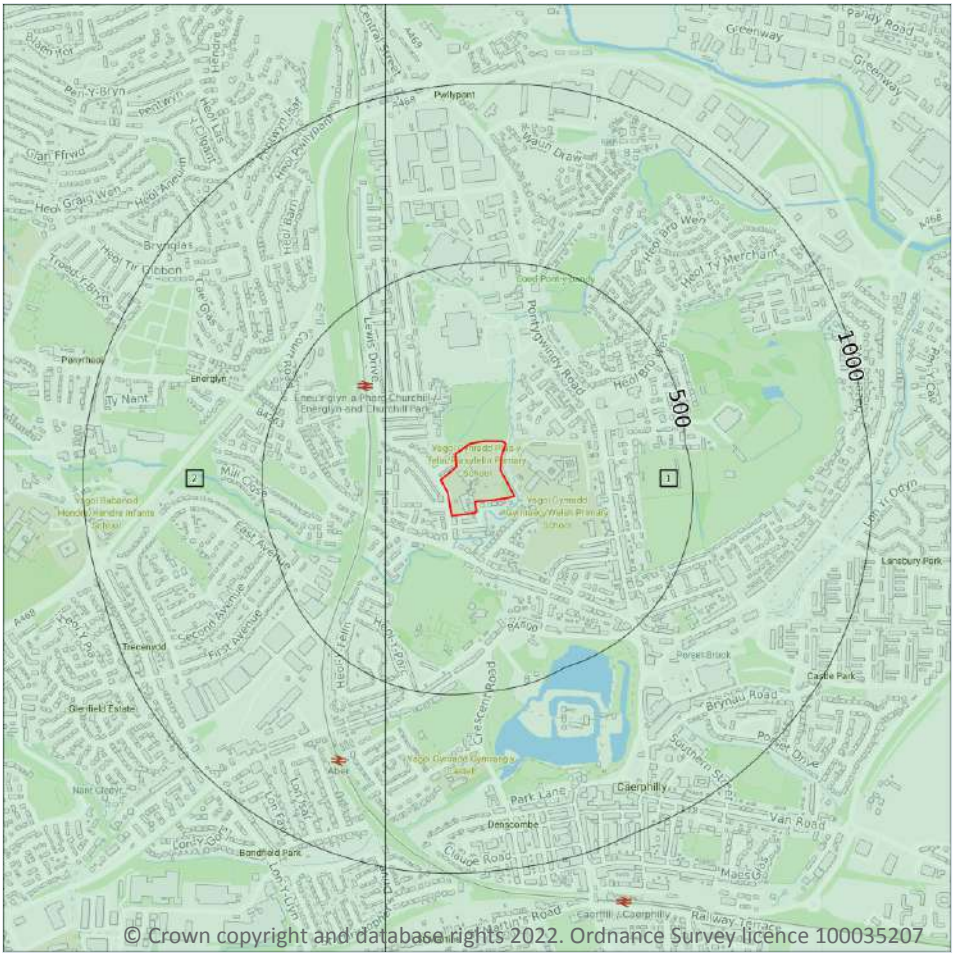
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 84**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**No coverage**	**ST18NE**
2	153m W	No coverage	Full	Full	Full	ST18NW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

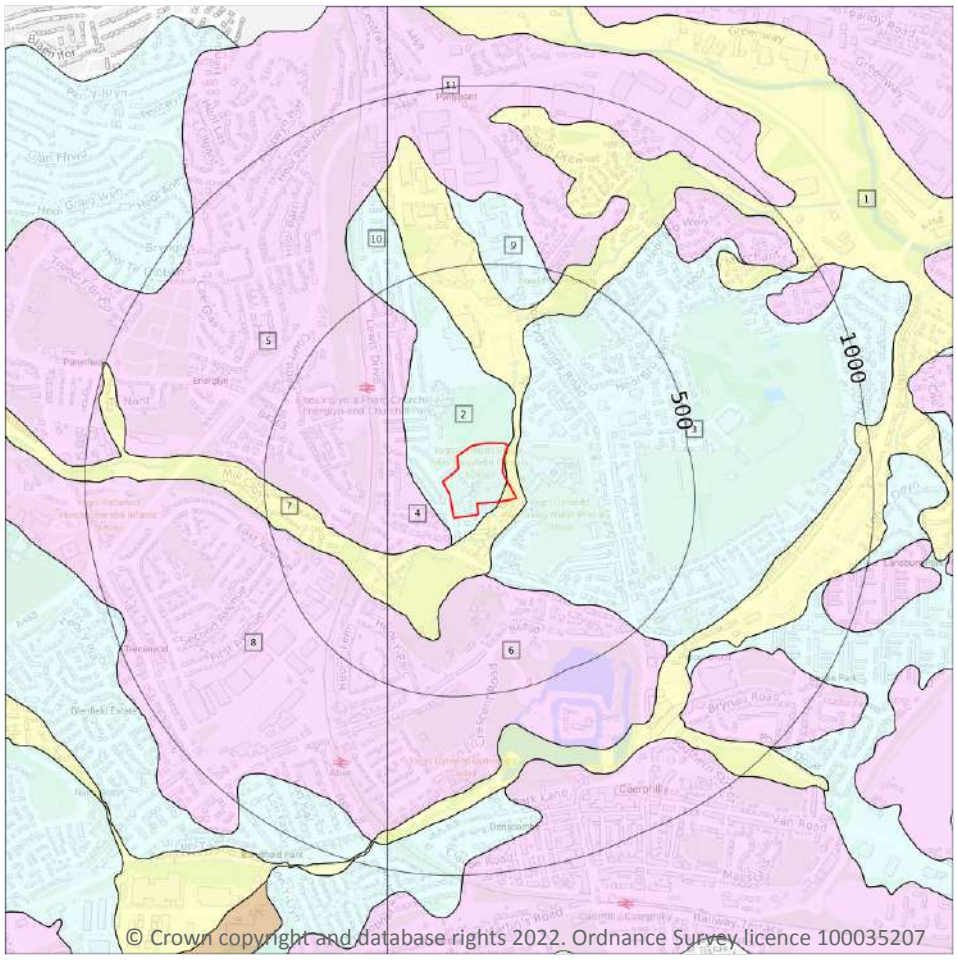
14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **11**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 86**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALV-XCZSV**	**Alluvium - Clay, Silt, Sand And Gravel**	**Clay, Silt, Sand And Gravel**
2	**On site**	**TILLD-DMTN**	**Till, Devensian - Diamicton**	**Diamicton**
3	24m E	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton

ID	Location	LEX Code	Description	Rock description
4	31m SW	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
5	153m W	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
6	168m S	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
7	210m SW	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
8	305m SW	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
9	378m N	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
10	461m NW	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
11	468m N	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

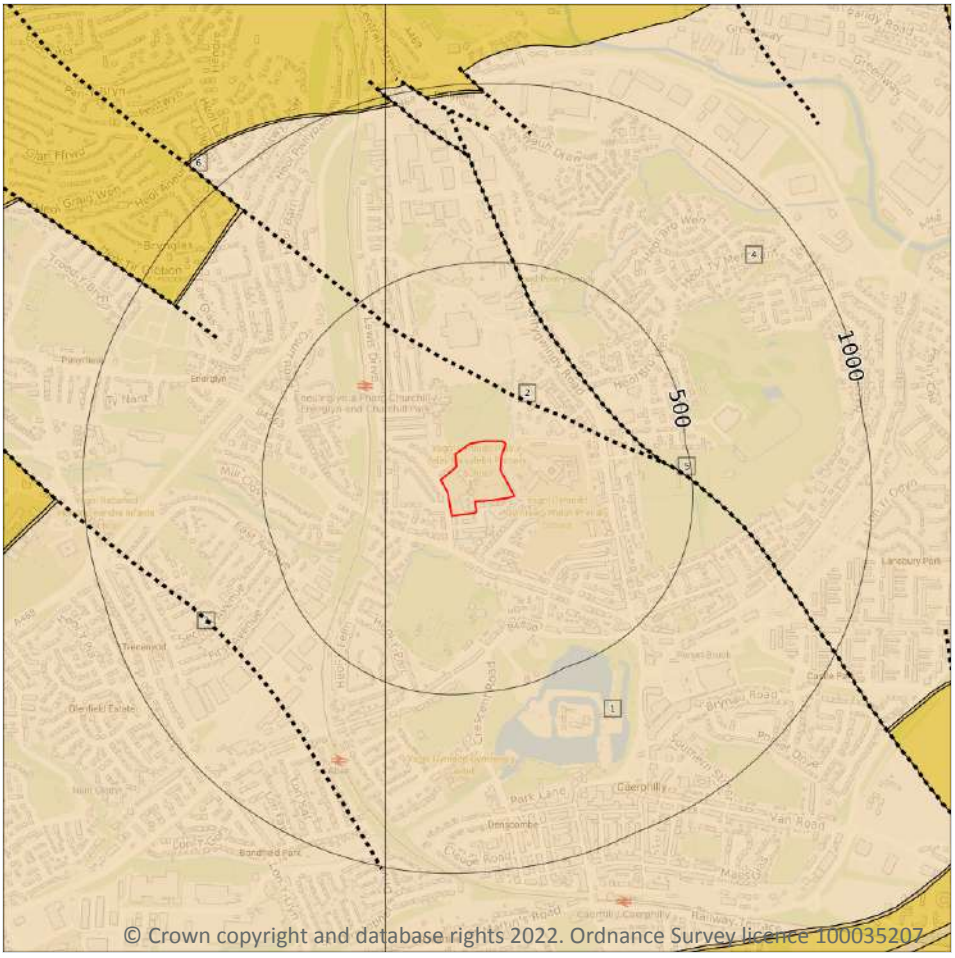
14.4 Landslip (10k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **3**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 88**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**GDB-MDSS**	**Grovesend Formation - Mudstone, Siltstone And Sandstone**	**Westphalian D Sub-age**
3	153m W	GDB-MDSS	Grovesend Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age
4	281m NE	GDB-MDSS	Grovesend Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	**3**

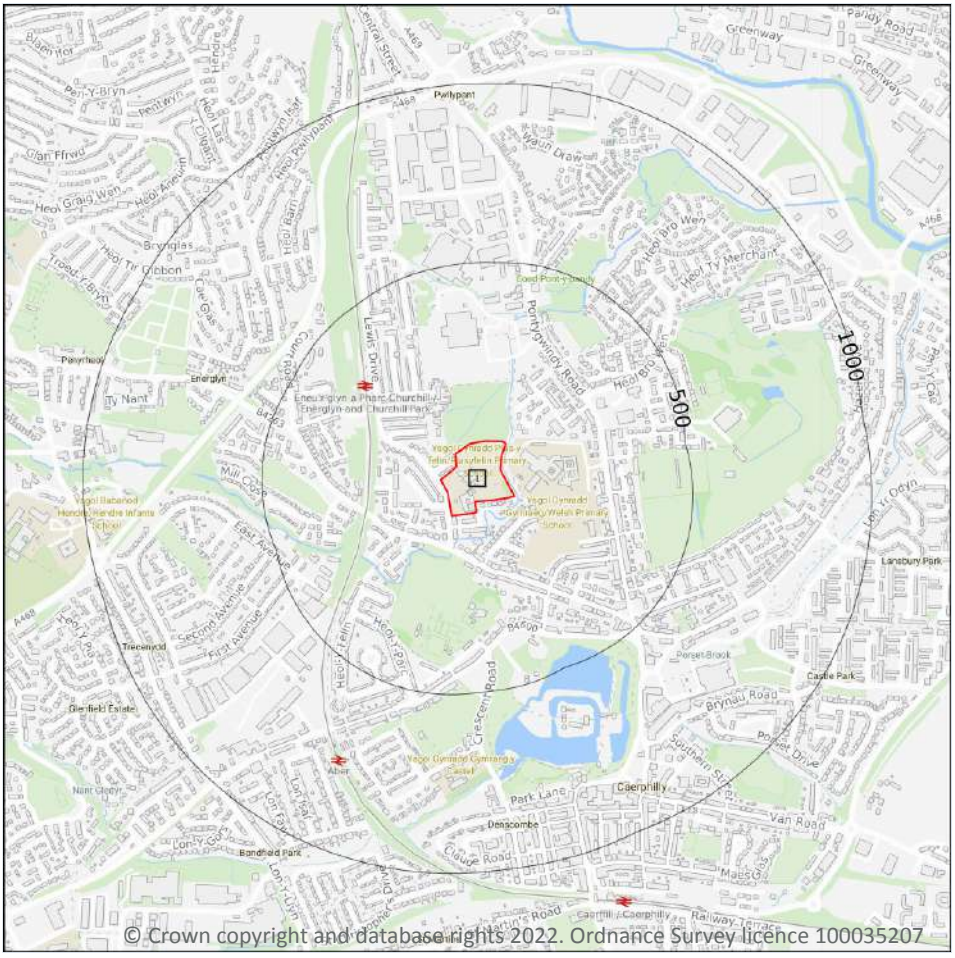
Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 88**

ID	Location	Category	Description
2	130m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
5	281m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
6	408m NW	FAULT	Normal fault, inferred; crossmarks on downthrow side

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme. Where 50k data is not available, this area has been filled in with 625k scale data.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 90**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW249_newport_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

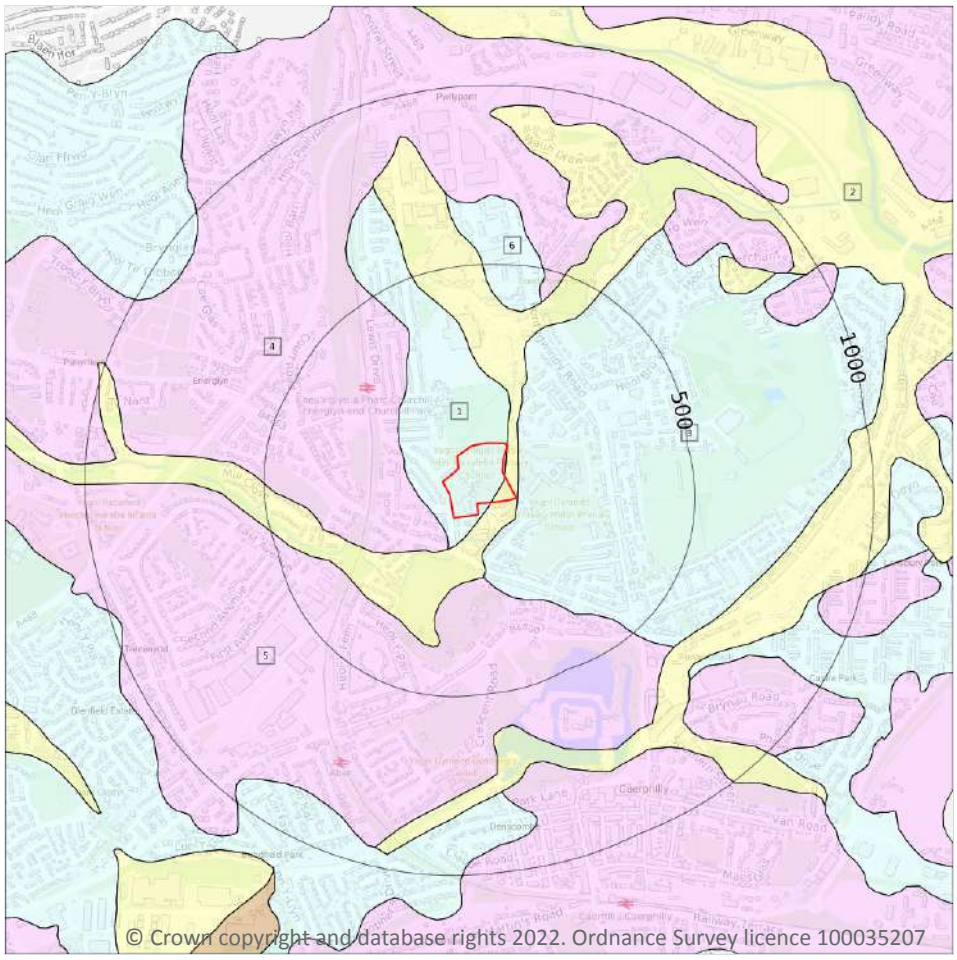
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **6**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 92**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**TILL, DEVENSIAN**	**DIAMICTON**
2	**On site**	**ALV-XCZSV**	**ALLUVIUM**	**CLAY, SILT, SAND AND GRAVEL**
3	3m SE	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

ID	Location	LEX Code	Description	Rock description
4	40m SW	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
5	176m S	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
6	371m N	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	**4**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**High**	**Very Low**
On site	**Mixed**	**High**	**Low**
3m SE	Mixed	High	Low
40m SW	Intergranular	Very High	High

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

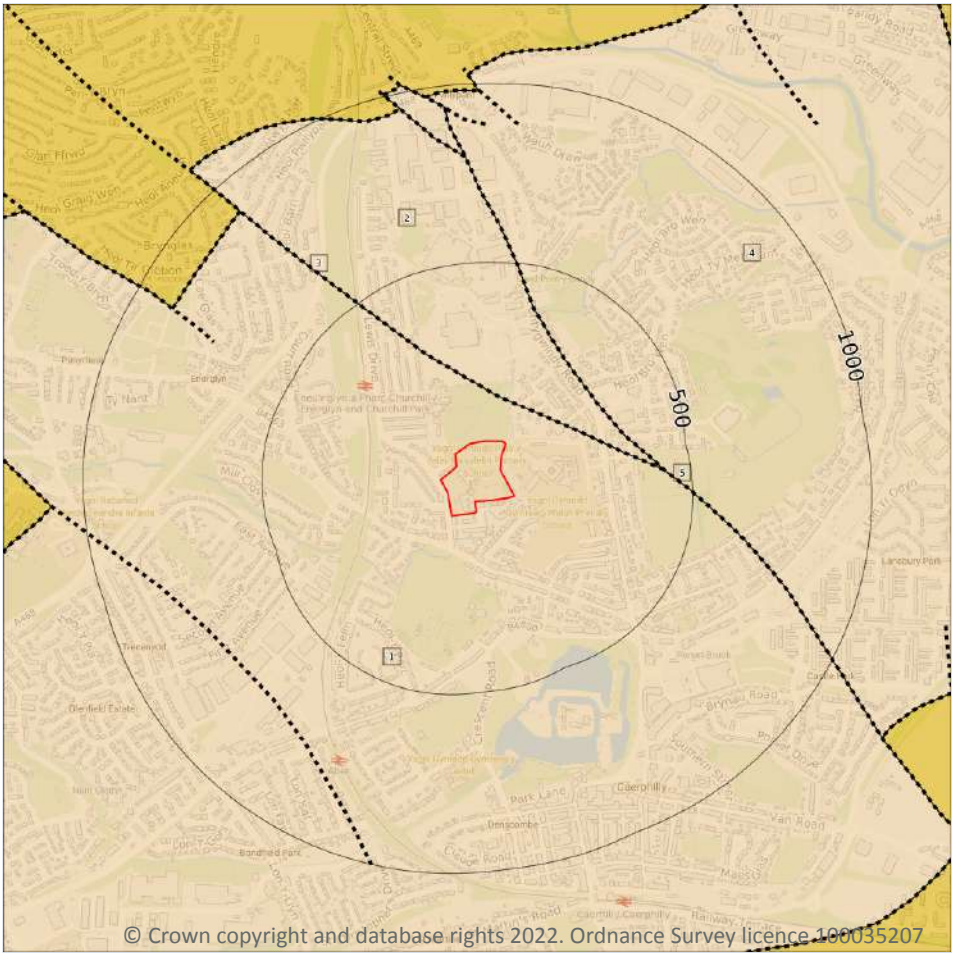
15.7 Landslip permeability (50k)

Records within 50m	**0**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m **3**

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 94**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**GDB-MDSS**	**GROVESEND FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE**	**WESTPHALIAN**
2	111m NE	GDB-MDSS	GROVESEND FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

ID	Location	LEX Code	Description	Rock age
4	273m NE	GDB-MDSS	GROVESEND FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Moderate**	**Low**

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	**2**

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 94**

ID	Location	Category	Description
3	111m NE	FAULT	Fault, inferred, displacement unknown
5	273m NE	FAULT	Fault, inferred, displacement unknown

This data is sourced from the British Geological Survey.

16 Boreholes

16.1 BGS Boreholes

Records within 250m	4

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

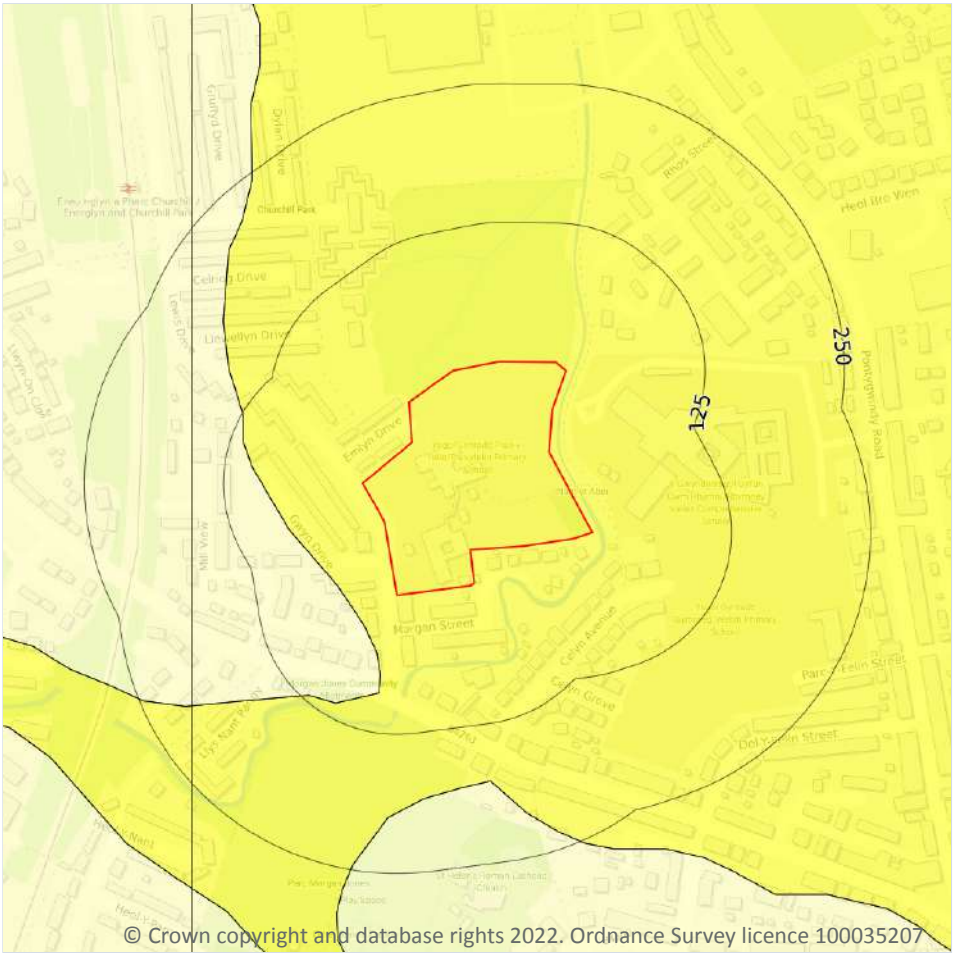
Features are displayed on the Boreholes map on **page 96**

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	238m SW	314970 187530	MILL ROAD BUS DEPT EXTN. 3	8.0	N	380739
A	238m SW	314970 187530	MILL ROAD BUS DEPT EXTN. 1	5.0	N	380737
A	238m SW	314970 187530	MILL ROAD BUS DEPT EXTN. 4	8.0	N	380740

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	238m SW	314970 187530	MILL ROAD BUS DEPT EXTN. 2	7.4	N	380738

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	2

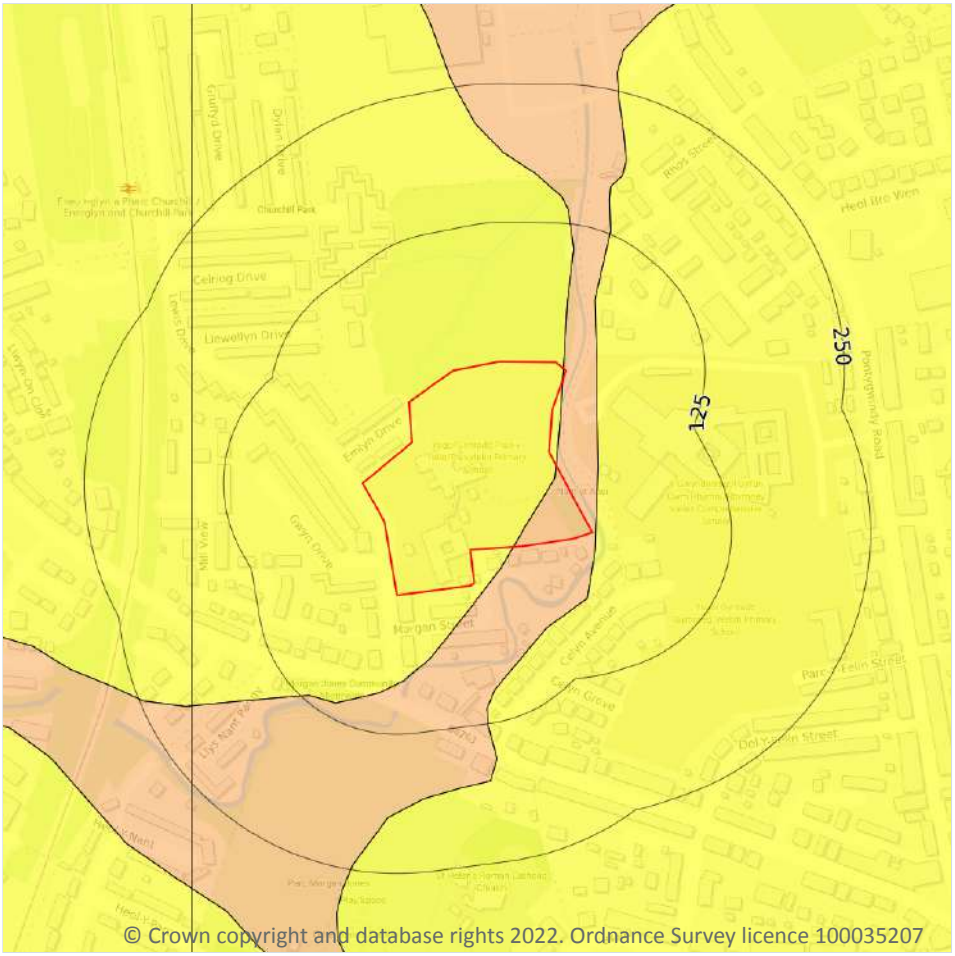
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 98**

Location	Hazard rating	Details
On site	**Very low**	**Ground conditions predominantly low plasticity.**
40m SW	Negligible	Ground conditions predominantly non-plastic.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	3

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

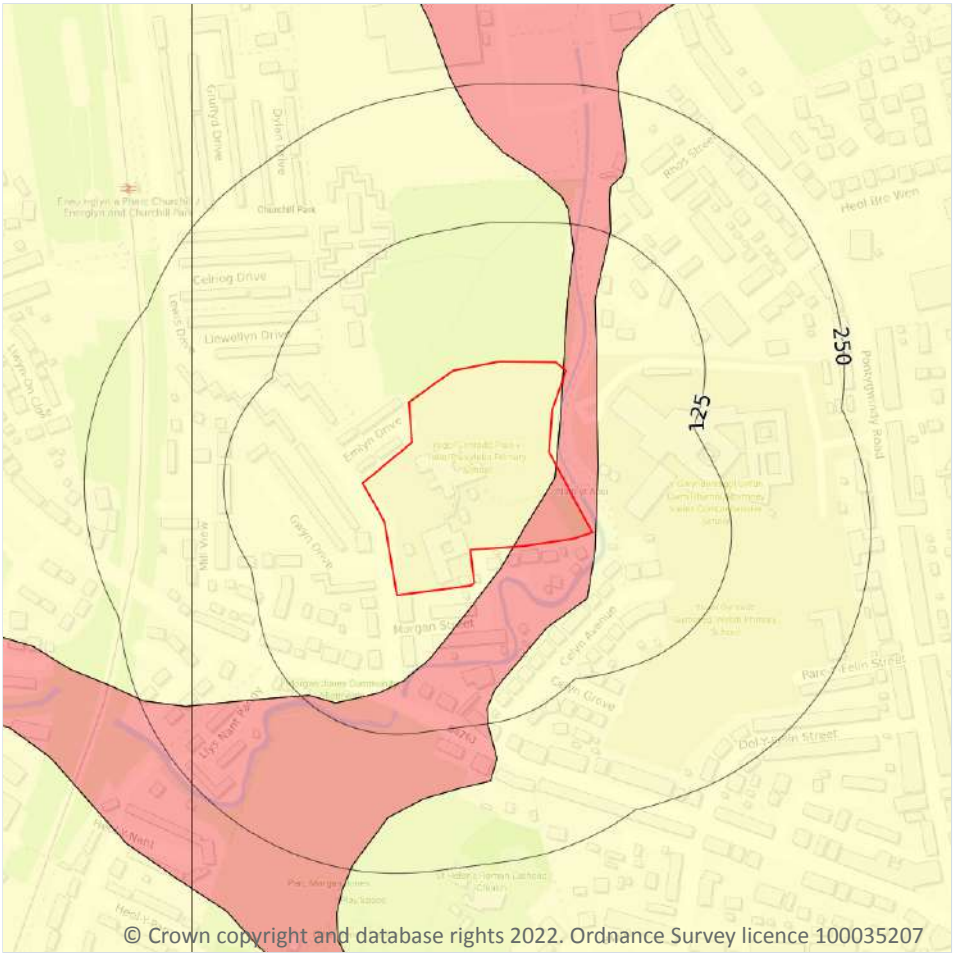
Features are displayed on the Natural ground subsidence - Running sands map on **page 99**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
On site	**Low**	**Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.**
3m SE	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	3

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

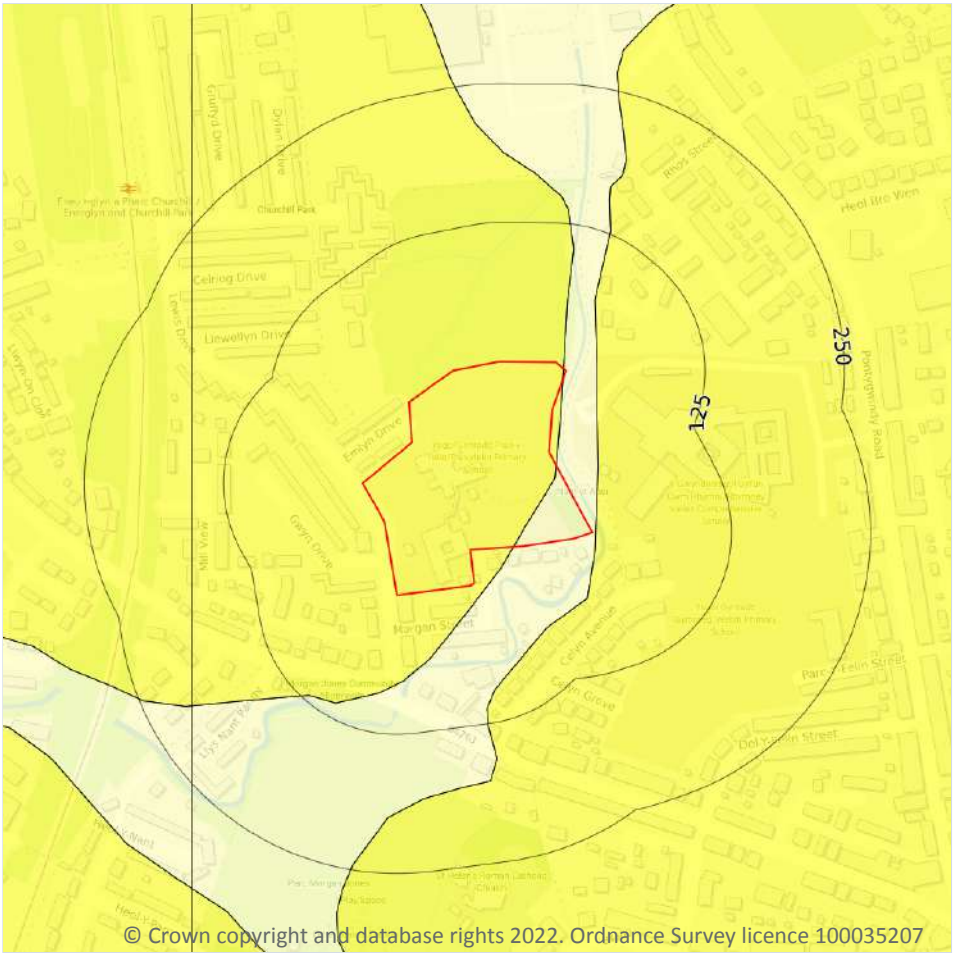
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 101**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**

Location	Hazard rating	Details
3m SE	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	3

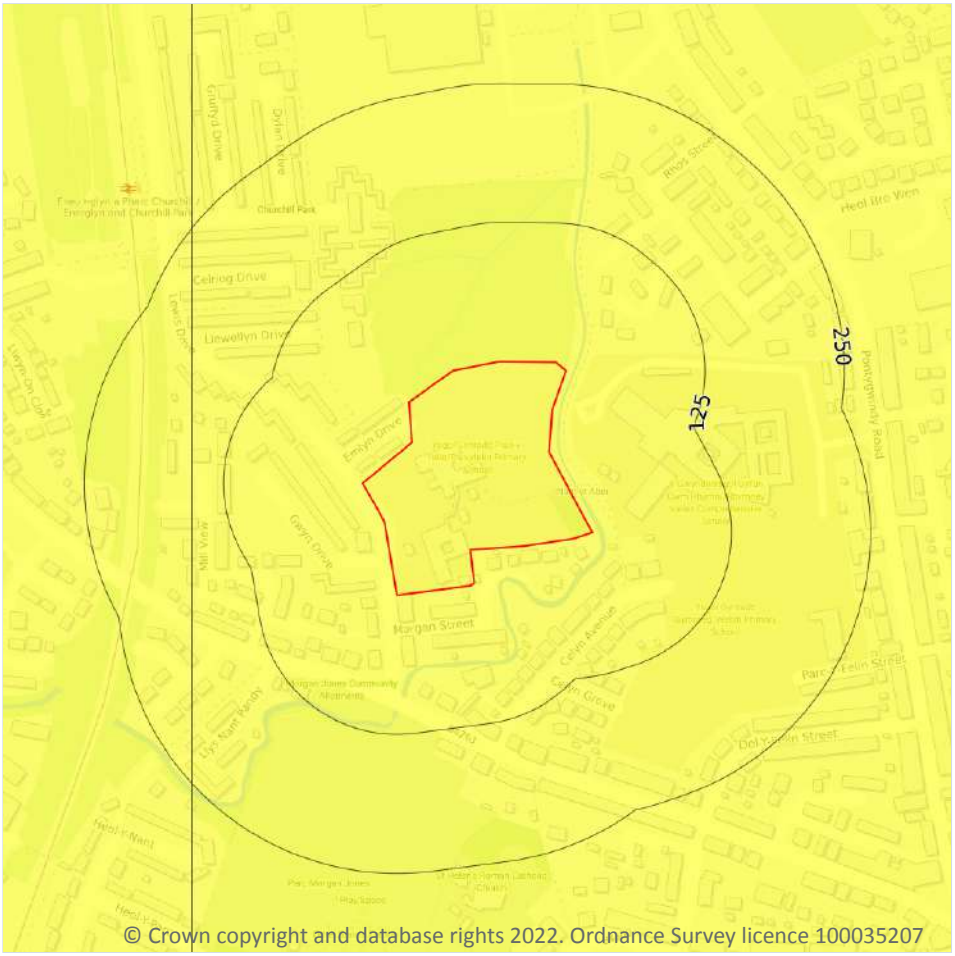
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 103**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**
3m SE	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



17.5 Landslides

Records within 50m	1

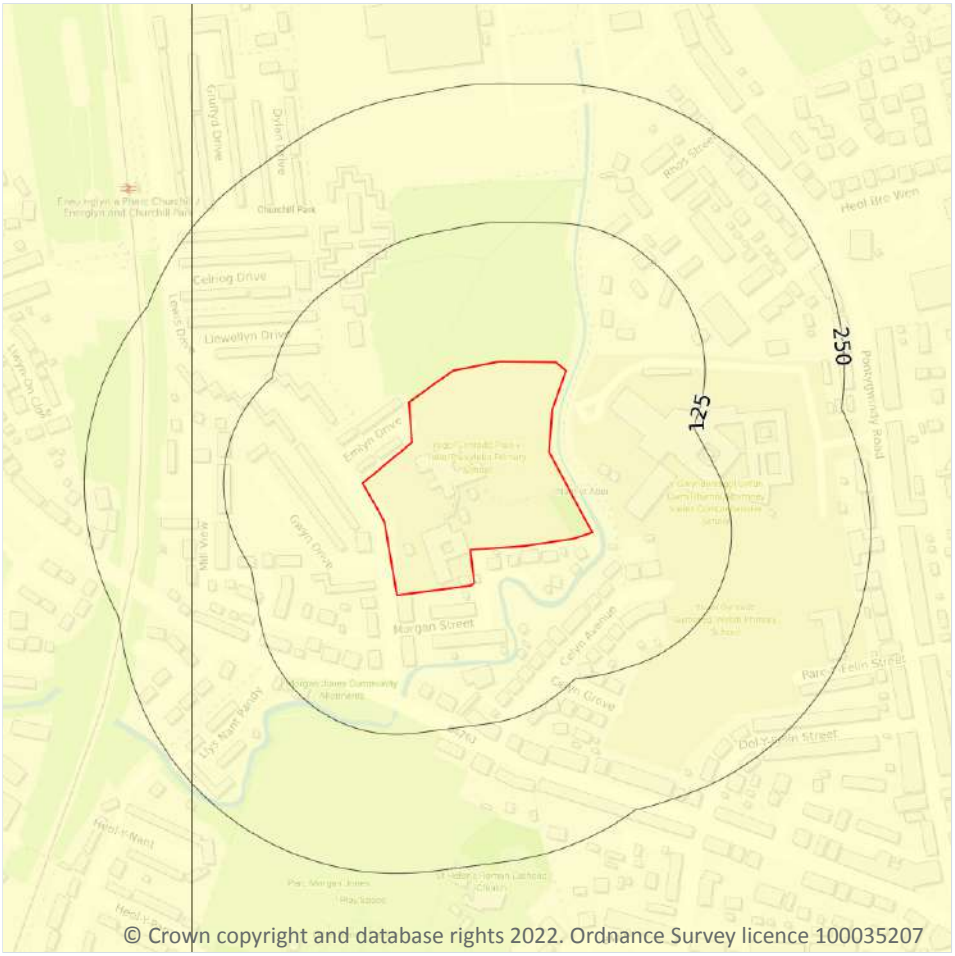
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 105**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m	1

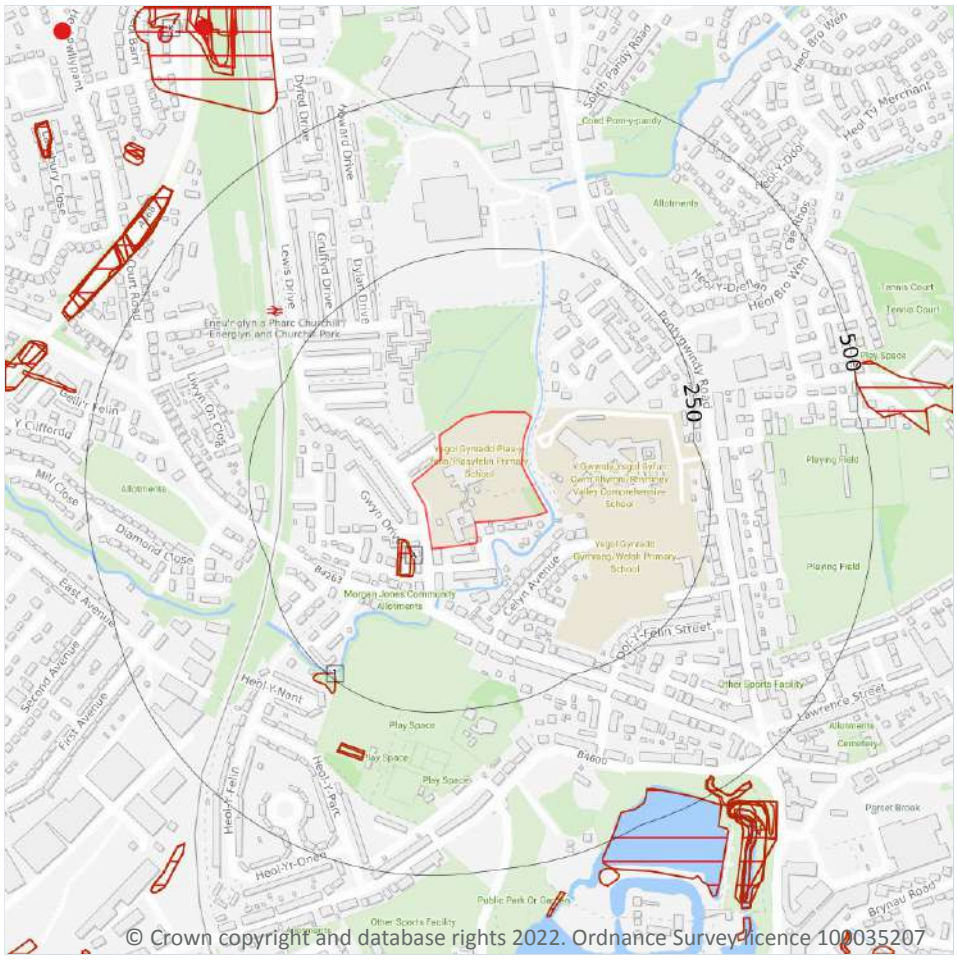
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 106**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities

Non Coal Mining

- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	3

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 108**

ID	Location	Land Use	Year of mapping	Mapping scale
A	31m SW	Pond	1899	1:10560
A	34m SW	Pond	1875	1:10560
1	243m SW	Unspecified Pit	1969	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	20

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining, ground workings and natural cavities map on **page 108**

ID	Location	Land Use	Year of mapping	Mapping scale
I	641m NW	Disused Colliery	1898	1:10560
-	668m W	Disused Colliery	1948	1:10560
-	668m W	Disused Colliery	1915	1:10560
-	668m W	Disused Colliery	1922	1:10560
K	733m NW	Old Coal Level	1898	1:10560
-	806m W	Disused Colliery	1899	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
-	810m W	Colliery	1875	1:10560
-	844m SW	Old Coal Shafts	1915	1:10560
-	844m SW	Old Coal Shafts	1922	1:10560
O	845m NW	Old Coal Shaft	1898	1:10560
-	854m W	Unspecified Old Shaft	1915	1:10560
-	854m W	Unspecified Old Shaft	1922	1:10560
-	861m W	Unspecified Shaft	1875	1:10560
-	880m NW	Unspecified Shaft	1875	1:10560
-	976m NW	Unspecified Old Shaft	1948	1:10560
-	977m NW	Air Shaft	1875	1:10560
-	978m NW	Air Shaft	1898	1:10560
-	978m NW	Old Air Shaft	1922	1:10560
-	980m NW	Old Air Shaft	1915	1:10560
-	997m E	Disused Colliery	1899	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	**0**

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	**0**

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	1

Areas which could be affected by past, current or future coal mining.

Location	Details
On site	**The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.**

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

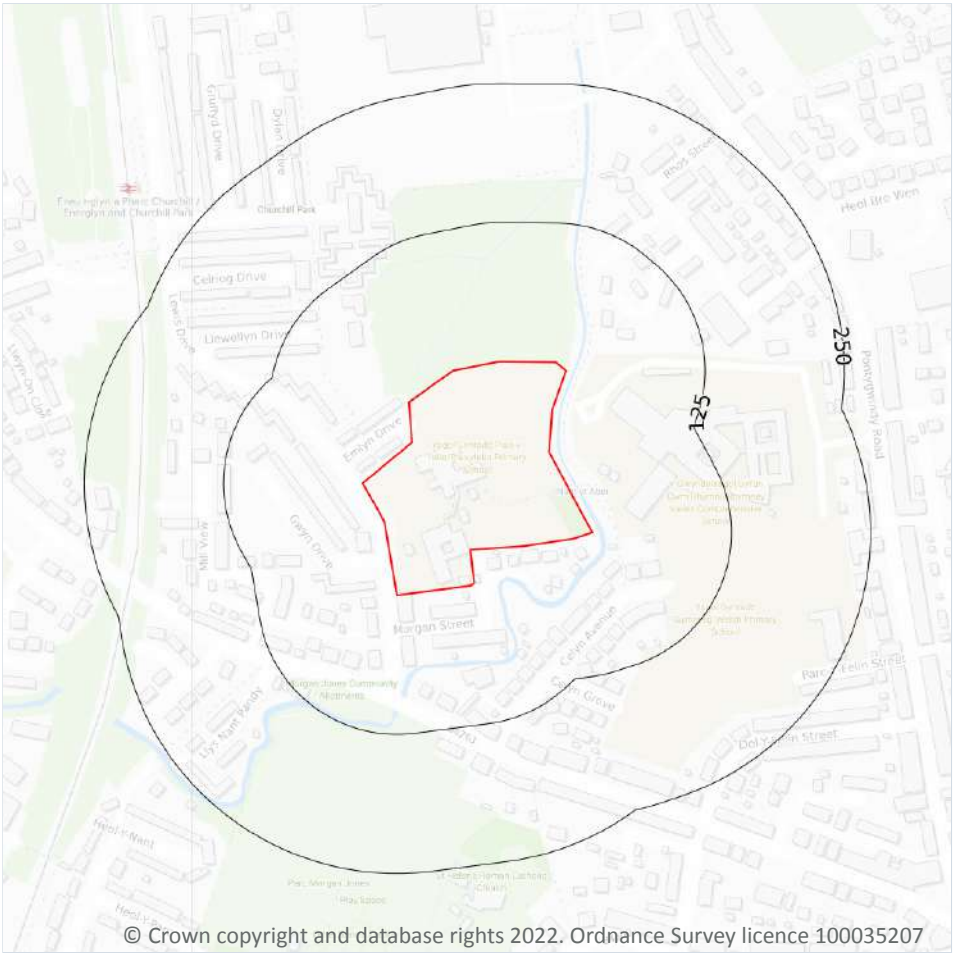
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 113**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None**

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	4

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
3m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
40m SW	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

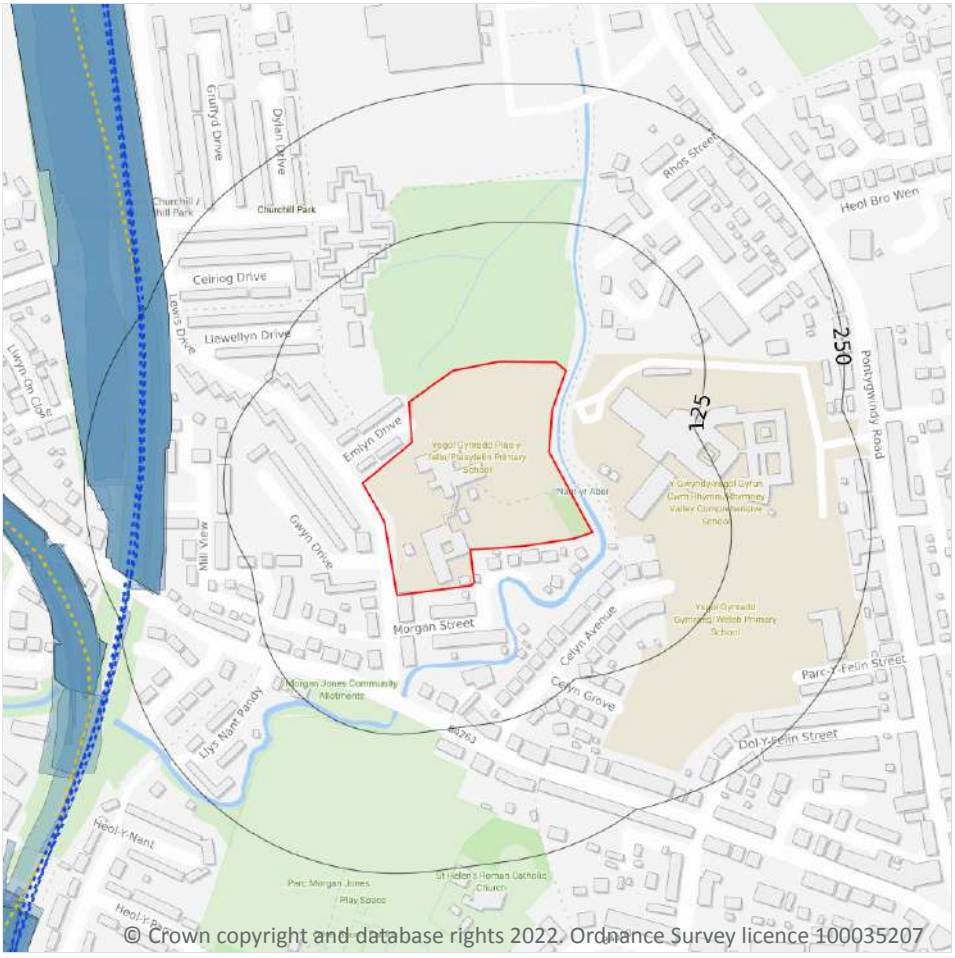
20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	9

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 115**

Location	Land Use	Year of mapping	Mapping scale
176m W	Railway	1889	-
176m W	Railway Sidings	1947	10560
177m W	Railway Sidings	1948	10560
177m W	Railway Sidings	1915	10560
177m W	Railway Sidings	1922	10560
188m W	Railway Sidings	1937	2500
216m W	Railway Sidings	1920	2500
216m W	Railway Sidings	1937	2500
238m W	Railway Sidings	1900	2500

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	7

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

Features are displayed on the Railway infrastructure and projects map on **page 115**

Location	Name	Type
197m W	Rhymney Line	rail
200m W	Not given	Multi Track
201m W	Rhymney Line	rail
224m W		rail
227m W	Rhymney Line	rail
234m W	Rhymney Line	rail
238m W	Rhymney Line	rail

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

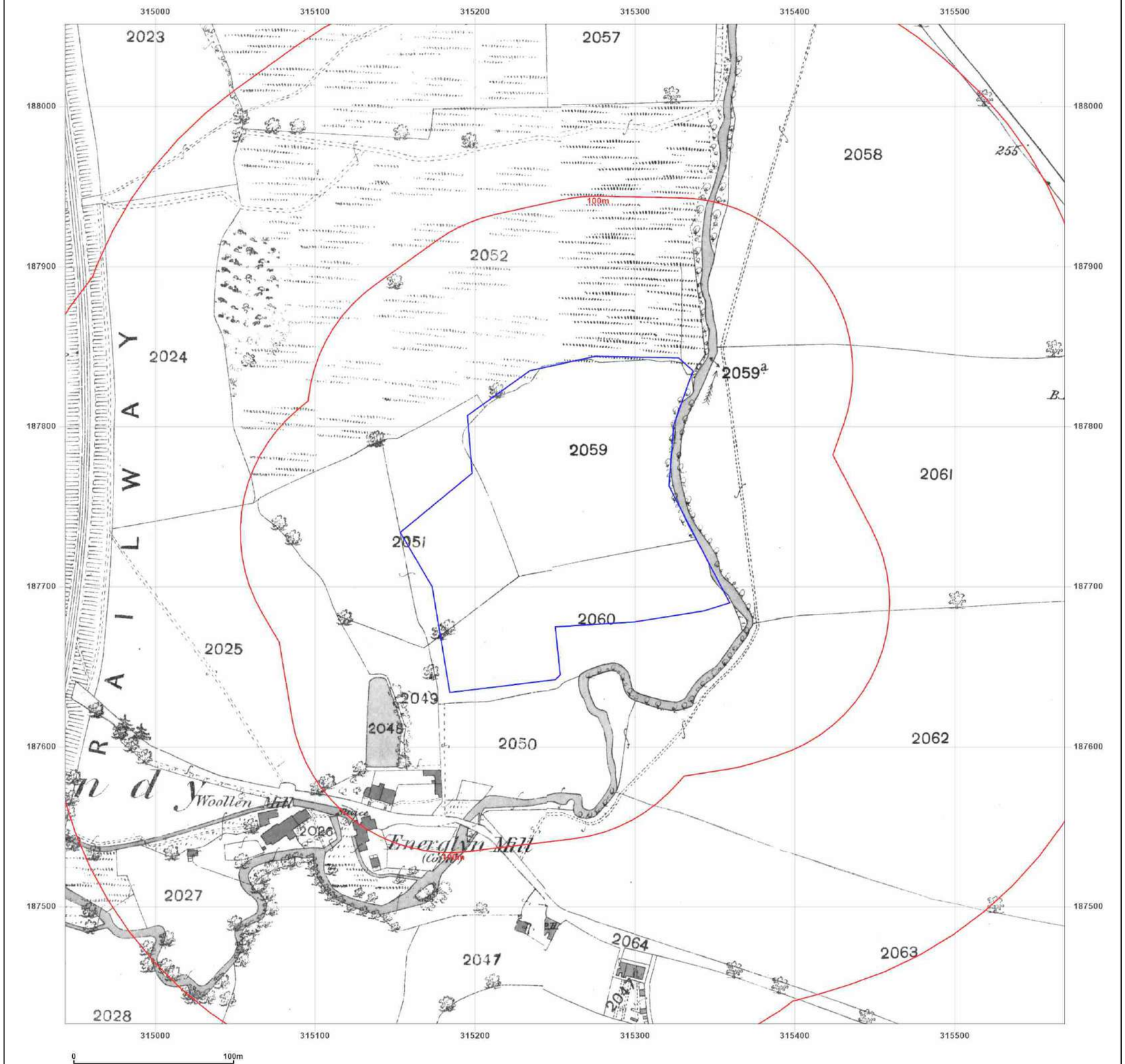
This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/.



Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series
Map date: **1876**
Scale: 1:2,500
Printed at: 1:2,500

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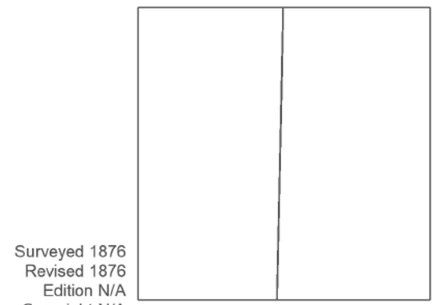

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Production date: 05 December 2022

Map legend available at:
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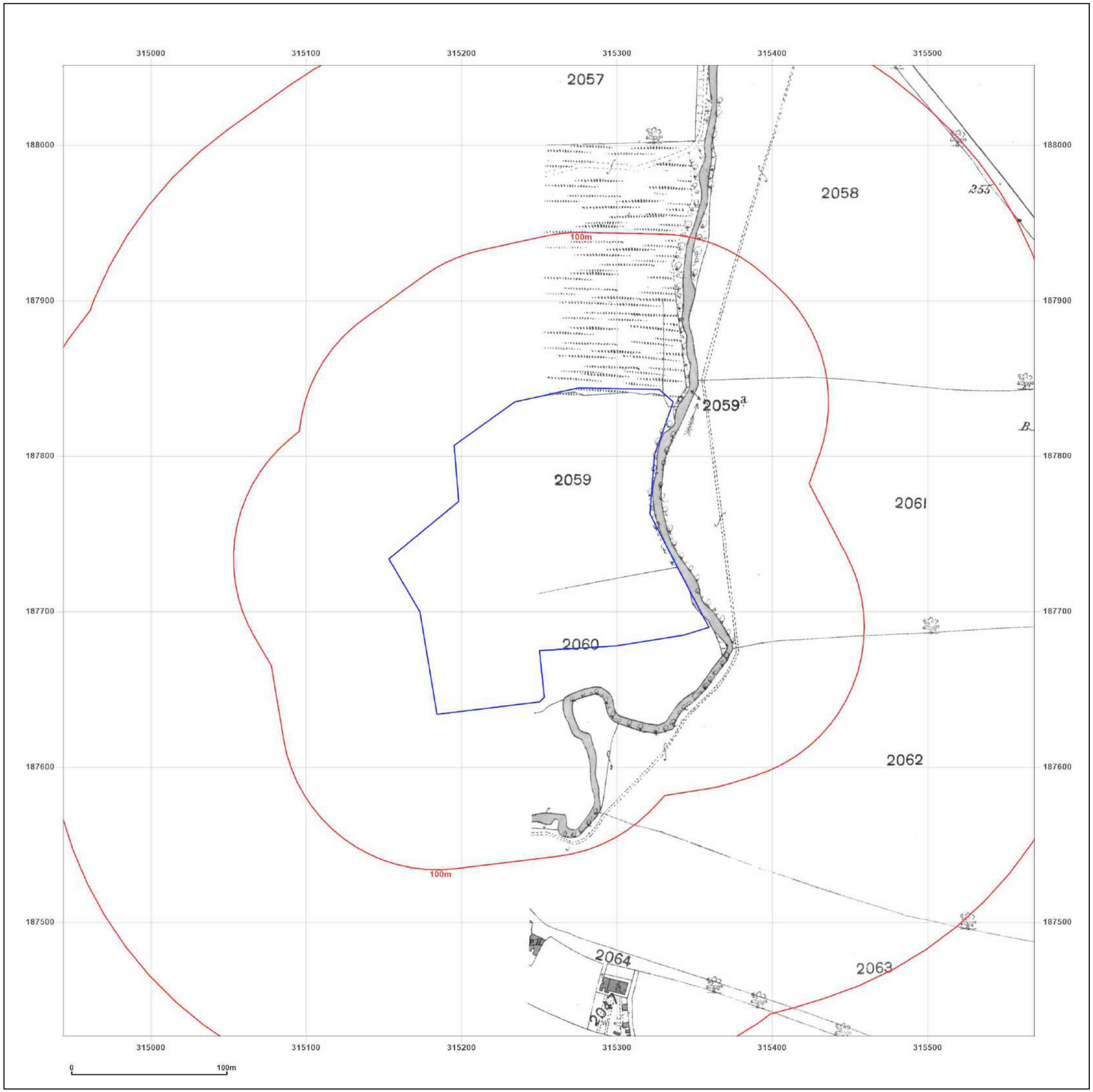

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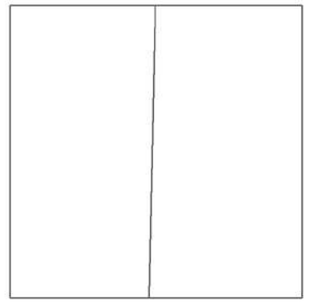

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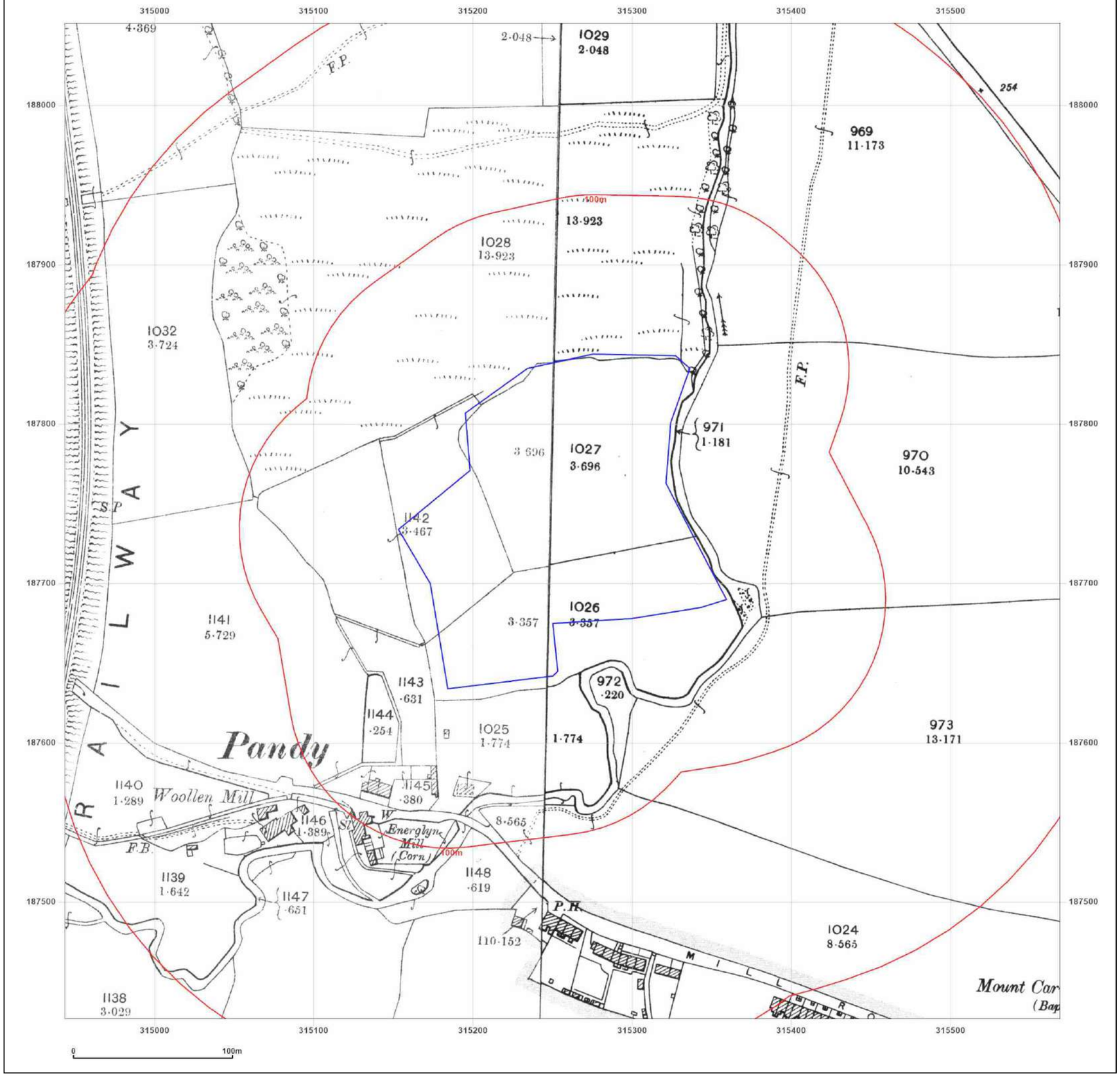

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

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Scale: 1:2,500
Printed at: 1:2,500

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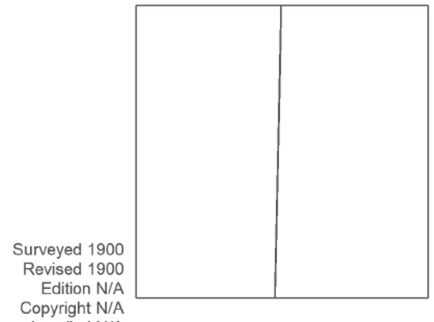

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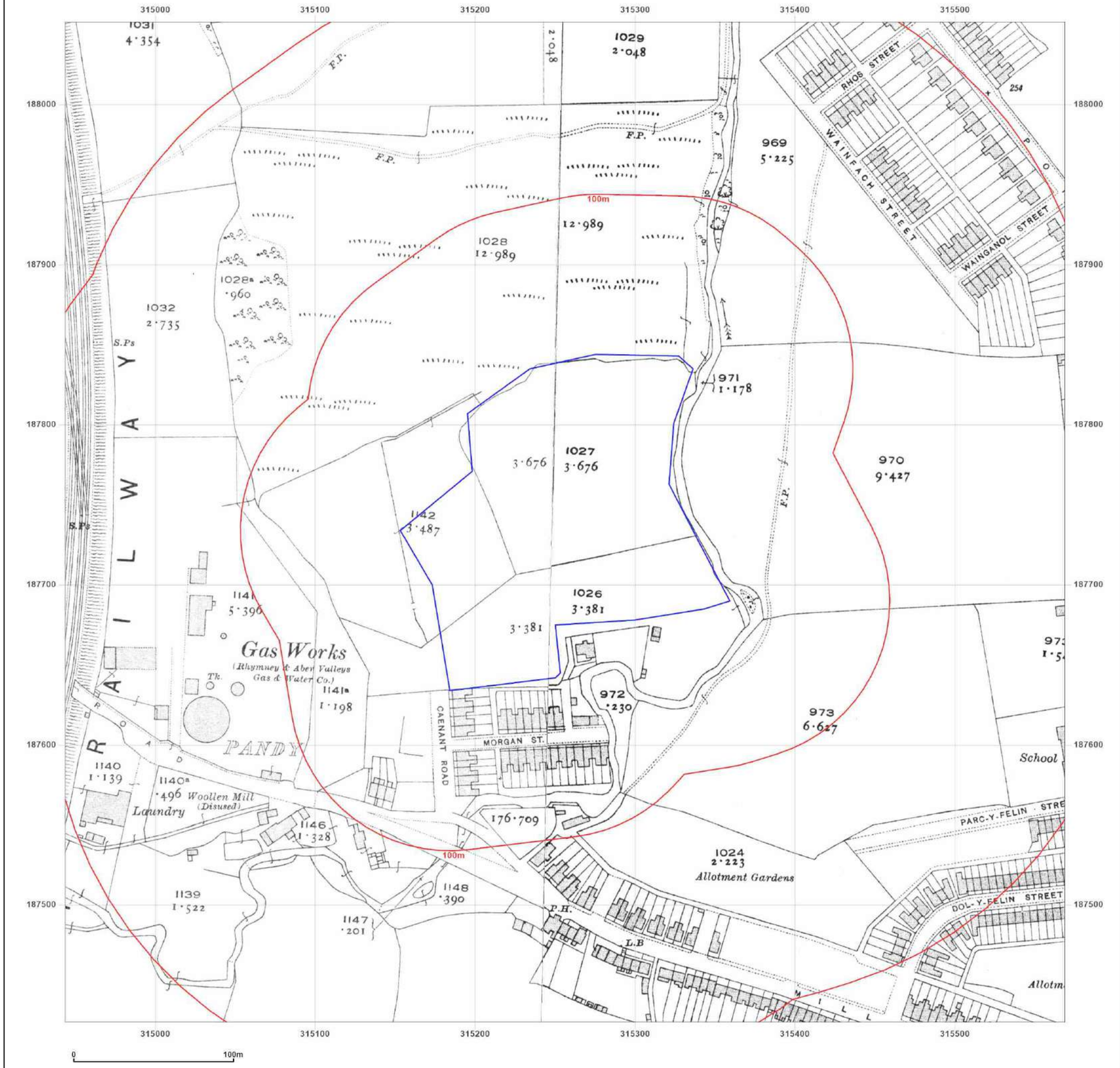

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series
Map date: **1920**
Scale: 1:2,500
Printed at: 1:2,500

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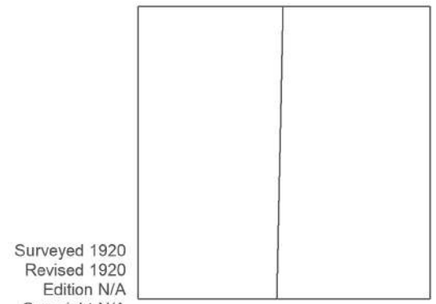

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Production date: 05 December 2022

Map legend available at:
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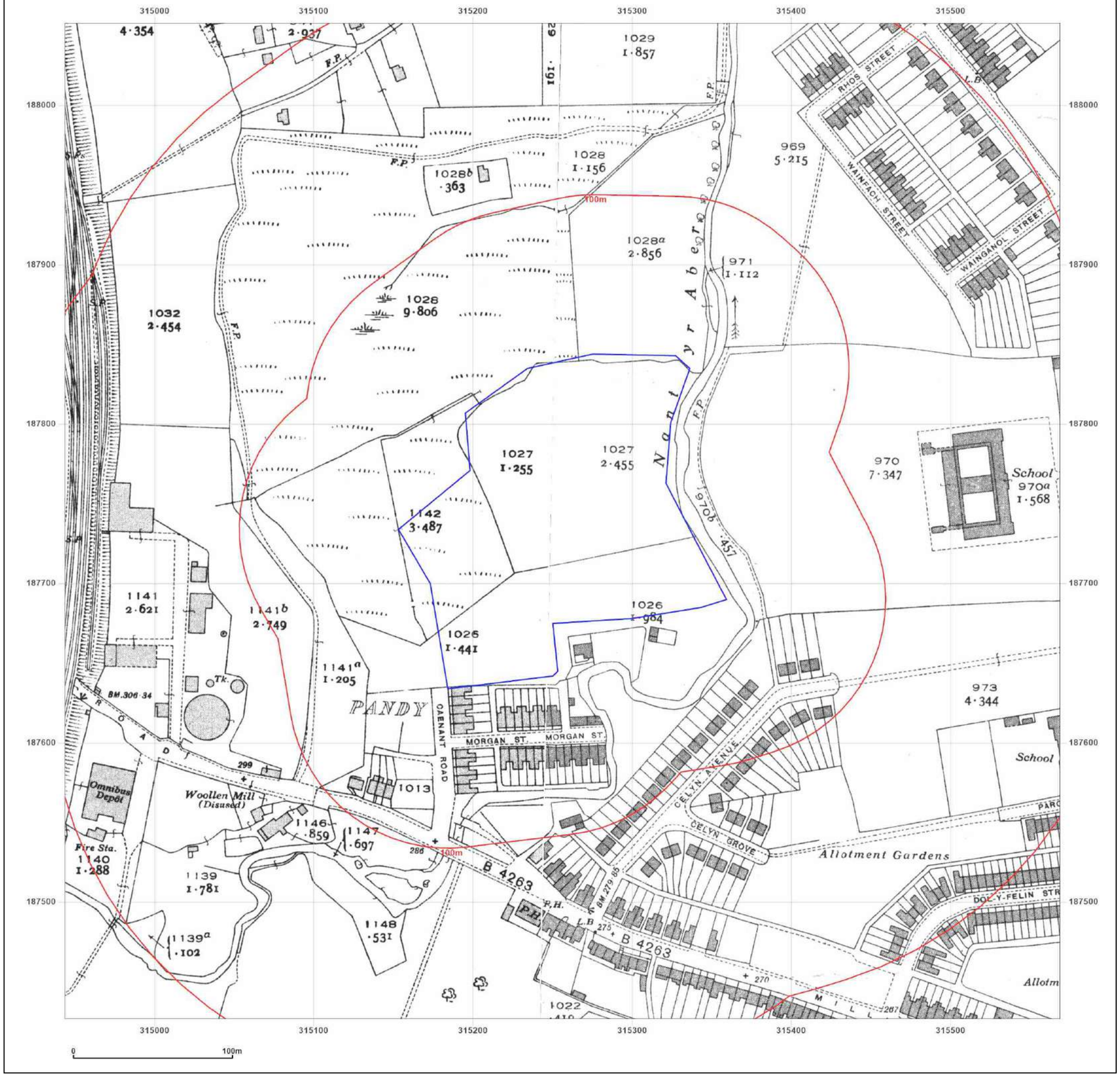

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series
Map date: **1937**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1937
Revised 1937
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1937
Revised 1937
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 05 December 2022

Map legend available at:
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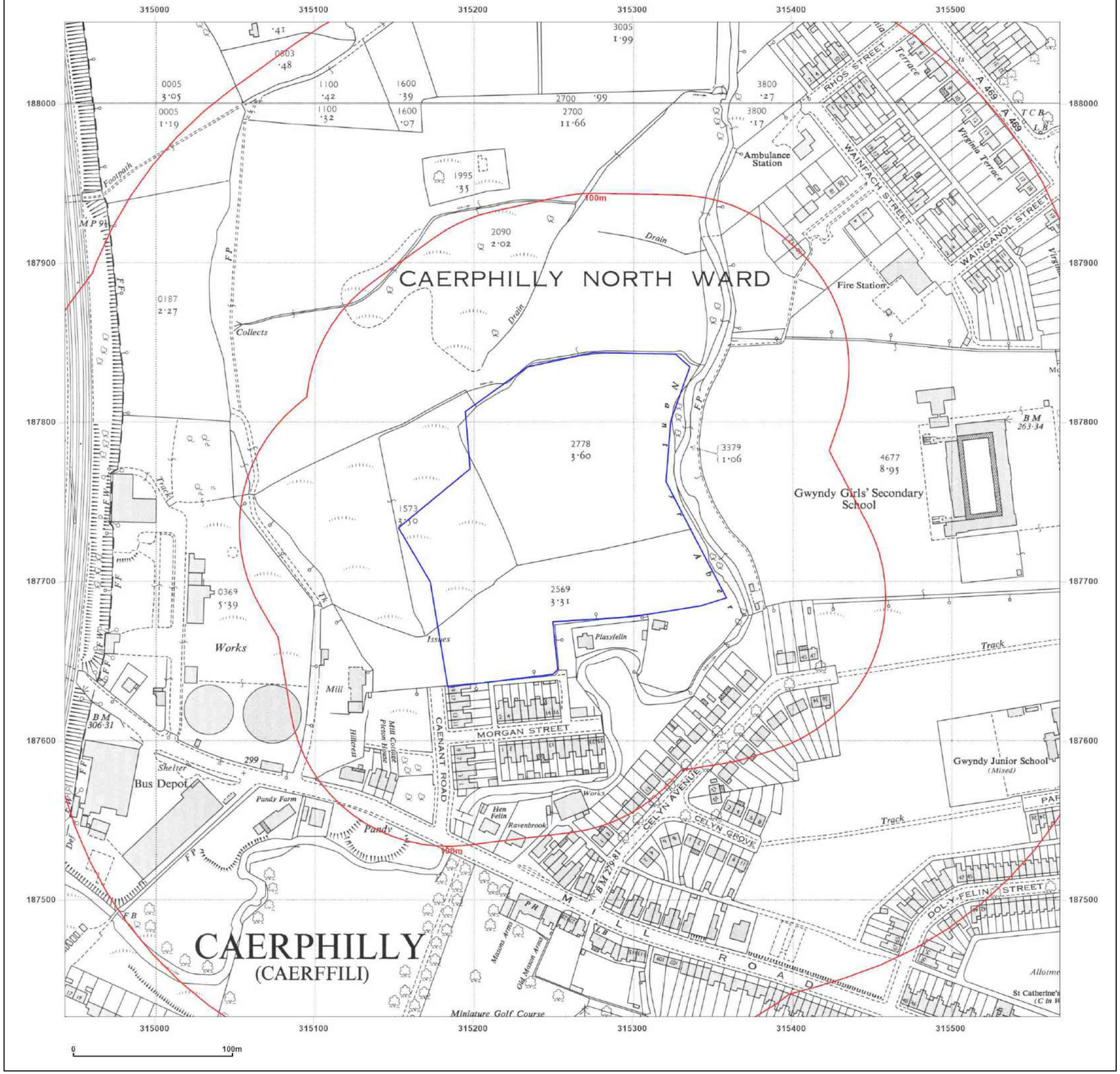

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid

Map date: **1962**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1960
Revised 1961
Edition 1962
Copyright 1962
Levelled 1957

Surveyed 1960
Revised 1961
Edition 1962
Copyright 1962
Levelled 1957

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Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid

Map date: **1970-1973**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1960
Revised 1971
Edition N/A
Copyright 1972
Levelled 1965

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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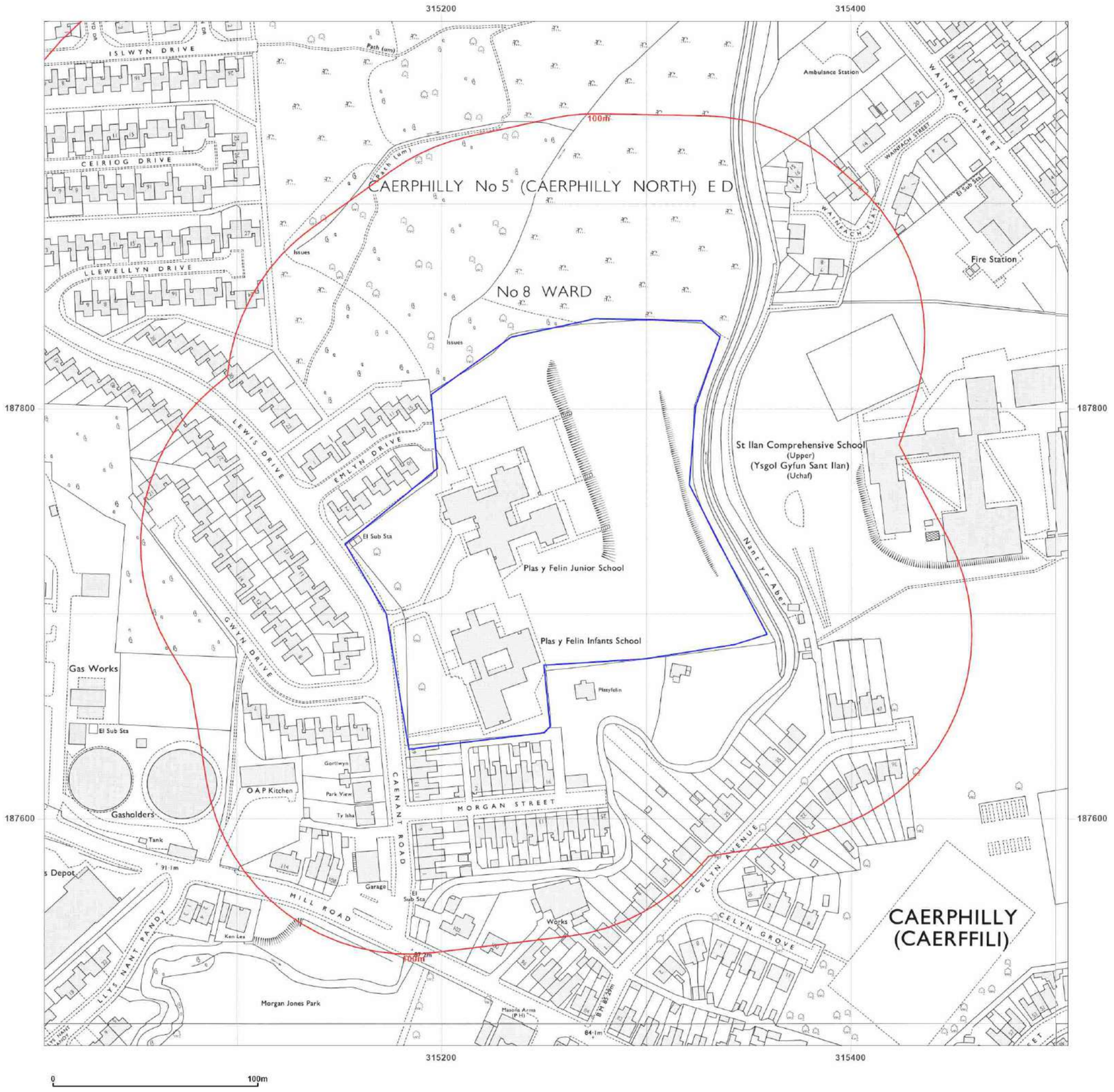

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid

Map date: **1976**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
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Surveyed 1975
Revised 1975
Edition N/A
Copyright 1976
Levelled 1965

Surveyed 1975
Revised 1975
Edition N/A
Copyright 1976
Levelled 1965

Surveyed 1975
Revised 1975
Edition N/A
Copyright 1976
Levelled 1965

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Map legend available at:
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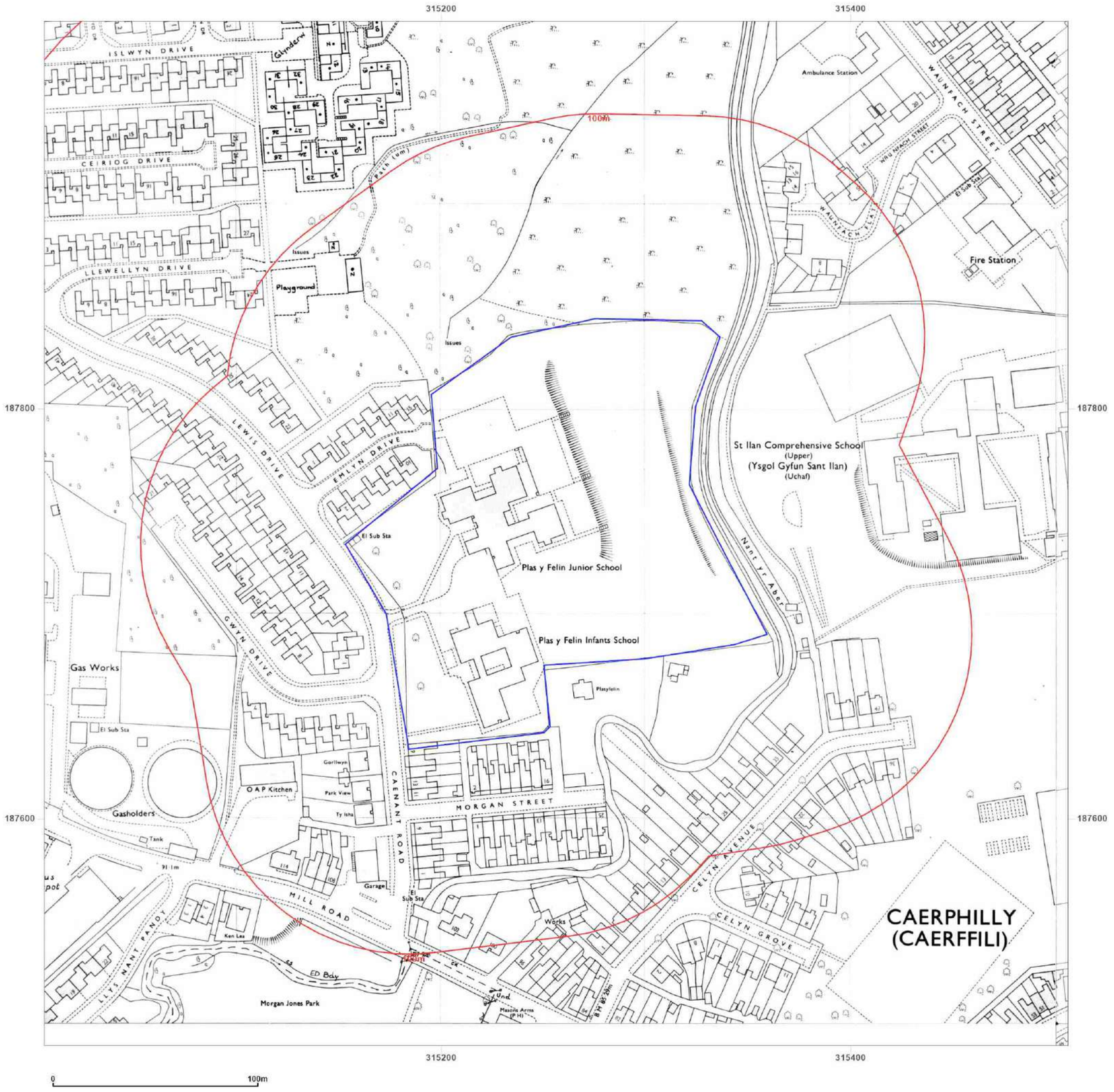

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid

Map date: **1987-1989**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1965
Revised 1987
Edition N/A
Copyright 1987
Levelled 1965

Surveyed 1989
Revised 1989
Edition N/A
Copyright 1989
Levelled N/A

Surveyed 1989
Revised 1989
Edition N/A
Copyright 1989
Levelled N/A

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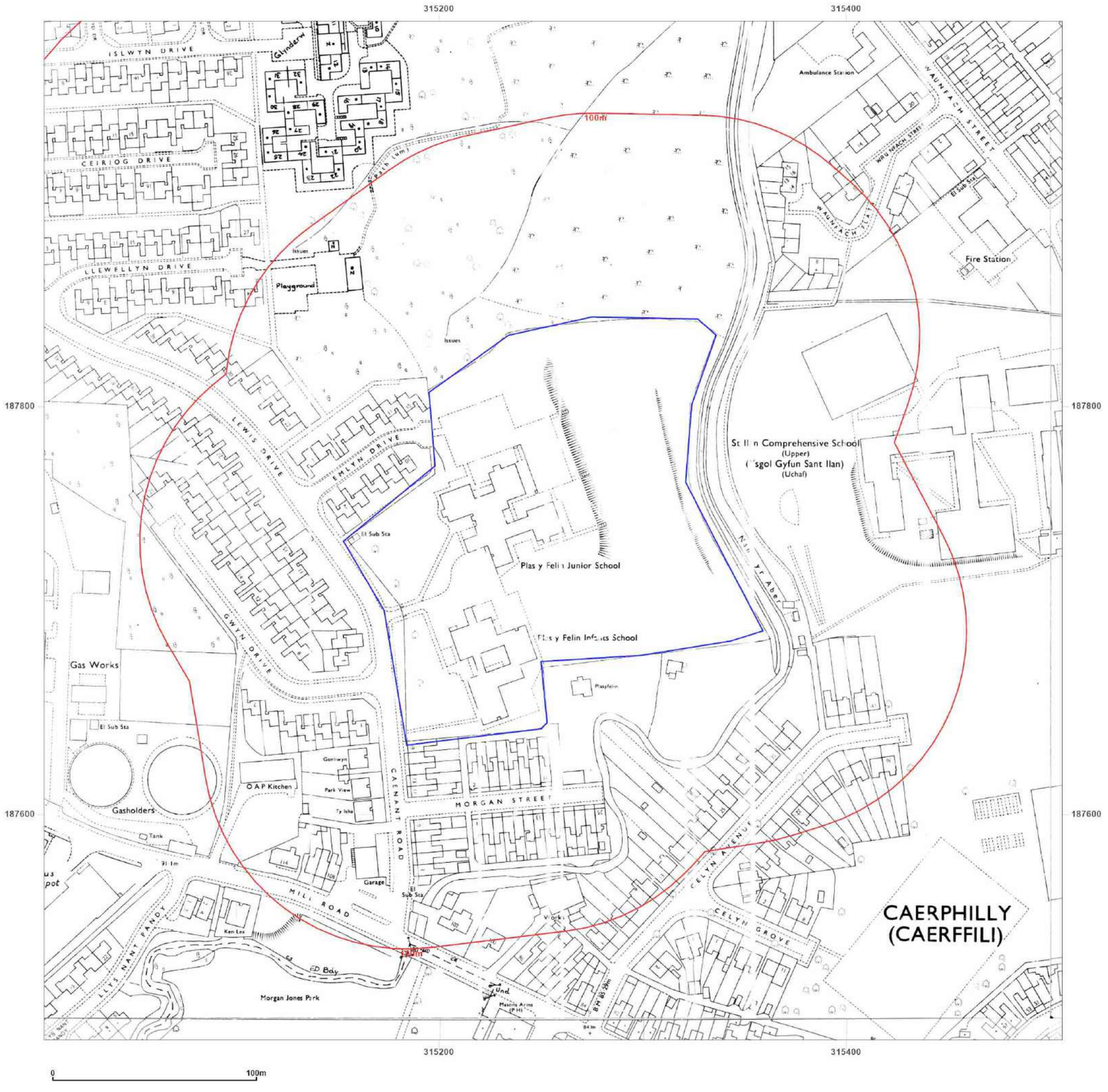

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid
Map date: **1989-1993**
Scale: 1:1,250
Printed at: 1:2,000

N
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Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A	Surveyed 1989 Revised 1989 Edition N/A Copyright 1989 Levelled N/A
Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A	Surveyed 1965 Revised 1989 Edition N/A Copyright 1989 Levelled 1965

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Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

N W E S

Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
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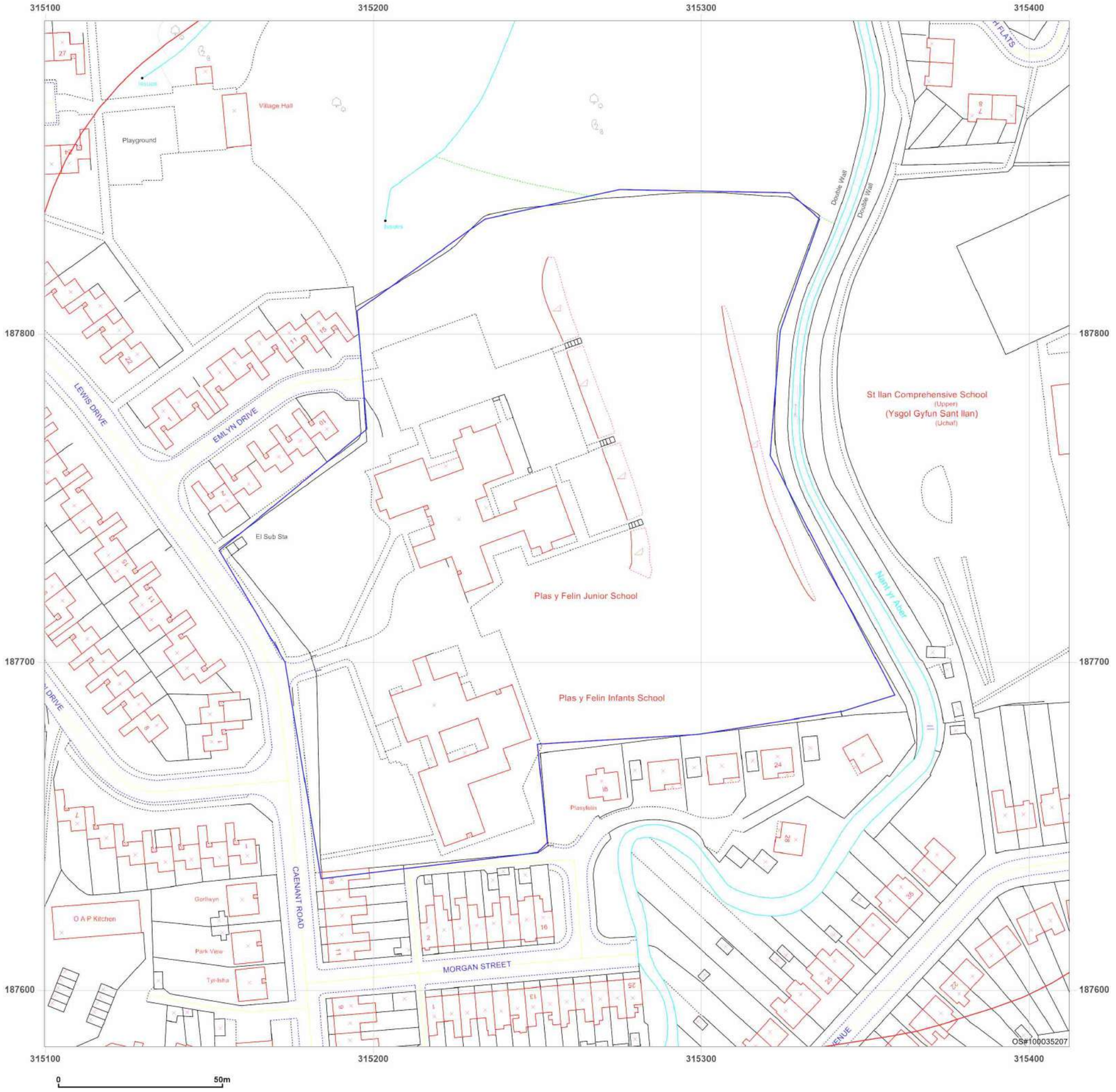

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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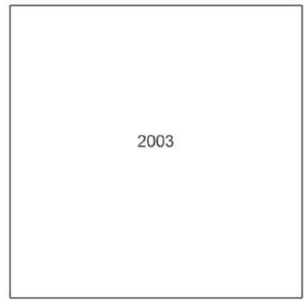

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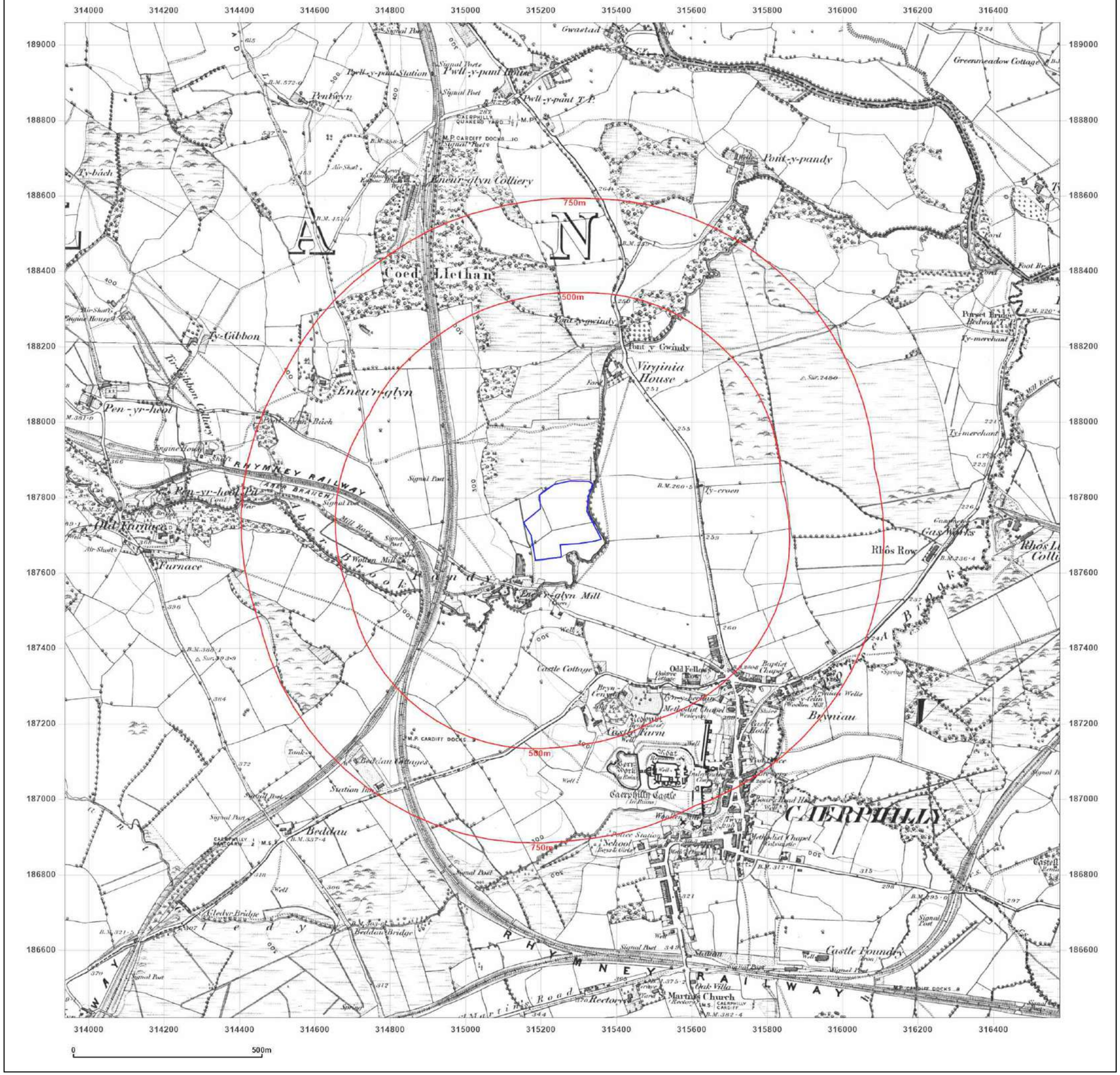

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series

Map date: **1875**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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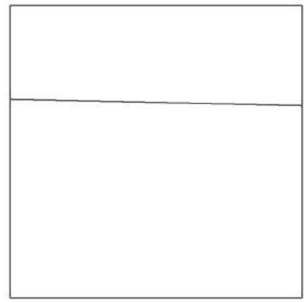
Surveyed 1875
Revised 1875
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1875
Revised 1875
Edition N/A
Copyright N/A
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Production date: 05 December 2022

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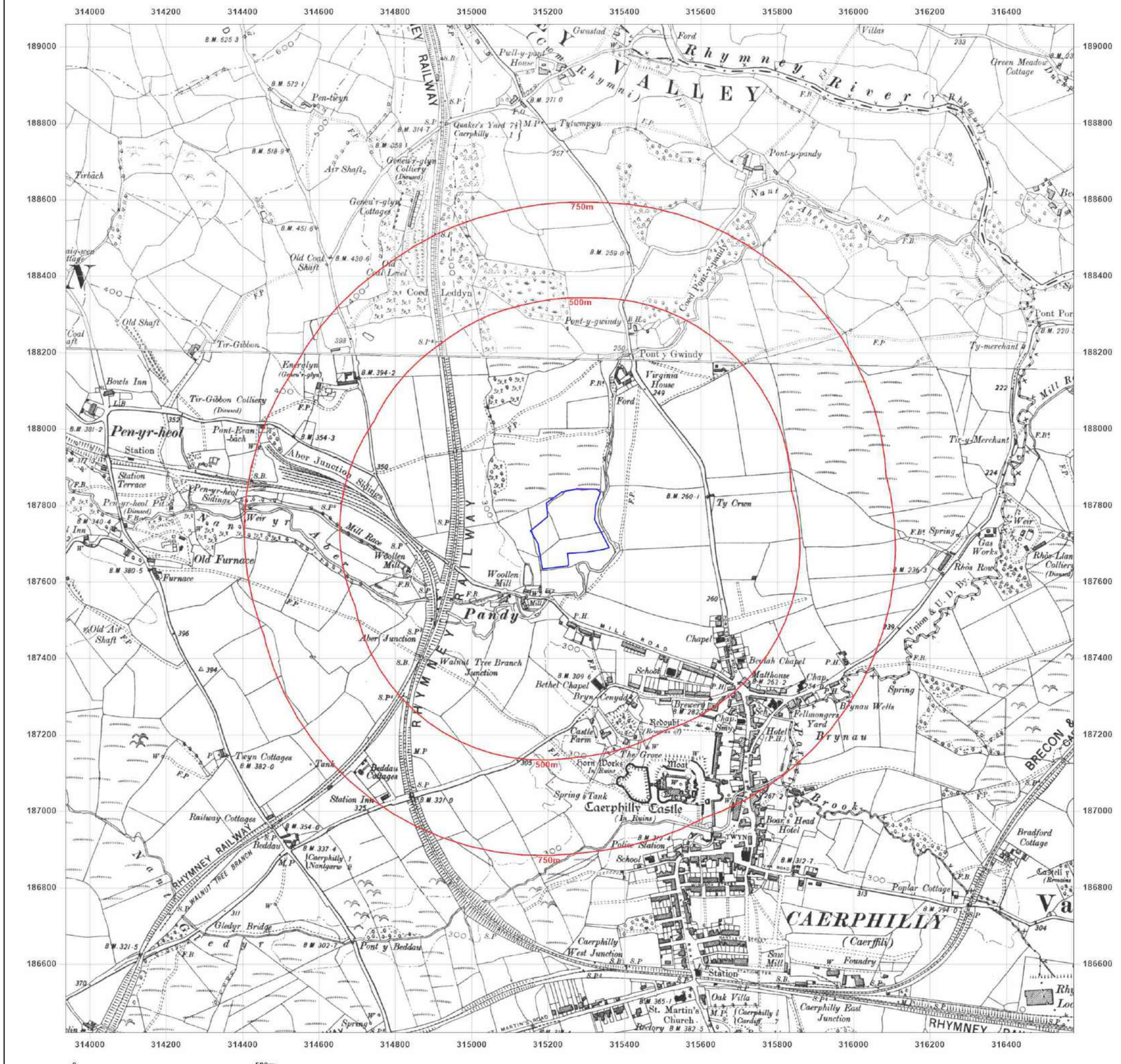

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series

Map date: **1898-1899**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1874
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

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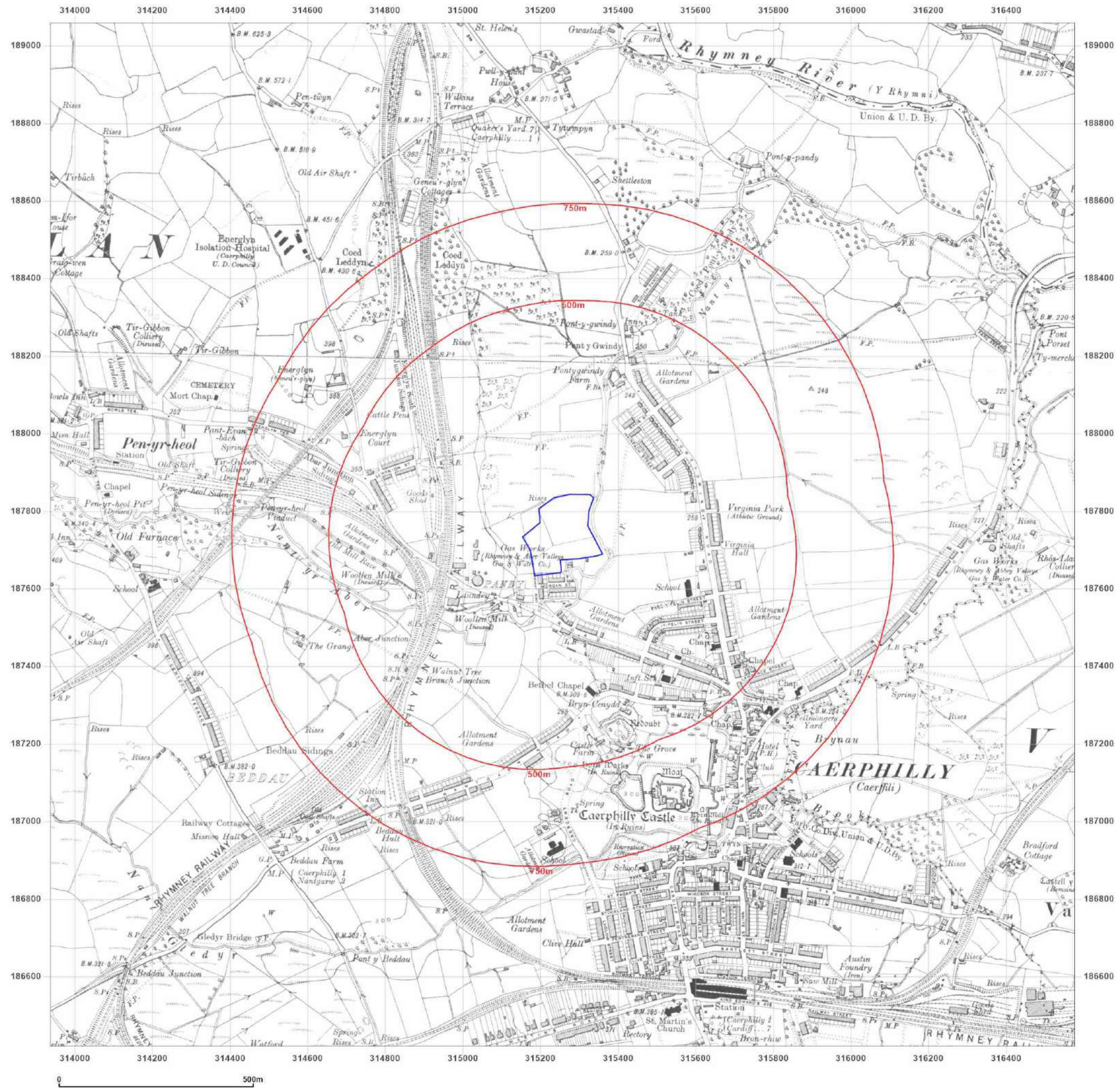

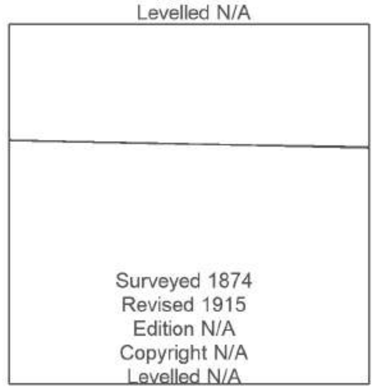

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series

Map date: **1915**

Scale: 1:10,560

Printed at: 1:10,560

N W E S

Surveyed 1874
Revised 1915
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1915
Edition N/A
Copyright N/A
Levelled N/A

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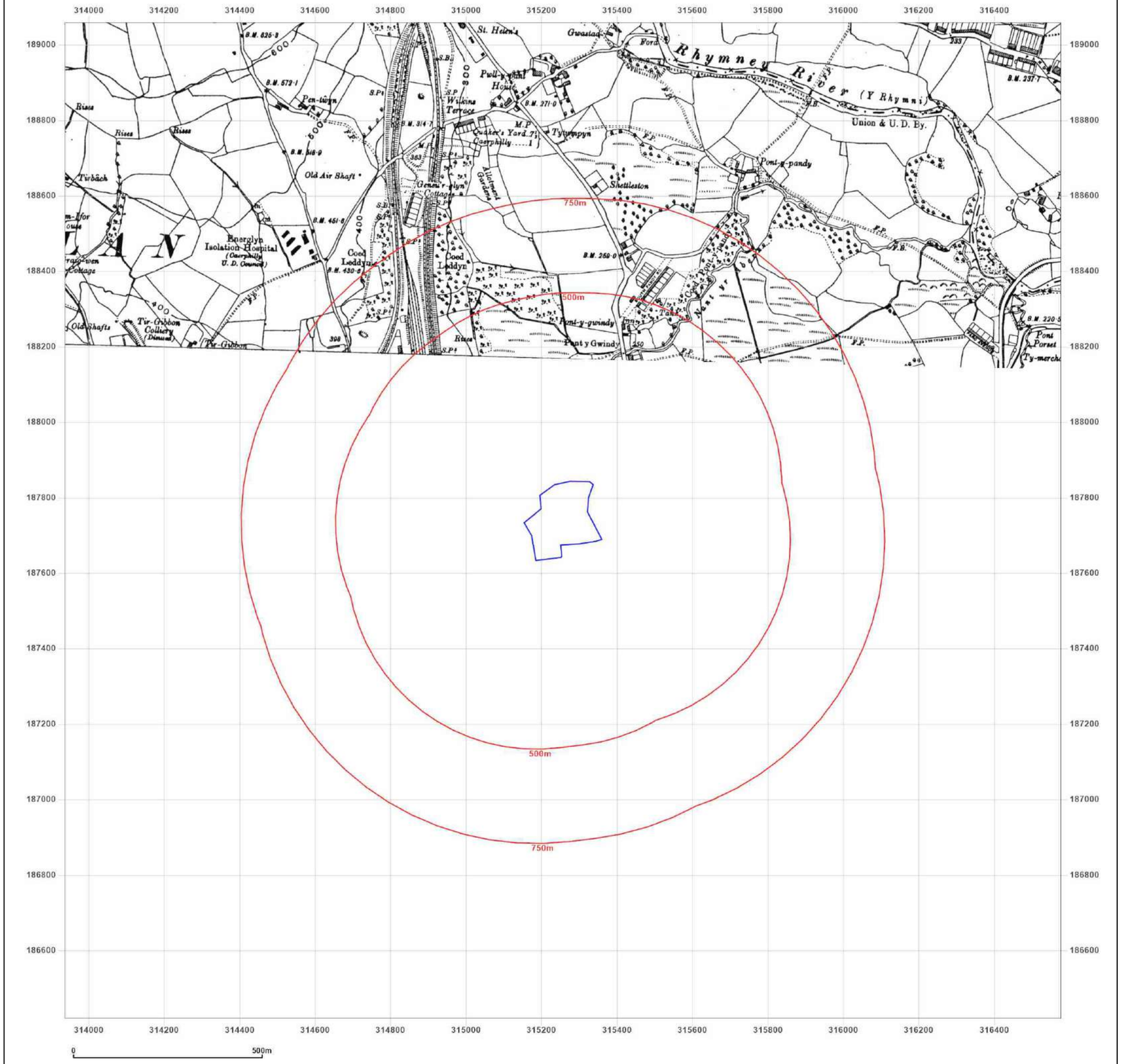

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series

Map date: **1916**

Scale: 1:10,560

Printed at: 1:10,560

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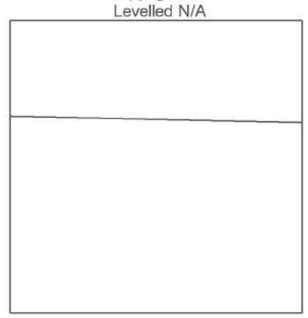
Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



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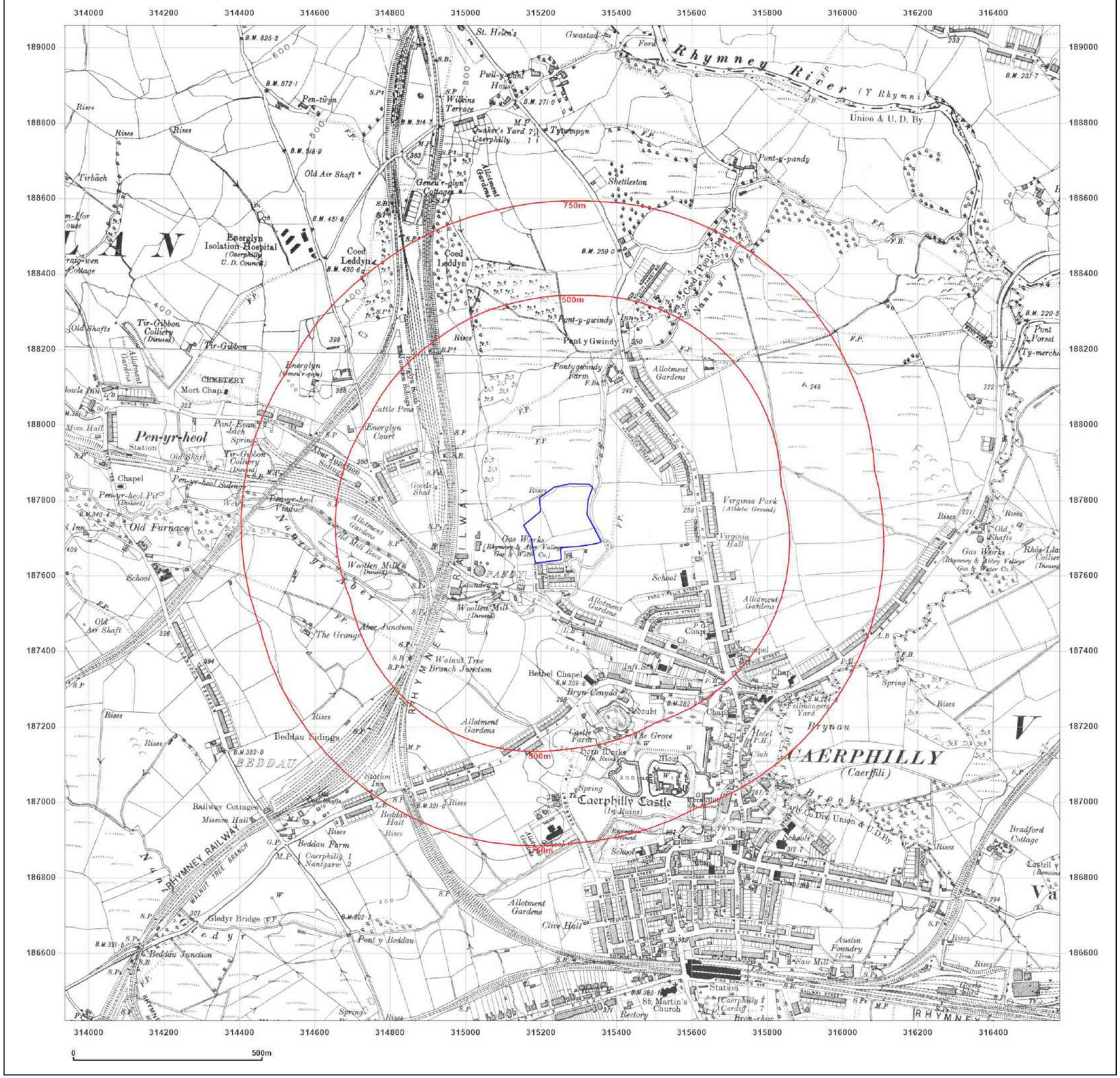

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series

Map date: **1922**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1874
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 05 December 2022

Map legend available at:
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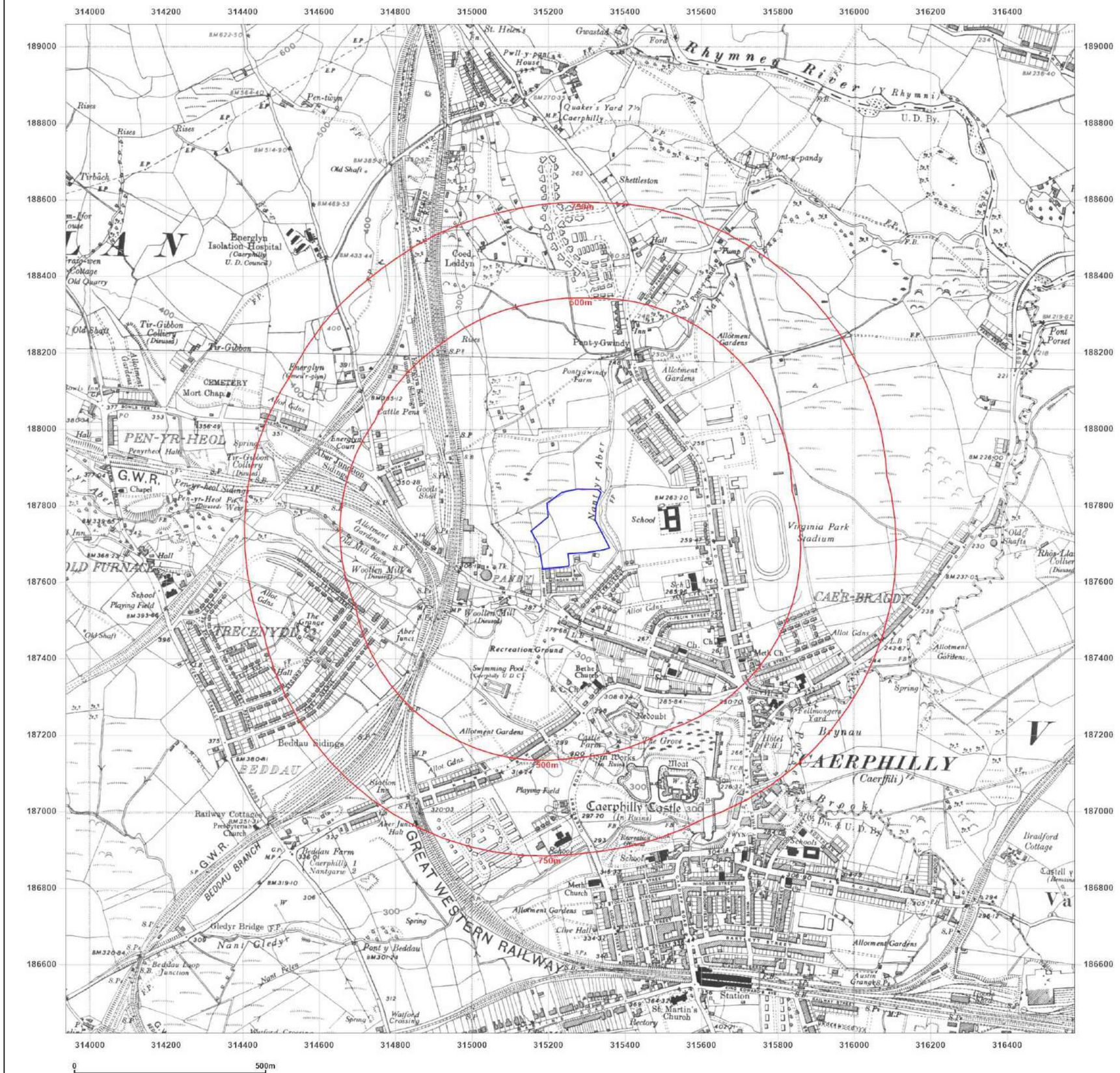

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series

Map date: **1947**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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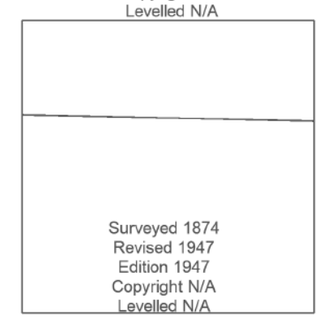
Surveyed 1874
Revised 1947
Edition 1947
Copyright N/A
Levelled N/A



Surveyed 1874
Revised 1947
Edition 1947
Copyright N/A
Levelled N/A

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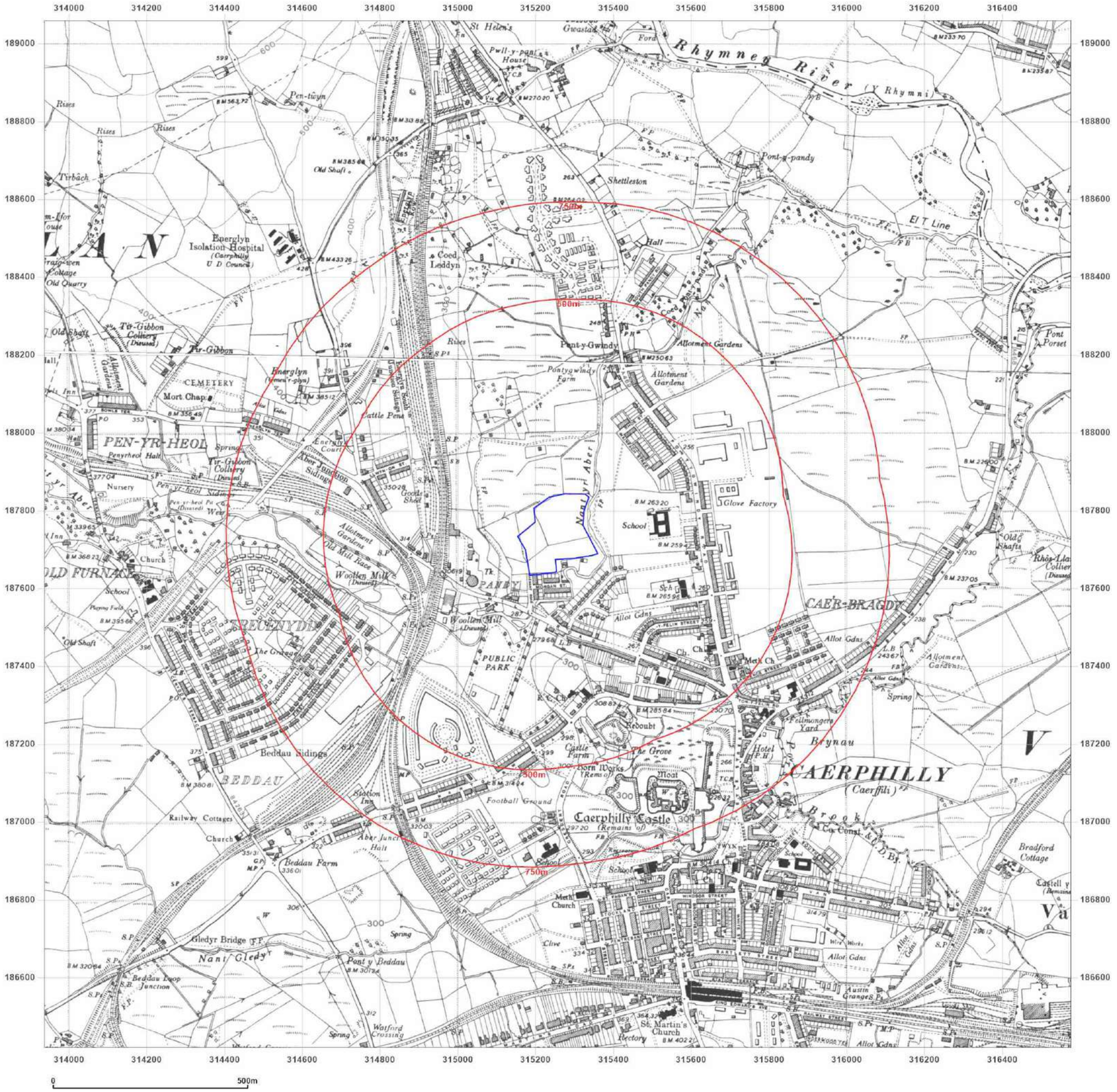

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: County Series

Map date: **1948**

Scale: 1:10,560

Printed at: 1:10,560

N
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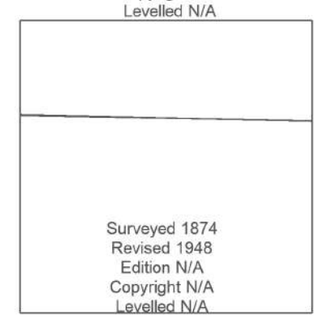
Surveyed 1874
Revised 1948
Edition N/A
Copyright N/A
Levelled N/A



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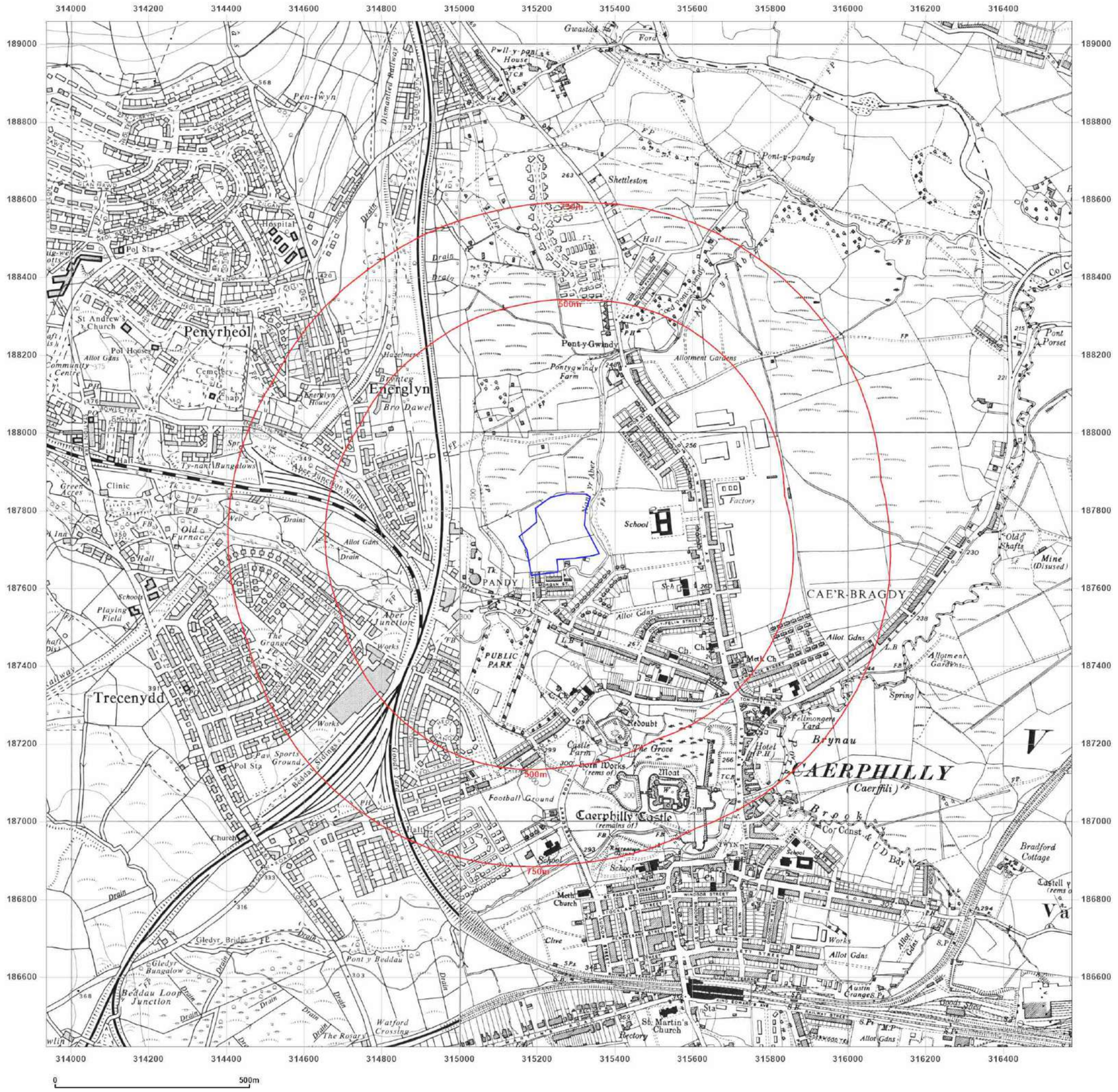

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: Provisional

Map date: **1960-1965**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1965
Revised 1965
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised 1948
Edition N/A
Copyright 1960
Levelled N/A

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Map legend available at:
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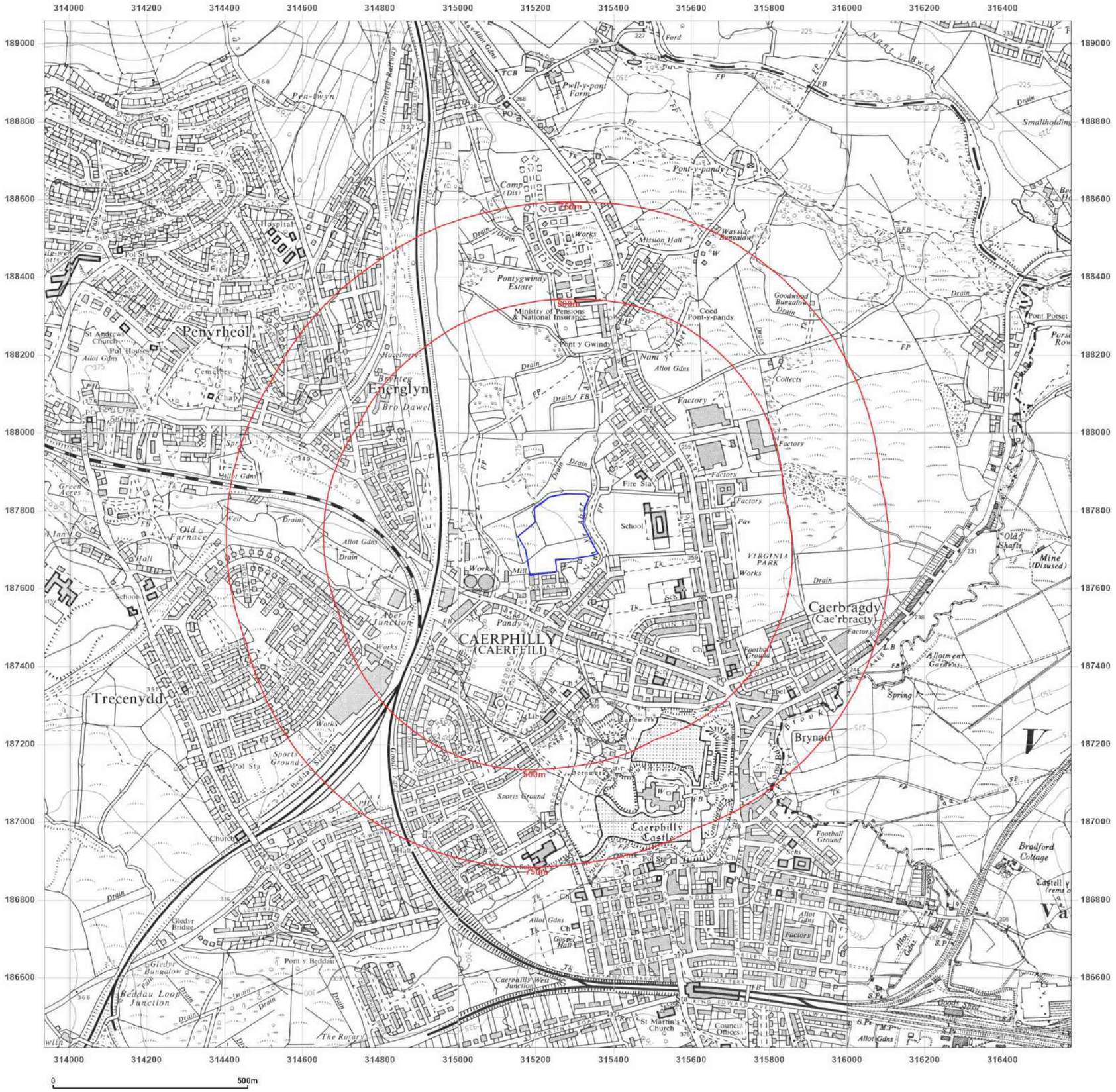

Surveyed 1968
Revised 1968
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1876
Revised 1948
Edition N/A
Copyright 1965
Levelled N/A

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: Provisional

Map date: **1965-1968**

Scale: 1:10,560

Printed at: 1:10,560

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Production date: 05 December 2022

Map legend available at:
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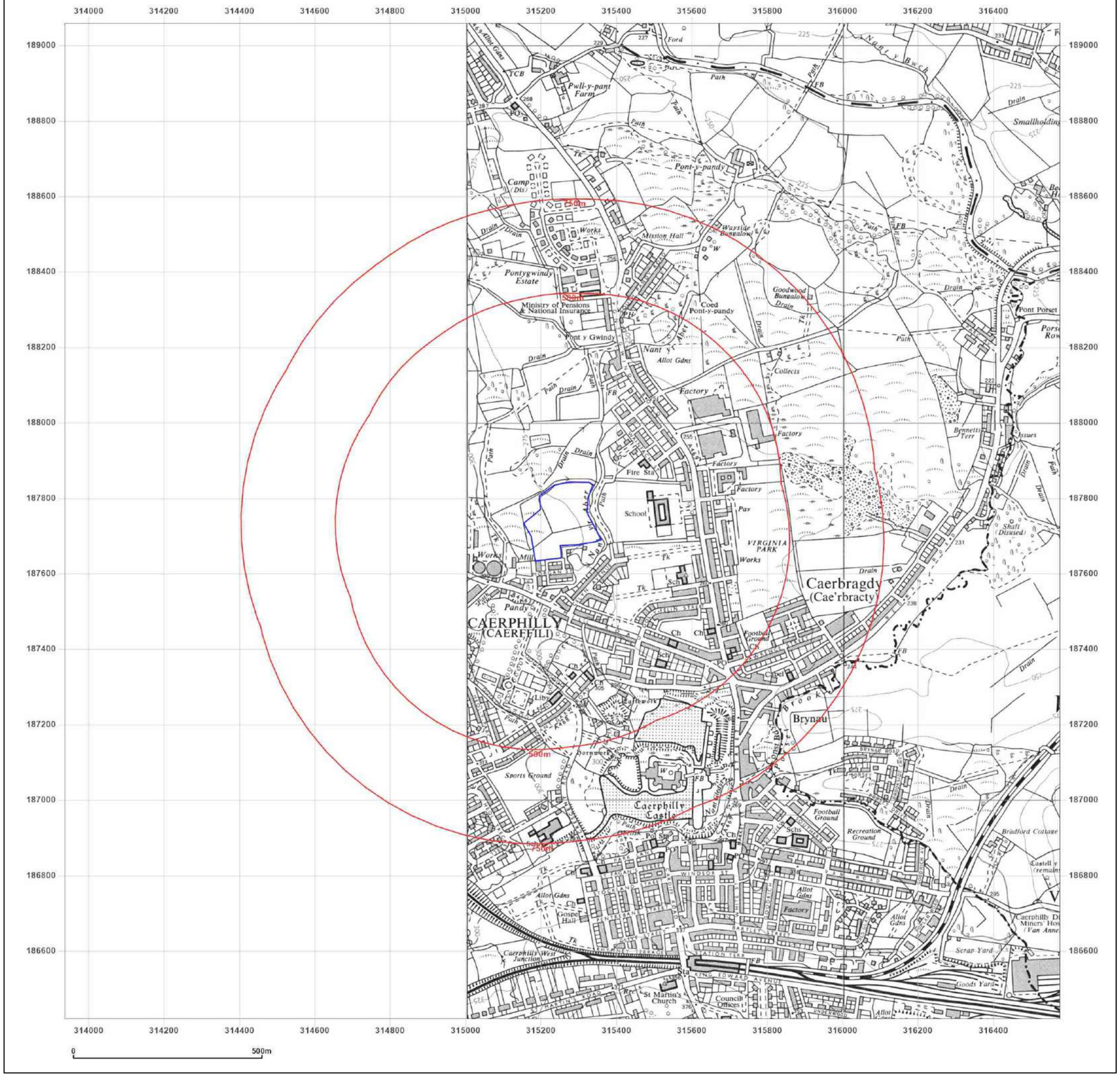

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: Provisional

Map date: **1969**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1969
Revised 1969
Edition N/A
Copyright N/A
Levelled N/A

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W: www.groundsure.com

Production date: 05 December 2022

Map legend available at:
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Surveyed 1977
Revised 1978
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1977
Revised 1978
Edition N/A
Copyright N/A
Levelled N/A

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid

Map date: **1978**

Scale: 1:10,000

Printed at: 1:10,000

N
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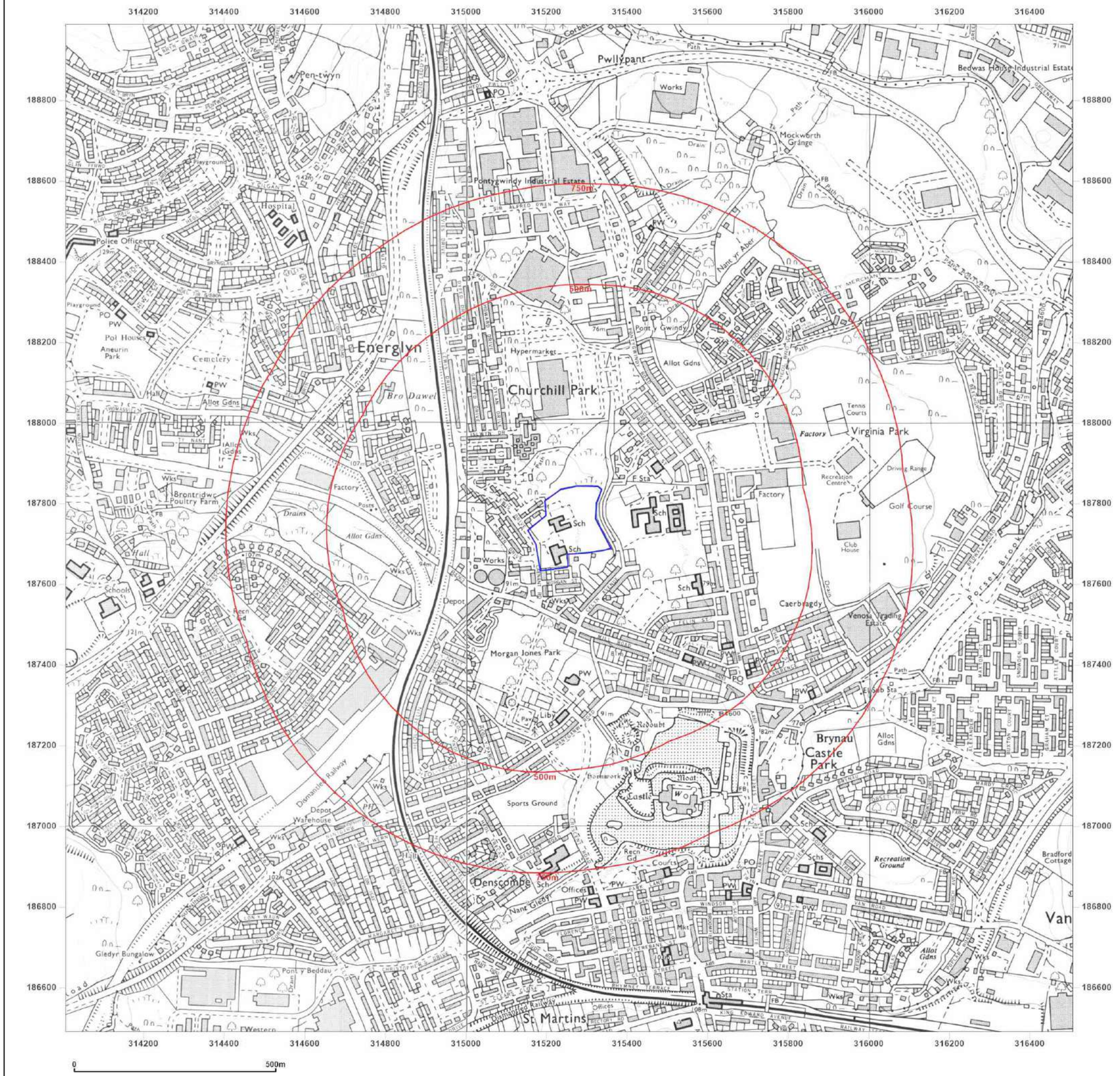
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 05 December 2022

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid

Map date: **1992**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1977
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1977
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 05 December 2022

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid
Map date: 2001
Scale: 1:10,000
Printed at: 1:10,000

N
W E
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2001

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 05 December 2022

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid
Map date: 2010
Scale: 1:10,000
Printed at: 1:10,000

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2010

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 05 December 2022

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Groundsure INSIGHTS

Site Details:

PLASYFELIN PRIMARY SCHOOL,
PLASYFELIN PRIMARY SCHOOL,
LEWIS DRIVE, CAERPHILLY,
CF83 3FT

Client Ref: 7008935_Plas_y_Felin_
Report Ref: GS-9241208
Grid Ref: 315256, 187739

Map Name: National Grid

Map date: **2022**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2022

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 05 December 2022

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

APPENDIX C – COAL AUTHORITY REPORT

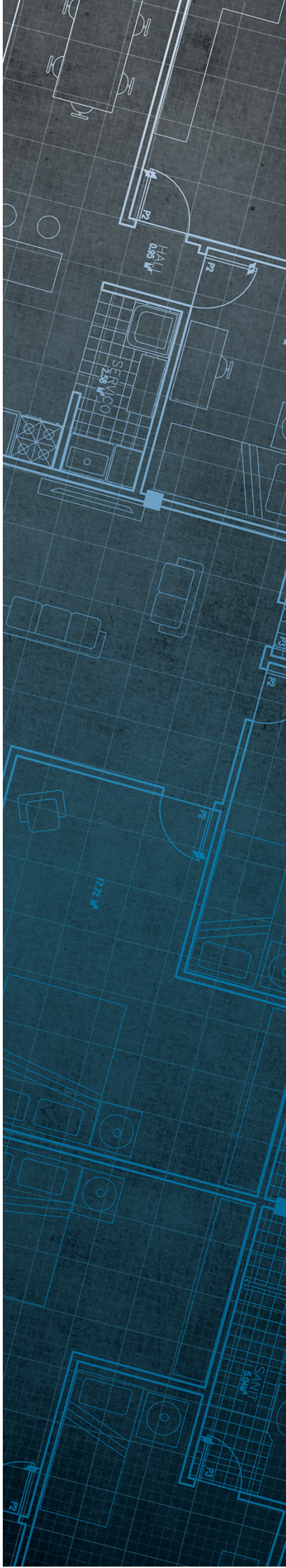
The Coal Authority

Consultants

Coal Mining Report

Plasyfelin Primary School, Plasyfelin Primary School, Lewis Drive, Caerphilly, Cf83 3ft
Caerphilly

Date of enquiry:	**5 December 2022**
Date enquiry received:	**5 December 2022**
Issue date:	**5 December 2022**
Our reference:	**51003328578001**
Your reference:	**GS-9241209**



Consultants

Coal Mining Report

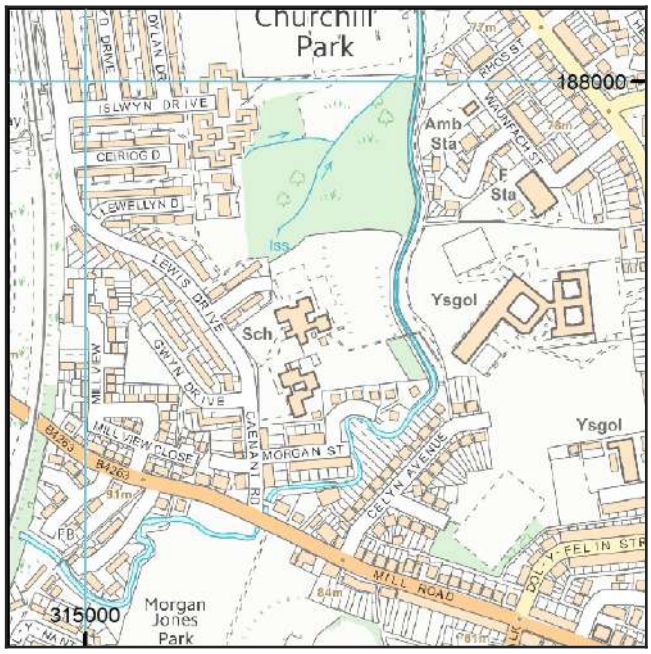
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

Plasyfelin Primary School, Plasyfelin Primary School, Lewis Drive, Caerphilly, Cf83 3ft
Caerphilly



Approximate position of property

Map data

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

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	MYNYDDISLWYN LOWER LEAF	Coal	41RX	151	Beneath Property	3.4	North	90	1879
unnamed	MYNYDDISLWYN LOWER LEAF	Coal	41RY	160	Beneath Property	2.1	North-East	90	1879

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:

SWR3030	SWR1835	SWR1834
PO0	2888	SWR4124
3024		

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
MYNYDDISLWYN BIG RIDER	Coal	Yes	Within	N/A	90

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 not in an area where a notice to withdraw support has been given.

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

Summary of findings

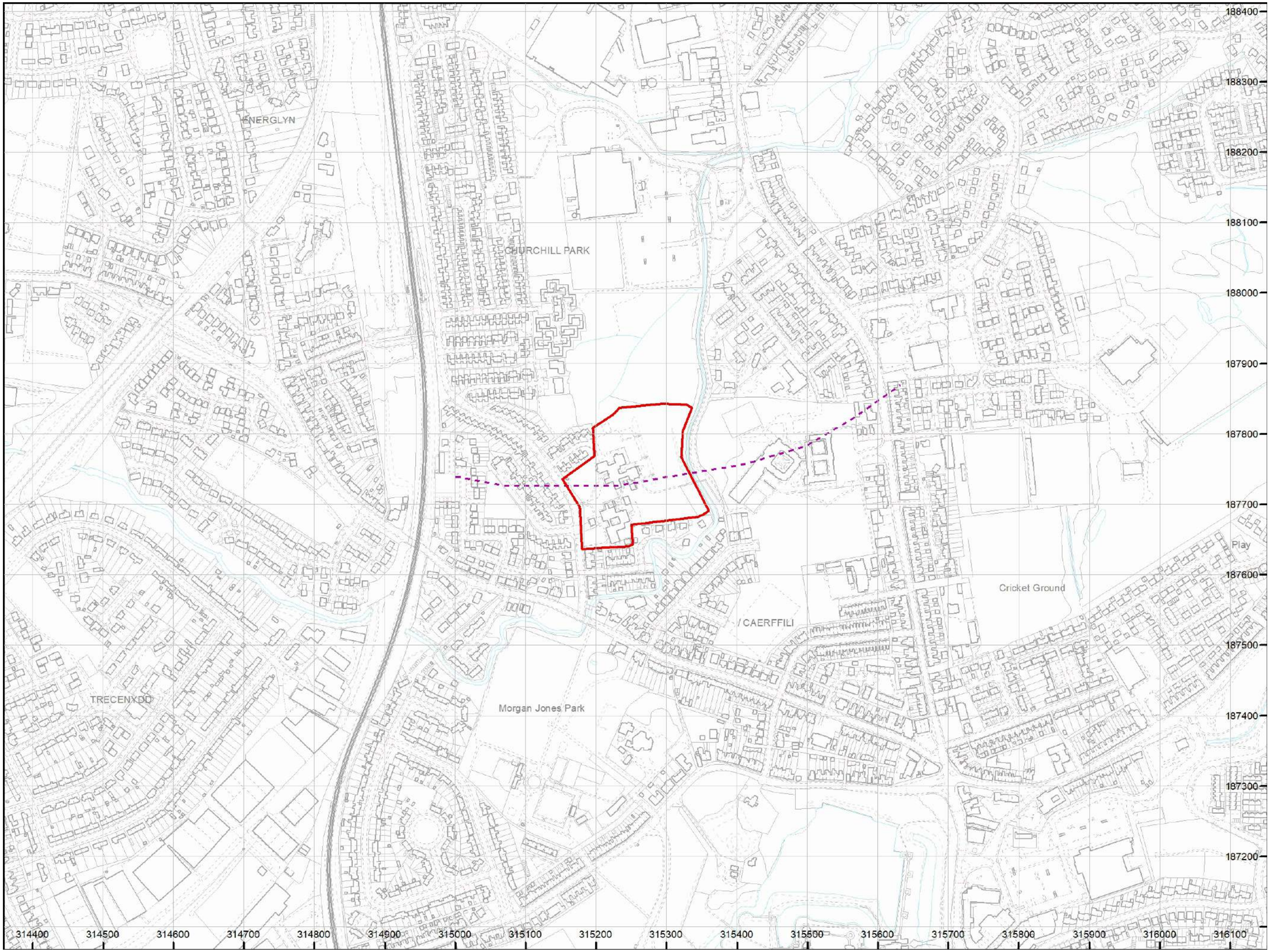
Map data

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)



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

APPENDIX D – SITE SPECIFIC UXO ASSESSMENT

UNEXPLODED BOMB RISK MAP

zeticauxo

SITE LOCATION

Location: CF83 3FP,
Map Centre: 315192,187612

LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

miltary | **industry** | **UXO find**
transport | **dock** | **Luftwaffe targets**
utilities | **Bombing decoy** | **other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: **(https://zeticauxo.com/downloads-and-resources/risk-maps/)**

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

APPENDIX E – EXPLORATORY HOLE LOGS

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315325.91	Northing:	187694.40
Level:	82.14mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH101**

Sheet 1 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Core	Klemm	DT & DT	40.00	200	9.00	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	16/03/2023
Finish Date:	17/03/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Sandy gravelly CLAY (Driller's description). TOP								
Boulder clay (Driller's description). TILL		0.40	81.74					
Mudstone (Driller's description).		8.20	73.94					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
0.00	40.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315325.91	Northing:	187694.40
Level:	82.14mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH101**

Sheet 2 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time					
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)	
0.00	40.00	Rotary Core	Klemm	DT & DT	40.00	200	9.00	200						

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	16/03/2023
Finish Date:	17/03/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Mudstone (Driller's description).								
		12.20	69.94					
Sandstone (Driller's description).								
		16.70	65.44					
Mudstone (Driller's description).								

11 12 13 14 15 16 17 18 19 20

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
0.00	40.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315325.91	Northing:	187694.40
Level:	82.14mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH101**

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Core	Klemm	DT & DT	40.00	200	9.00	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	16/03/2023
Finish Date:	17/03/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Mudstone (Driller's description).								
Sandstone (Driller's description).		23.30	58.84					

21 22 23 24 25 26 27 28 29 30

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
0.00	40.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315325.91	Northing:	187694.40
Level:	82.14mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH101**

Sheet 4 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Core	Klemm	DT & DT	40.00	200	9.00	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	16/03/2023
Finish Date:	17/03/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Sandstone (Driller's description).								
Mudstone (Driller's description).		31.00	51.14					
Sandstone (Driller's description).		33.40	48.74					
EOH at 40.00m - Borehole Final Depth Achieved		40.00	42.14					

31 32 33 34 35 36 37 38 39 40

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
0.00	40.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315301.56	Northing:	187700.56
Level:	82.92mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH102**

Sheet 1 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Core	Klemm	DT & DT	40.00	200	7.50	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	17/03/2023
Finish Date:	17/03/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Boulder clay (Driller's description). TILL								
Sandstone (Driller's description).		7.40	75.52					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
0.00	40.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315301.56	Northing:	187700.56
Level:	82.92mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH102**

Sheet 2 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Core	Klemm	DT & DT	40.00	200	7.50	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	17/03/2023
Finish Date:	17/03/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Sandstone (Driller's description).								
Mudstone (Driller's description).		13.40	69.52					

11 12 13 14 15 16 17 18 19 20

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
0.00	40.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315301.56	Northing:	187700.56
Level:	82.92mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH102**

Sheet 3 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Core	Klemm	DT & DT	40.00	200	7.50	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	17/03/2023
Finish Date:	17/03/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Mudstone (Driller's description).								
Sandstone (Driller's description).		21.40	61.52					
Mudstone (Driller's description).		29.60	53.32					

21 22 23 24 25 26 27 28 29 30

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
0.00	40.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315301.56	Northing:	187700.56
Level:	82.92mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH102**

Sheet 4 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Core	Klemm	DT & DT	40.00	200	7.50	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	17/03/2023
Finish Date:	17/03/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Mudstone (Driller's description).								
Sandstone (Driller's description).		31.70	51.22					
EOH at 40.00m - Borehole Final Depth Achieved		40.00	42.92					

31 32 33 34 35 36 37 38 39 40

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
0.00	40.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315276.16	Northing:	187699.81
Level:	84.75mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH103**

Sheet 1 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Open Hole	Klemm	DT & DT	40.00	200	7.50	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	18/01/2023
Finish Date:	18/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Brown sandy gravelly CLAY (Driller's description). TILL								
Boulder clay (Driller's description). TILL		3.30	81.45					
Mudstone (Driller's description).		7.00	77.75					
Sandstone (Driller's description).		8.00	76.75					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
40.00	0.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315276.16	Northing:	187699.81
Level:	84.75mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH103**

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Open Hole	Klemm	DT & DT	40.00	200	7.50	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	18/01/2023
Finish Date:	18/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Sandstone (Driller's description).								
Mudstone (Driller's description).		12.60	72.15					
Sandstone (Driller's description).		19.00	65.75					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
40.00	0.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315276.16	Northing:	187699.81
Level:	84.75mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH103**

Sheet 3 of 4

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Open Hole	Klemm	DT & DT	40.00	200	7.50	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	18/01/2023
Finish Date:	18/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Sandstone (Driller's description).								
		24.10	60.65					
Mudstone (Driller's description).								
		30.00	54.75					

21 22 23 24 25 26 27 28 29 30

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
40.00	0.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315276.16	Northing:	187699.81
Level:	84.75mAOD	Depth:	40.00m
Logger:	PM	Type:	RO
		Inclination:	90°

Status: FINAL

Borehole Number: **BH103**

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	40.00	Rotary Open Hole	Klemm	DT & DT	40.00	200	7.50	200					

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	18/01/2023
Finish Date:	18/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples, Tests and Rotary Coring: Depth (m)	Ref	Tests / Results
Sandstone (Driller's description).								
EOH at 40.00m - Borehole Final Depth Achieved		40.00	44.75					

31 32 33 34 35 36 37 38 39 40

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. No coal seams, broken ground or loss of flush noted.

Flushing

From (m)	To (m)	Return Min %	Colour	Type
40.00	0.00	90	Brown	Air / Mist

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315301.32	Northing:	187749.30
Level:	82.78mAOD	Depth:	7.00m
Logger:	PM	Type:	CP
		Inclination:	90°

Status: FINAL

Borehole Number: **BH104**

Sheet 1 of 1

Method, Plant and Crew				
From (m)	To (m)	Type	Plant Used	Crew
0.00	1.20	Inspection Pit	Hand tools	AJ & LB
1.20	7.00	Cable Percussion	Dando 3000	AJ & LB

Diameter		Casing	
Depth (m)	Diam (mm)	Depth(m)	Diam (mm)
7.00	200	7.00	200

Drilling Progress by Time				
Date	Time	Depth (m)	Casing (m)	Water (m)
19/01	00:00	7.00	6.90	4
19/01	16:00	6.00	6.00	3.2

Scale: 1:50
Checked By: KW
Approved By: SR
Start Date: 19/01/2023
Finish Date: 20/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)
Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium sub rounded of sandstone. (TOPSOIL) TOP		0.25	82.53
Brown slightly clayey slightly silty sandy fine to medium subrounded GRAVEL of sandstone SAND. Sand is fine to coarse. TILL			
Medium dense brown slightly clayey very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub rounded to rounded of sandstone. TILL		1.30	81.48
Dense brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse (predominantly coarse). TILL		5.50	77.28
Dense brown silty very sandy GRAVEL. Gravel is fine to medium rounded of sandstone. TILL		6.00	76.78
EOH at 7.00m - Borehole Final Depth Achieved		7.00	75.78

Water Level (m)

Inst / Backfill

Samples and Testing

Depth (m)	Ref	Tests / Results
0.00 - 0.50	BB1	
0.50 - 1.00	BB2	
1.00 - 1.45	DD1	SPT(S) 1.00m, N=35 (6,8/10,9,7,9)
1.50 - 2.00	BB3	
2.00 - 2.45	DD2	SPT(S) 2.00m, N=20 (8,6/7,6,3,4)
2.50 - 3.00	BB4	
3.00 - 3.45	DD3	SPT(S) 3.00m, N=26 (2,2/5,7,6,8)
3.50 - 4.00	BB5	
4.00 - 4.45	DD4	SPT(S) 4.00m, N=41 (4,6/7,8,12,14)
4.50 - 5.00	BB6	
5.00 - 5.45	DD5	SPT(S) 5.00m, N=29 (7,6/6,7,7,9)
5.10 - 5.50	BB7	
6.00 - 6.45	DD6	SPT(S) 6.00m, 25 (25 for 115mm/25 for 75mm)
6.50 - 6.90	BB8	
6.90	DD7	SPT(S) 6.90m, 0 (50 for 10mm/0 for 0mm)

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.

Chiselling

From (m)	To (m)	Time (mins)
1.60	2.00	30

Water Added

From (m)	To (m)
1.20	7.00

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks
5.20	-	-	20	2.80	

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315296.42	Northing:	187801.86
Level:	82.08mAOD	Depth:	4.30m
Logger:	PM	Type:	CP
		Inclination:	90°

Status: FINAL

Borehole Number: **BH105**

Sheet 1 of 1

Method, Plant and Crew				
From (m)	To (m)	Type	Plant Used	Crew
0.00	1.20	Inspection Pit	Hand tools	AJ & LB
1.20	4.30	Cable Percussion	Dando 3000	AJ & LB

Diameter	
Depth (m)	Diam (mm)
4.30	200

Casing	
Depth(m)	Diam (mm)
4.30	200

Drilling Progress by Time				
Date	Time	Depth (m)	Casing (m)	Water (m)
18/01	10:00	2.00	2.00	1.5
18/01	14:00	4.10	3.80	2.10
18/01	15:00	4.30	4.00	2.10

Scale: 1:50
Checked By: KW
Approved By: SR
Start Date: 18/01/2023
Finish Date: 18/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
Firm brown silty slightly gravelly CLAY. Gravel is fine to medium sub rounded of sandstone. (TOPSOIL)						0.00 - 0.50	BB1	
TOP		0.25	81.83					
Firm brown slightly clayey slightly silty gravelly SAND. Sand is medium. Gravel is fine to coarse sub rounded of sandstone.						0.50 - 1.00	BB2	
TILL						1.00 - 1.15	DD3	SPT(C) 1.20m, N=37 (9,8/12,8,8,9)
		1.50	80.58	▼		1.50 - 2.00	BB4	
Brown silty very sandy CLAY. Sand is fine to coarse. Gravel is fine to coarse (predominantly coarse) sub rounded of sandstone.				▽				
TILL						2.00 - 2.15	DD5	SPT(C) 2.00m, N=39 (8,8/9,9,10,11)
						2.50 - 3.00	BB6	
						3.00 - 3.15	DD7	SPT(C) 3.00m, N=22 (4,5/4,7,5,6)
Stiff sandy gravelly bouldery CLAY. Sand is fine to coarse. Gravel is fine to coarse sub rounded of sandstone. Boulder is of sandstone.		3.50	78.58			3.50 - 4.00	BB8	
TILL								
Chiseling boulder from 4.00 to 4.30 for 2.5 hrs. Recovered as broken angular fragments of iron-stained pennant sandstone.						4.00 - 4.15	DD9	SPT(C) 4.00m, 0 (50 for 80mm/0 for 0mm)
						4.10 - 4.30	BB10	
EOH at 4.30m - Borehole Final Depth Achieved		4.30	77.78					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.

Chiselling		
From (m)	To (m)	Time (mins)
3.80	4.30	150

Water Added	
From (m)	To (m)
1.20	4.30

Hammer Information	
Serial No.	Energy Ratio %

Groundwater					
Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks
1.80	-	-	20	1.50	

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315288.99	Northing:	187827.84
Level:	81.42mAOD	Depth:	7.00m
Logger:	PM	Type:	CP
		Inclination:	90°

Status: FINAL

Borehole Number: **BH106**

Sheet 1 of 1

Method, Plant and Crew				
From (m)	To (m)	Type	Plant Used	Crew
0.00	1.20	Inspection Pit	Hand tools	AJ & LR
1.20	7.00	Cable Percussion	Dando 3000	AJ & LR

Diameter	
Depth (m)	Diam (mm)
7.00	200

Casing	
Depth(m)	Diam (mm)
6.00	200

Drilling Progress by Time				
Date	Time	Depth (m)	Casing (m)	Water (m)
16/01	16:00	2.00	1.00	
01/03	17:01	7.00	6.00	3.10

Scale:	1:50
Checked By:	KW
Approved By:	SR
Start Date:	16/01/2023
Finish Date:	17/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
Turf over soft dark brown silty CLAY with rootlets. (TOPSOIL) TOP		0.20	81.22			0.05 - 0.50	BB1	
Medium dense brown slightly silty very gravelly fine to coarse SAND. Gravel is fine to medium sub rounded to rounded of sandstone. TILL						0.50 - 1.00	BB2	
						1.00 - 1.15	DD3	SPT(C) 1.20m, N=26 (5,5/5,6,7,8)
Medium dense becoming dense brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse (predominantly coarse) rounded of sandstone. TILL		1.50	79.92			1.50 - 2.00	BB4	
						2.00 - 2.15	DD5	SPT(C) 2.00m, N=43 (16,10/15,10,10,8)
						2.30 - 3.00	BB6	
						3.00 - 3.15	DD7	SPT(C) 3.00m, N=40 (8,8/8,10,12,10)
Dense brown slightly silty sandy GRAVEL. Sand is fine to coarse. Gravel is fine to medium sub angular to sub rounded of sandstone and siltstone. TILL		3.50	77.92			3.50 - 4.00	BB8	
						4.00 - 4.15	DD9	SPT(C) 4.00m, N=29 (7,8/8,7,7,7)
						4.50 - 5.00	BB10	
						5.00 - 5.15	DD11	SPT(C) 5.00m, N=31 (7,8/7,8,8,8)
Dense brown sandy GRAVEL. Sand is medium to coarse. Gravel is fine to coarse sub angular of sandstone. TILL		5.50	75.92			5.50 - 6.00	BB12	
						6.00 - 6.15	DD13	SPT(C) 6.00m, N=16 (7,5/4,4,4,4)
						6.15 - 7.00	BB14	
Stiff greyish brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium sub angular of sandstone. TILL		6.80	74.62					
		7.00	74.42			7.00 - 7.15	DD15	SPT(C) 7.00m, N=31 (4,3/7,7,8,9)

EOH at 7.00m - Borehole Final Depth Achieved

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.

Chiselling		
From (m)	To (m)	Time (mins)
1.80	2.00	30

Water Added	
From (m)	To (m)
1.20	7.00

Hammer Information	
Serial No.	Energy Ratio %

Groundwater					
Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks
1.55	1	-	20	1.00	

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315269.86	Northing:	187802.27
Level:	82.56mAOD	Depth:	7.60m
Logger:	PM	Type:	CP
		Inclination:	90°

Status: FINAL

Borehole Number: **BH107**

Sheet 1 of 1

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time				
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)
0.00	1.20	Inspection Pit	Hand tools	AJ & LB	7.60	200	7.60	200	23/03	12:00	5.00	5.00	3.1
1.20	7.60	Cable Percussion	Dando 3000	AJ &LB									

Scale: 1:50
Checked By: KW
Approved By: SR
Start Date: 23/01/2023
Finish Date: 23/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
Firm brown silty slightly gravelly CLAY. Gravel is fine to medium sub rounded of sandstone. (TOPSOIL)						0.00 - 0.50	BB1	
TOP		0.30	82.26					
Brown slightly silty gravelly very clayey fine to coarse SAND. Gravel is fine to coarse sub rounded of sandstone. TILL						0.50 - 1.00	BB2	
						1.00 - 1.15	DD3	SPT(C) 1.00m, N=29 (3,7/7,8,7,7)
		1.50	81.06			1.50 - 2.00	BB4	
Medium dense silty sandy GRAVEL with medium cobble content. Sand is fine to coarse. Gravel and cobbles are fine to course sub rounded to rounded of sandstone. TILL						2.00 - 2.15	DD5	SPT(C) 2.00m, N=19 (5,4/4,5,5,5)
						2.50 - 3.00	BB6	
						3.00 - 3.15	DD7	SPT(C) 3.00m, N=18 (2,5/4,4,5,5)
						3.50 - 4.00	DB8	
						4.00 - 4.15	DD9	SPT(C) 4.00m, N=8 (2,2/2,2,2,2)
						4.50 - 5.00	BB10	
						5.00 - 5.15	DD11	SPT(C) 5.00m, N=9 (3,4/3,2,2,2)
						5.50 - 5.80	BB12	
Firm to stiff silty sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub rounded to rounded of sandstone. TILL		5.80	76.76			5.80 - 6.00	DD13	SPT(C) 5.80m, 50 (11,14/50 for 35mm)
						6.50 - 7.00	BB14	
						7.00 - 7.15	DD15	SPT(C) 7.00m, 50 (6,11/50 for 70mm)
						7.00 - 7.50	BB16	
						7.50 - 7.65	DD17	
EOH at 7.60m - Borehole Final Depth Achieved		7.60	74.96					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.

Chiselling			Water Added		Hammer Information	
From (m)	To (m)	Time (mins)	From (m)	To (m)	Serial No.	Energy Ratio %
5.80	6.00	30	2.00	7.60		
7.30	7.50	60				

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks
2.00	-	-	20	1.50	

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**
Location: **Caerphilly**
Client: **CCBC**

Location Details
Easting: 315291.28 Northing: 187681.06
Level: 83.40mAOD Depth: 0.80m
Logger: CS Type: TP
Ordnance Survey Great Britain National Grid

Status: FINAL

Pit Number: **TP/SA101**
Sheet 1 of 1

Hole Information

Pit Dimensions: 2.00m × 0.70m
Orientation: °
Shoring: None
Stability: Good
Plant: JCB 3CX

Groundwater

Strike (m)	Rose To (m)	After (mins)	Remarks

Scale: 1:25
Checked By: KW
Approved By: SR
Start Date: 06/01/2023
Finish Date: 06/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
MADE GROUND: Dark brown sandy CLAY. Sand is fine to medium with abundant rootlets (TOPSOIL) TOP		0.20	83.20					
Dark reddish brown silty sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to medium angular to subrounded. Cobbles are subrounded to subangular. Arisings becoming slightly less clayey with depth TILL						0.30 0.30	BB16 ESES10	
						0.50 0.50	BB17 ESes11	
EOH at 0.80m - Trial Pit Final Depth Achieved		0.80	82.60					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. ES = Environmental sample
3. B= Bulk disturbed sample

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**
Location: **Caerphilly**
Client: **CCBC**

Location Details
Easting: 315313.98 Northing: 187803.47
Level: 81.04mAOD Depth: 1.20m
Logger: CS Type: TP
Ordnance Survey Great Britain National Grid

Status: FINAL

Pit Number: **TP/SA104**

Sheet 1 of 1

Hole Information

Pit Dimensions: 0.70m x 2.00m
Orientation: °
Shoring: None
Stability: Good
Plant: JCB 3CX

Groundwater

Strike (m)	Rose To (m)	After (mins)	Remarks
1.20	0.00	0	

Scale: 1:25
Checked By: KW
Approved By: SR
Start Date: 06/01/2023
Finish Date: 06/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
MADE GROUND: Turf over dark brown sandy CLAY Sand is fine to coarse with frequent rootlets TOP								
Dark orangish brown clayey gravelly SAND with high cobble content. Sand is fine to coarse. Gravel is fine to coarse angular to subangular of sandstone. Cobbles are subrounded subangular angular well rounded of sandstone. TILL		0.20	80.84			0.30 0.30	BB10 ESES8	
						0.50 0.50	BB11 ESES19	
						1.00 1.00	BB12 ESES20	
EOH at 1.20m - Water Strike		1.20	79.84					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. ES = Environmental sample
3. B= Bulk disturbed sample

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**
Location: **Caerphilly**
Client: **CCBC**

Location Details
Easting: Northing:
Level: Depth: 1.70m
Logger: CS Type: TP
Ordnance Survey Great Britain National Grid

Status: FINAL

Pit Number: **TP/SA105**
Sheet 1 of 1

Hole Information

Pit Dimensions: 2.00m x 0.70m
Orientation: °
Shoring: None
Stability: Good
Plant: JCB 3CX

Groundwater

Strike (m)	Rose To (m)	After (mins)	Remarks

Scale: 1:25
Checked By: KW
Approved By: SR
Start Date: 05/01/2023
Finish Date: 05/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
MADE GROUND: Turf over dark brown slightly gravelly CLAY. Gravel is medium subrounded (TOPSOIL) TOP						0.20	ESES4	
Dark orange mottled brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of sandstone. TILL		0.30				0.30 - 0.40 0.50 - 0.60 0.60	BB4 BB5 ESES5	
Light orangish brown very gravelly SAND with high cobble content and with medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of sandstone. Cobbles are subangular subrounded assorted lithologies. Boulders are 400mm of sandstone. TILL		0.80				1.00 - 1.10 1.20	BB6 ESes6	
EOH at 1.70m - Water Strike		1.70						

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. ES = Environmental sample
3. B= Bulk disturbed sample

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**
Location: **Caerphilly**
Client: **CCBC**

Location Details
Easting: Northing:
Level: Depth: 1.70m
Logger: CS Type: TP
Ordnance Survey Great Britain National Grid

Status: FINAL

Pit Number: **TP/SA107**
Sheet 1 of 1

Hole Information

Pit Dimensions: 2.20m x 0.70m
Orientation: °
Shoring: None
Stability: Poor, wet sands and clay collapsed walls
Plant: JCB 3CX

Groundwater

Strike (m)	Rose To (m)	After (mins)	Remarks
0.70	0.00	0	
1.50	0.00	0	

Scale: 1:25
Checked By: KW
Approved By: SR
Start Date: 05/01/2023
Finish Date: 05/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
MADE GROUND: Turf over dark brown slightly sandy CLAY. Sand is fine with abundant roots and rootlets TOP						0.20 0.30	ESES1 BB1	
Brown/black with dark reddish brown clayey silty GRAVEL with cobbles. Gravels are fine to coarse with high cobble content of subangular sandstone. TILL		0.50		▼		0.50 0.60	BB2 ESES2	
Reddish orange very slightly clayey SAND. Sand is fine to coarse. TILL		1.00		▼		1.00 1.20	BB3 ESes3	
EOH at 1.70m - Trial Pit Final Depth Achieved		1.70						

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. ES = Environmental sample
3. B= Bulk disturbed sample

Project Number: **B040567**

TETRA TECH

Project:	**Plasyfelin**	Location Details	Status
Location:	**Caerphilly**	Easting: 315282.92 Northing: 187767.97	FINAL
Client:	**CCBC**	Level: 83.09mAOD Depth: 1.35m	Pit Number **TP102**
		Logger: CS Type: TP	Sheet 1 of 1
		Ordnance Survey Great Britain National Grid	

Hole Information

Pit Dimensions: 2.00m × 0.70m

Orientation:	°
Shoring:	None
Stability:	Good
Plant:	JCB 3CX

Groundwater

Strike (m)	Rose To (m)	After (mins)	Remarks
1.35	0.00	0	

Scale:	1:25
Checked By:	KW
Approved By:	SR
Start Date:	06/01/2023
Finish Date:	06/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
MADE GROUND: Dark brown slightly sandy gravelly CLAY. Sand is fine to coarse .Gravel is fine to fine coarse, angular to subangular with abundant rootlets (TOPSOIL). TOP								
Dark brown slightly gravelly silty clayey fine to coarse SAND. Gravel is fine to coarse angular to subangular of sandstone. TILL		0.30	82.79			0.30 0.30	BB15 ESES12	
						0.50 0.50	BB16 ESES13	
Brownish orange clayey gravelly SAND with medium cobble content. Sand is fine to coarse. Gravel is fine coarse angular to subangular of sandstone. Cobbles are subrounded of sandstone. TILL		0.90	82.19			1.00 1.00	BB17 ESes14	
EOH at 1.35m - Trial Pit Final Depth Achieved		1.35	81.74	▼				

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. ES = Environmental sample
3. B= Bulk disturbed sample

Project Number **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details

Easting: 315317.06 Northing: 187780.52

Level: 81.07mAOD Depth: 1.50m

Logger: CS Type: TP

Ordnance Survey Great Britain National Grid

Status: FINAL

Pit Number: **TP103**

Sheet 1 of 1

Hole Information

Pit Dimensions: 2.00m x 0.70m

Orientation: °

Shoring: None

Stability: Good

Plant: JCB 3CX

Groundwater

Strike (m)	Rose To (m)	After (mins)	Remarks
1.50	0.00	0	

Scale: 1:25

Checked By: KW

Approved By: SR

Start Date: 06/01/2023

Finish Date: 06/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
MADE GROUND: dark brown silty clayey gravelly SAND. Gravel is fine to coarse angular with abundant rootlets . Sands are fine to coarse (TOPSOIL) TOP								
Reddish orangish brown slightly silty clayey sandy GRAVEL with medium cobble content. Gravel is fine to coarse subangular to subrounded of sandstone. Cobbles are subrounded of sandstone. Sands are fine to coarse. Becoming very cobbly from 1.1mbgl. TILL		0.30	80.77			0.30 0.30	Bb18 ESes15	
						0.50 0.50	Bb19 ESes16	
						1.00 1.00	Bb20 ESes17	
EOH at 1.50m - Water Strike		1.50	79.57					

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. ES = Environmental sample
3. B= Bulk disturbed sample

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**
Location: **Caerphilly**
Client: **CCBC**

Location Details
Easting: Northing:
Level: Depth: 1.30m
Logger: CS Type: TP
Ordnance Survey Great Britain National Grid

Status: FINAL

Pit Number: **TP106**

Sheet 1 of 1

Hole Information

Pit Dimensions: 2.00m x 0.70m
Orientation: °
Shoring: None
Stability: Good
Plant: JCB 3CX

Groundwater

Strike (m)	Rose To (m)	After (mins)	Remarks
0.90	0.00	0	
	0.00	0	

Scale: 1:25
Checked By: KW
Approved By: SR
Start Date: 05/01/2023
Finish Date: 05/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
MADE GROUND: Dark brown sandy CLAY (TOPSOIL) TOP						0.20	ES ES10	
Dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of sandstone. TILL		0.20				0.30	B B7	
clay land drain struck, repaired and backfilled. pit extended.		0.40				0.50	B B8	
Dark to light orangish yellowish brown clayey sandy gravelly GRAVEL with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of sandstone. Cobbles are angular, assorted lithologies with occasional boulders of 300mm of sandstone. TILL				▼		0.60	ES ES11	
						1.00	B B9	
						1.20	ES Ses12	
EOH at 1.30m - Trial Pit Final Depth Achieved		1.30						

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. ES = Environmental sample
3. B= Bulk disturbed sample

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315308.34	Northing:	187719.40
Level:	82.60mAOD	Depth:	1.50m
Logger:	James Craddock	Type:	WS+DP
		Inclination:	°

Status: FINAL

Hole Number: **WS101**

Sheet 1 of 1

Scale: 1:50
Checked By: KW
Approved By: SR
Start Date: 05/01/2023
Finish Date: 05/01/2023

Hole Information

From (m)	To (m)	Type	Termination
0.00	1.20	Inspection Pit	Borehole Final Depth Achieved
1.20	1.50	Windowless Sampling	

Groundwater

Strike (m)	Rises to (m)	Time (min)	Remarks
1.00			

Blows / 100mm	Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
14, 17, 21, 25	Grass turf over slightly sandy gravelly SILT/CLAY. Sands are predominantly fine to medium. Gravels are fine to coarse of subangular sandstone. Horizon has occasional nodules of rootlets. TOP							0.00 - 0.55	1 B	
								0.30	1 ES	
	Organish brown clayey sandy very cobbly GRAVEL. Sands are fine to medium, gravels are subangular to subrounded of sandstone with frequent cobbles of the same. Gravels are becoming coarser with depth. Horizon assessed as medium dense due to very hard digging with a shovel. ALV		0.55	82.05				0.55 - 1.20	2 B	
								0.60	2 ES	
			1.20	81.40				1.20	3 ES	N=50 (2,8/50 for 235mm)
								1.20	SPT(C)	
	Greyish brown very silty sandy GRAVEL. Sands are fine to medium. Gravels are fine to medium of sandstone and mixed lithologies. ALV		1.50	81.10						
	EOH at 1.50m - Borehole Final Depth Achieved									

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks
1.20	1.50	64	60	WS Refused

Hammer Information

Hammer Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315303.83	Northing:	187774.74
Level:	82.58mAOD	Depth:	1.20m
Logger:	James Craddock	Type:	WS+DP
		Inclination:	°

Status: FINAL

Hole Number: **WS102**

Sheet 1 of 1

Scale: 1:50
Checked By: KW
Approved By: SR
Start Date: 05/01/2023
Finish Date: 05/01/2023

Hole Information

From (m)	To (m)	Type	Termination
0.00	1.20	Inspection Pit	Borehole Final Depth Achieved
1.20	1.65	Windowless Sampling	

Groundwater

Strike (m)	Rises to (m)	Time (min)	Remarks

Blows / 100mm	Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
	Grass turf over slightly sandy gravelly SILT. Sands are fine to medium, gravels are fine to medium of mudstone and siltstone. Horizon has frequent nodules of rootlets in situ (<250mm). Horizon has white staining within soil matrix. TOP		0.30	82.28				0.00 - 0.30	1 B	
								0.30	1 ES	
								0.30 - 1.20	2 B	
								0.60	2 ES	
								0.80	SPT(C)	N=50 (14,17/50 for 95mm)
19	Yellowish brown clayey silty sandy GRAVEL. Sands are fine to medium, gravels are fine to medium becoming coarser with depth of sandstone and mudstone, subangular to subrounded sandstone. horizon has rare and isolated patches of organish brown and grey clay mottling, more frequent with depth. TILL		1.20	81.38						
22										
22										
25										
	EOH at 1.20m - Borehole Final Depth Achieved									

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks

Hammer Information

Hammer Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315293.02	Northing:	187812.83
Level:	81.79mAOD	Depth:	4.00m
Logger:	James Craddock	Type:	WLS
		Inclination:	°

Status: FINAL

Borehole Number: **WS103**

Sheet 1 of 1

Method, Plant and Crew					Diameter		Casing		Groundwater						Remarks
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Strike (m)	Casing (m)	Sealed (m)	Rose To (m)	Time (mins)		
0.00	1.20	Inspection Pit	Hand Digging Tools	SWGT											
1.20	4.00	Dynamic Windowless Sampling	DART 346	SWGT											

Scale: 1:25
Checked By: KW
Approved By: SR
Start Date: 05/01/2023
Finish Date: 05/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
Light brown gravelly sandy SILT. Sands are predominantly fine to medium. Gravels are fine to medium of subangular to angular of sandstone with occasional clasts of subangular mudstone. TOP						0.00 - 0.50	B1	
						0.30	ES1	
Orangish brown sandy gravelly CLAY. Sands are fine to medium. Gravels are fine to medium of subangular to subrounded sandstone. Horizon is slightly damp from 0.80m bgl with waterstrike at 1.30m. Horizon becoming increasingly abundant in gravel from 1.50m bgl. TILL		0.50	81.29			0.60	ES2	
						1.20	ES3	SPT(C) 1.20m, N=11 (1,2/2,3,3,3)
								SPT(C) 2.00m, N=45 (6,7/10,10,11,14)
Greyish brown gravelly SAND. Sands are fine to medium becoming coarse with depth. Gravels are fine to medium, subangular to subrounded of sandstone with mixed lithologies of river gravels. TILL		2.40	79.39			2.40 - 4.00	B2	
								SPT(C) 3.00m, N=34 (8,9/8,7,8,11)
EOH at 4.00m - Borehole Final Depth Achieved		4.00	77.79					SPT(C) 4.00m, N=50 (15,19/50 for 160mm)

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery %	Remarks
1.20	2.00	87	70	
2.00	3.00	64	80	
3.00	4.00	64	70	WS Refused

Hammer Information

Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315259.61	Northing:	187827.07
Level:	81.99mAOD	Depth:	4.00m
Logger:	James Craddock	Type:	WLS
		Inclination:	°

Status: FINAL

Borehole Number: **WS104**

Sheet 1 of 1

Method, Plant and Crew					Diameter		Casing		Groundwater						Remarks
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Strike (m)	Casing (m)	Sealed (m)	Rose To (m)	Time (mins)		
0.00	1.20	Inspection Pit	Hand Digging Tools	SWGT											
1.20	4.00	Dynamic Windowless Sampling	Dart 346	SWGT											

Scale:	1:25
Checked By:	KW
Approved By:	SR
Start Date:	05/01/2023
Finish Date:	05/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
Grass turf over silty sandy CLAY. Sands are fine to medium. Gravels are fine to medium of subangular mudstone and occasional subangular to occasionally angular sandstone. Horizon has rare nodules of in-situ rootlets. Very damp pit walls during excavation of inspection pit. TOP						0.00 - 0.30	B1	
Orangish brown with frequent clay mottling of orangish grey, sandy gravelly cobbly CLAY. Sands are fine to medium. Gravels are fine to coarse of subangular to subrounded sandstone. horizon has rare coal gravels tabular in shape and fissile Large sandstone cobble being chased down the borehole for 2-3m. TILL		0.30	81.69			0.30 0.30 - 1.20 0.60 1.20 1.20 - 3.00	ES1 B2 ES2 ES3 B3	SPT(C) 1.20m, N=17 (6,5/4,5,4,4) SPT(C) 2.00m, N=28 (8,7/6,8,7,7)
Grey with rare orange staining very sandy gravelly CLAY. Sands are fine to coarse. Gravels are predominantly fine to medium, subrounded sandstone and mixed lithologies of river gravels TILL		3.00	78.99			3.00 - 4.00	B4	SPT(C) 3.00m, N=12 (2,3/2,3,3,4)
EOH at 4.00m - Borehole Final Depth Achieved		4.00	77.99					SPT(C) 4.00m, N=50 (15,17/50 for 95mm)

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery %	Remarks
1.20	2.00	102	80	
2.00	3.00	87	65	
3.00	4.00	84	60	WS Refused

Hammer Information

Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:		Northing:	
Level:		Depth:	3.50m
Logger:	James Craddock	Type:	WLS
		Inclination:	°

Status: FINAL

Borehole Number: **WS105**

Sheet 1 of 1

Method, Plant and Crew					Diameter		Casing		Groundwater						
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Strike (m)	Casing (m)	Sealed (m)	Rose To (m)	Time (mins)	Remarks
0.00	1.20	Inspection Pit	Hand Digging Tools	SWGT										
1.20	3.50	Dynamic Windowless Sampling	DART 346	SWGT										

Scale: 1:25
Checked By: KW
Approved By: SR
Start Date: 05/01/2023
Finish Date: 05/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
Light brown gravelly sandy SILT. Sands are predominantly fine to medium. Gavels are fine to medium of subangular to occasionally angular sandstone and mudstone. TOP						0.00 - 0.50	B1	
						0.30	ES1	
Orangish brown sandy gravelly cobbly SILT. Sands are fine to medium. Gravels are fine to medium of subangular to subrounded sandstone with rare cobbles are of the same. TILL		0.50				0.50 - 1.20	B2	
						0.60	ES2	
						1.20	ES3	SPT(C) 1.20m, N=23 (4,4/6,4,7,6)
Greyish brown very sandy GRAVEL, becoming grey SAND from 3.00m bgl. Sands are fine to medium becoming coarse from 3.00m bgl. Gravels are subangular to subrounded of mixed alluvial river gravels. TILL		2.00				2.00 - 3.50	B3	SPT(C) 2.00m, N=26 (4,5/6,7,7,6)
								SPT(C) 3.00m, N=45 (9,10/10,12,9,14)
EOH at 3.50m - Borehole Final Depth Achieved		3.50						SPT(C) 3.50m, N=50 (14,14/50 for 170mm)

1 2 3 4 5

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery %	Remarks
1.20	2.00	87	80	
2.00	3.00	64	75	
3.00	3.50	64	70	WS Refused

Hammer Information

Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:		Northing:	
Level:		Depth:	1.50m
Logger:	James Craddock	Type:	WS+DP
		Inclination:	°

Status: FINAL

Hole Number: **WS106**

Sheet 1 of 1

Scale: 1:50
Checked By: KW
Approved By: SR
Start Date: 06/01/2023
Finish Date: 06/01/2023

Hole Information

From (m)	To (m)	Type	Termination
0.00	1.20	Inspection Pit	Borehole Final Depth Achieved
1.20	1.50	Windowless Sampling	

Groundwater

Strike (m)	Rises to (m)	Time (min)	Remarks

Blows / 100mm	Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
5 10 15 20 25 30 35 40 45	Grass turf over light brown slightly sandy gravelly SILT with occasional patches of clay. Sands are predominantly fine to medium. Gravels are fine to medium of subangular sandstone and blocky angular mudstone. Horizon has rare nodules of rootlets. TOP							0.00 - 0.50	1 B	
								0.30	1 ES	
			0.50					0.50 - 1.20	2 B	
								0.60	2 ES	
	Pale organish brown very sandy gravelly CLAY. Sands are fine to medium. Gravels are fine to medium subangular to subrounded sandstone. TILL									
			1.20					1.20	3 ES	N=26 (5,6/6,7,6,7)
								1.20 - 1.50	3 B	
								1.20	SPT(C)	
	Orangish brown sandy gravelly CLAY becoming very cobbly and gravelly with depth. Sands are fine to medium. Gravels and cobbles are fine to coarse, subangular to subrounded of sandstone with frangible fragments of quartz. Horizon has rare coal tabular fissile gravels. TILL		1.50							
7								1.65	SPT(C)	N=50 (17,19/50 for 95mm)
8										
17										
25	EOH at 1.50m - Borehole Final Depth Achieved									

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks
1.20	1.50	87	50	WS Refused

Hammer Information

Hammer Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315261.39	Northing:	187691.29
Level:	86.18mAOD	Depth:	2.00m
Logger:	James Craddock	Type:	WS+DP
		Inclination:	°

Status: FINAL

Hole Number: **WS107**

Sheet 1 of 1

Scale: 1:50
Checked By: KW
Approved By: SR
Start Date: 06/01/2023
Finish Date: 06/01/2023

Hole Information

From (m)	To (m)	Type	Termination
0.00	1.20	Inspection Pit	Borehole Final Depth Achieved
1.20	2.00	Windowless Sampling	

Groundwater

Strike (m)	Rises to (m)	Time (min)	Remarks
1.20			

Blows / 100mm	Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
	Grass turf over light brown gravelly slightly clayey sandy SILT. Sands are fine to medium. Gravels are fine to medium of subangular mudstone with occasional clasts of subrounded sandstone. Horizon has occasional rootlets within the first 100mm. Horizon has rare subangular tabular red tile fragments in situ at 0.25m bgl. MGR(C)		0.50	85.68				0.00 - 0.50	1 B	
								0.30	1 ES	
								0.50 - 1.20	2 B	
								0.60	2 ES	
	Orangish brown with frequent greyish brown and black staining, sandy gravelly CLAY. Sands are fine to medium. Gravels are fine to coarse becoming coarser with depth. Horizon becoming very cobbly from 0.65m bgl. Horizon becoming slightly damp with depth. From 1.70m bgl horizon becoming very cobbly with flint and sandstone. TILL							1.20	3 ES	N=19 (4,5/3,3,5,8)
7 9 10 25								1.20	SPT(C)	
								1.70	SPT(C)	N=50 (14,16/50 for 235mm)
	EOH at 2.00m - Borehole Final Depth Achieved		2.00	84.18						

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks
1.20	2.00	87	40	WS Refused

Hammer Information

Hammer Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:	315265.64	Northing:	187677.70
Level:	85.99mAOD	Depth:	1.30m
Logger:	James Craddock	Type:	WS+DP
		Inclination:	°

Status: FINAL

Hole Number: **WS108**

Sheet 1 of 1

Scale: 1:50
Checked By: KW
Approved By: SR
Start Date: 06/01/2023
Finish Date: 06/01/2023

Hole Information

From (m)	To (m)	Type	Termination
0.00	1.20	Inspection Pit	Borehole Final Depth Achieved
1.20	1.30	Windowless Sampling	

Groundwater

Strike (m)	Rises to (m)	Time (min)	Remarks

Blows / 100mm	Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing: Depth (m)	Ref	Test Results
	Grass turf over light brown gravelly sandy SILT. Sands are fine to medium. Gravels are fine to medium of subangular mudstone with occasional clasts of subrounded sandstone. Horizon has occasional rootlets in situ at 0.10m bgl. TOP							0.00 - 0.35	1 B	
			0.35	85.64				0.30	1 ES	
								0.35 - 1.30	2 B	
								0.60	2 ES	
								0.80	SPT(C)	N=40 (8,10/9,10,10,11)
	Orangish brown with greyish brown mottling sandy gravelly CLAY. Sands are fine to medium. Gravels are fine to coarse of subangular sandstone. WS suspected refusal on sandstone cobbles at 1.30m bgl. TILL							1.20	3 ES	
10, 14, 10, 9, 19, 25	EOH at 1.30m - Borehole Final Depth Achieved		1.30	84.69				1.30	SPT(C)	N=50 (14,7/50 for 95mm)

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery (%)	Remarks
0.80	1.30	87	50	WS Refused

Hammer Information

Hammer Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:		Northing:	
Level:		Depth:	4.40m
Logger:	James Craddock	Type:	WLS
		Inclination:	°

Status: FINAL

Borehole Number: **WS109**

Sheet 1 of 1

Method, Plant and Crew					Diameter		Casing		Groundwater						Remarks
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Strike (m)	Casing (m)	Sealed (m)	Rose To (m)	Time (mins)		
0.00	1.20	Inspection Pit	Hand Digging Tools	SWGT											
1.20	4.40	Dynamic Windowless Sampling	DART 346	SWGT											

Scale:	1:25
Checked By:	KW
Approved By:	SR
Start Date:	06/01/2023
Finish Date:	06/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
Grass turf over slightly sandy gravelly clayey SILT. Sands are fine to medium. Gravels are fine to medium, subangular to occasionally angular of mudstone and siltstone. Horizon has occasional rootlets in situ (<200mm). TOP						0.00 - 0.40	B1	
						0.30	ES1	
Yellowish orangish brown sandy CLAY. Sands are fine becoming coarser with depth. Horizon is very wet from 0.80m bgl with groundwater strike at 1.10m bgl. Horizon becoming very dense sandy gravelly CLAY. Horizon has rare coal staining from 1.70 and bgl with rare cobbles of sandstone at 1.50m bgl. TILL		0.40				0.40 - 1.20	B2	
						0.60	ES2	
						1.20	ES3	SPT(C) 1.20m, N=44 (1,6/10,12,14,8)
						1.20 - 4.00	B3	
								HV 1.80m, (p)=32 kPa (r)= kPa
No recovery due to gravelly nature of strata.		2.00						SPT(C) 2.00m, N=21 (4,6/7,4,5,5)
Greyish brown, with orangish brown mottling, sandy gravelly CLAY. Sands are fine to coarse. Gravels are fine to medium subangular to subrounded sandstone becoming coarser with depth. TILL		3.00						SPT(C) 3.00m, N=16 (3,2/4,5,3,4)
								HV 3.60m, (p)=62 kPa (r)= kPa
								SPT(C) 4.00m, N=39 (7,6/8,9,10,12)
EOH at 4.40m - Borehole Final Depth Achieved		4.40						SPT(C) 4.45m, N=50 (11,12/50 for 235mm)

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery %	Remarks
1.20	2.00	102	100	
2.00	3.00	87	0	
3.00	4.00	87	90	WS Refused

Hammer Information

Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

TETRA TECH

Project: **Plasyfelin**

Location: **Caerphilly**

Client: **CCBC**

Location Details			
Easting:		Northing:	
Level:		Depth:	5.00m
Logger:	James Craddock	Type:	WLS
		Inclination:	°

Status: FINAL

Borehole Number: **WS110**

Sheet 1 of 1

Method, Plant and Crew					Diameter		Casing		Groundwater					
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Strike (m)	Casing (m)	Sealed (m)	Rose To (m)	Time (mins)	Remarks
0.00	1.20	Inspection Pit	Hand Digging Tools	SWGT										
1.20	5.00	Dynamic Windowless Sampling	DART 346	SWGT										

Scale: 1:25
Checked By: KW
Approved By: SR
Start Date: 06/01/2023
Finish Date: 06/01/2023

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results	
Grass turf over greyish brown very sandy gravelly SILT. Sands are fine to medium. Gravels are fine becoming medium with depth of occasionally tabular and fissile siltstone. TOP						0.00 - 0.40	B1		
						0.30	ES1		
Orangish brown with occasional grey mottling. sandy gravelly cobbly CLAY. Sands are fine to coarse and gravels are fine to coarse subangular to subrounded sandstone. Horizon has rare tabular cobble of sandstone at 1.00m. Groundwater strike at 1.1 0m bgl. Horizon has occasional cobbles of sandstone from 1.80 to 2.0m bgl. TILL		0.40				0.40 - 1.20	B2		
						0.60	ES2		
						1.20	ES3	SPT(C) 1.20m, N=28 (4,4/6,6,8,8)	1
								HV 1.50m, (p)=20 kPa (r)= kPa	
Greyish brown sandy gravelly CLAY with occasional cobbles. Sands are fine to medium. Gravels are fine to coarse of subangular to subrounded sandstone and siltstone with rare isolated fragments of coal staining. Large cobble of mudstone at 3.0m bgl. Horizon is becoming grey and very sandy with depth. TILL		2.00				2.00 - 3.00	B3	SPT(C) 2.00m, N=20 (2,3/4,3,6,7)	2
								SPT(C) 3.00m, N=45 (4,6/7,11,14,13)	3
								SPT(C) 4.00m, N=15 (4,2/4,3,4,4)	4
EOH at 5.00m - Borehole Final Depth Achieved		5.00						SPT(C) 5.00m, N=31 (4,6/5,8,9,9)	5

Observations / Remarks

1. Position cleared by Midland Survey and then further checked by TT with CAT and Genny.
2. Inspection pit dug to 1.20m prior to intrusive works.
3. ES = Environmental sample
4. B= Bulk disturbed sample
5. C = Cone penetration test

Sampling Runs

From (m)	To (m)	Diam (mm)	Recovery %	Remarks
1.20	2.00	102	100	
2.00	3.00	87	75	WS Refused

Hammer Information

Serial No.	Energy Ratio %
DART346	68

Project Number: **B040567**

Plate 1 WS01 - Surface

Plate 2 WS01 - Subsurface

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Project :-
Plas-y-Felin

CCBC

Project No.: B040567

06/01/2023

Plate 3 WS01 - Handpit arisings

Plate 4 WS01 - 1.20m - 1.50m

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Plate 5 WS01 - Traces of white material

Plate 6 WS01 - Traces of white material

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Project No.: B040567

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Plate 7 WS01 - Traces of white material

Plate 8 BLANK

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Plate 9 WS02 - Surface

Plate 10 WS02 - Subsurface

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Plate 11 WS02 - Handpit arisings

Plate 12 BLANK

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Plate 13 WS03 - Surface

Plate 14 WS03 - Subsurface

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Plate 15 WS03 - Handpit arisings

Plate 16 WS03 - 1.20m - 4.00m

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Plate 17 WS04 - Surface

Plate 18 WS04 - Subsurface

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Plate 19 WS04 - Handpit arisings

Plate 20 WS04 - 1.20m - 4.00m

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Plate 21 WS05 - Surface

Plate 22 WS05 - Subsurface

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Plate 23 WS05 - Handpit arisings

Plate 24 WS05 - 1.00m - 3.50m

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Project :-
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05/01/2023

Plate 25 WS06 - Surface

Plate 26 WS06 - Subsurface

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Project :-
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Plate 27 WS06 - Handpit arisings

Plate 28 WS06 - 1.20m - 1.50m

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Project :-
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Project No.: B040567

05/01/2023

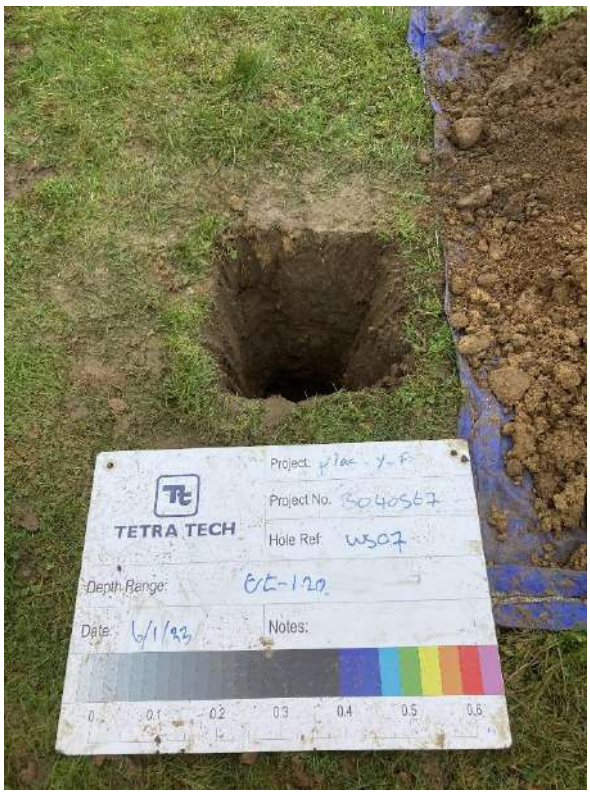

Plate 29 WS07 - Surface

Plate 30 WS07 - Subsurface

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Project No.: B040567

06/01/2023

Plate 31 WS07 - Handpit arisings

Plate 32 WS07 - 1.20m - 1.50m

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06/01/2023

Plate 33 WS08 - Surface

Plate 34 WS08 - Subsurface

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Plate 35 WS08 - Handpit arisings

Plate 36 WS08 - 0.80m - 1.30m

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Project :-
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Project No.: B040567

06/01/2023

Plate 37 WS09 - Surface

Plate 38 WS09 - Subsurface

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Project :-
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Project No.: B040567

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Plate 39 WS09 - Handpit arisings

Plate 40 WS09 - 2.00m - 4.40m

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Environmental Consultancy
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TETRA TECH

Project :-
Plas-y-Felin

CCBC

Project No.: B040567

06/01/2023

Plate 41 WS10 - Surface

Plate 42 WS10 - Subsurface

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Environmental Consultancy
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TETRA TECH

Project :-
Plas-y-Felin

CCBC

Project No.: B040567

06/01/2023

Plate 43 WS10 - Handpit arisings

Plate 44 WS10 - 1.50m - 3.00m

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Project :-
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Project No.: B040567

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Plate 45 WS10 - 3.00m - 5.00m

Plate 46 BLANK

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Environmental Consultancy
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Project :-
Plas-y-Felin

CCBC

Project No.: B040567

06/01/2023

Plate 47 Trial Pit excavation at TP01 location

Plate 48 Downhole view of TP01

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Environmental Consultancy
Ground Technologies & Investigation

Project :-
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CCBC

Project No.: B040567

06/01/2023

Plate 49 Trial Pit excavation at TP02 location

Plate 50 Trial Pit excavation at TP03 location

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Environmental Consultancy
Ground Technologies & Investigation

Project :-
Plas-y-Felin

CCBC

Project No.: B040567

06/01/2023

Plate 51 Trial Pit excavation at TP04 location

Plate 52 Groundwater encountered within location TP04

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Plate 53 Arisings associated with the excavation of TP04

Plate 54 Trial Pit excavation at TP05 location

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Plate 59 View of strata exposed within TP05

Plate 56 View of strata exposed within TP05

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Project No.: B040567

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Plate 61 Trial Pit excavation at TP06 location

Plate 58 Image of arisings associated with TP06, and positioning of excavator to prevent damage to grass

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Plate 63 Image of land drain encountered within TP06

Plate 60 Image of land drain encountered within TP06

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Plate 65 Mid-stage of patchwork of land drain within TP06

Plate 62 Layer of gravel placed over patchwork of land drain encountered within TP06

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Plate 67 Groundwater encountered within TP06 once pit had been extended

Plate 64 Trial Pit excavation at TP07 location

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Plate 69 View of strata and groundwater within TP07, showing wet sandy layer

Plate 66 Image of arisings associated with TP07

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Plate 71 Image of ground disturbance as a result of wet ground during site worrks

Plate 68 Image of ground disturbance as a result of wet ground during site worrks

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Plate 73 Image of ground disturbance as a result of wet ground during site worrks

Plate 70 Image of ground disturbance as a result of wet ground during site worrks, smoothed

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Plate 75 Image of ground disturbance as a result of wet ground during site worrks, smoothed

Plate 72 Image of ground disturbance as a result of wet ground during site worrks and bog mats

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Project :-
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Plate 77 Image of bog mats laid over wettest areas during site works to prevent damage

Plate 74 Image of bog mats laid over wettest areas during site works to prevent damage

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APPENDIX F – TRL PROBE TEST RESULTS

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Ground Engineering Services

TETRA TECH

PROJECT No.:	Plas Y Felin
PROJECT NAME:	784-B40567
CLIENT:	CCBC
FIGURE No.:	TRL01

DCP-CBR Corellation

$Log_{10}(CBR) = 2.48\text{-}1.057 \times Log_{10}$ (mm/blow)

DCP -Modulus E Corellation

$E = 17.6\ (CBR)^{0.64}$ MPa

In situ CBR by TRL Probe

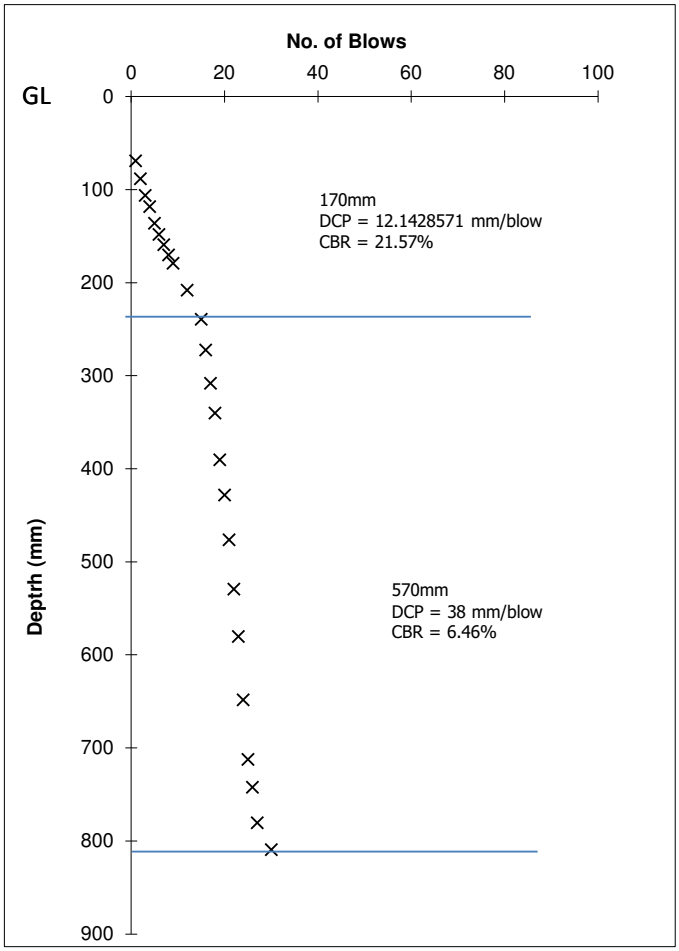
Reference: TRL01 Position: TRL01 Date: 06 January 2023

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
69	1	191	69				
19	2	210	88				
18	3	228	106				
12	4	240	118				
18	5	258	136				
12	6	270	148				
11	7	281	159				
11	8	292	170				
9	9	301	179				
29	12	330	208				
31	15	361	239				
33	16	394	272				
36	17	430	308				
32	18	462	340				
50	19	512	390				
38	20	550	428				
48	21	598	476				
53	22	651	529				
51	23	702	580				
68	24	770	648				
64	25	834	712				
30	26	864	742				
38	27	902	780				
29	30	931	809				

Test started at: 0 m below ground level

Zero Reading: 122 mm

Zero reading = start depth below ground surface



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Data compiled by: JC
Data checked by: SR

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TETRA TECH

PROJECT No.:	Plas Y Felin
PROJECT NAME:	784-B40567
CLIENT:	CCBC
FIGURE No.:	TRL02

DCP-CBR Corellation

$Log_{10}(CBR) = 2.48-1.057 \times Log_{10}$ (mm/blow)

DCP -Modulus E Corellation

$E = 17.6\ (CBR)^{0.64}$ MPa

In situ CBR by TRL Probe

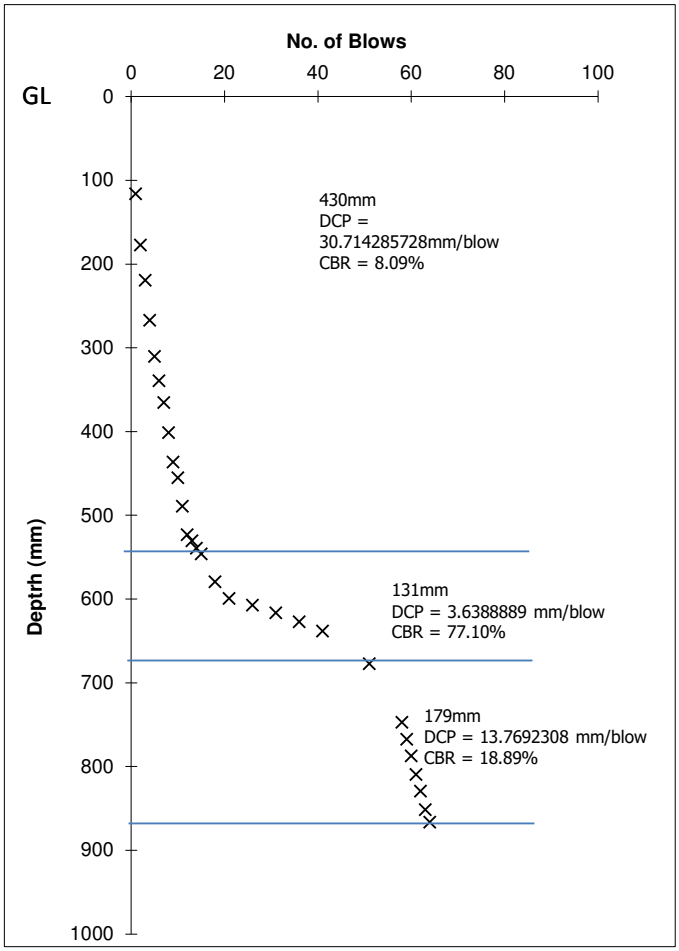
Reference: TRL02 Position: TRL02 Date: 06 January 2023

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
116	1	191	116				
61	2	252	177				
42	3	294	219				
48	4	342	267				
43	5	385	310				
29	6	414	339				
26	7	440	365				
36	8	476	401				
35	9	511	436				
19	10	530	455				
34	11	564	489				
34	12	598	523				
7	13	605	530				
9	14	614	539				
7	15	621	546				
33	18	654	579				
20	21	674	599				
8	26	682	607				
9	31	691	616				
11	36	702	627				
11	41	713	638				
39	51	752	677				
70	58	822	747				
20	59	842	767				
20	60	862	787				
22	61	884	809				
20	62	904	829				
22	63	926	851				
15	64	941	866				

Test started at: 0 m below ground level

Zero Reading: 75 mm

Zero reading = start depth below ground surface



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TETRA TECH

PROJECT No.:	Plas Y Felin
PROJECT NAME:	784-B40567
CLIENT:	CCBC
FIGURE No.:	TRL03

DCP-CBR Corellation

$Log_{10}(CBR) = 2.48\text{-}1.057 \times Log_{10}$ (mm/blow)

DCP -Modulus E Corellation

$E = 17.6\ (CBR)^{0.64}$ MPa

In situ CBR by TRL Probe

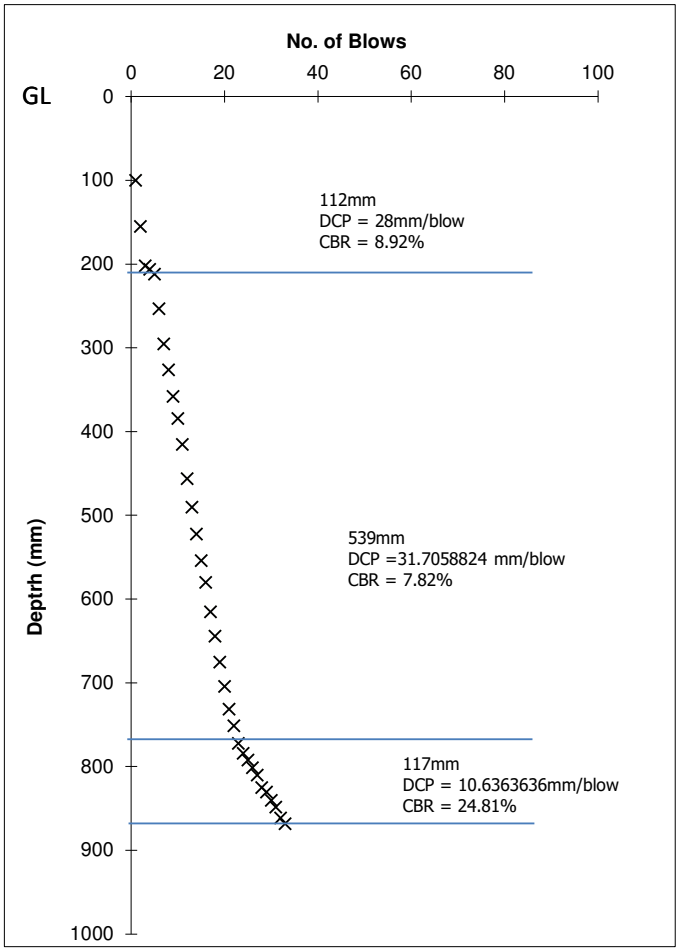
Reference: TRL03 Position: TRL03 Date: 06 January 2023

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
100	1	180	100				
55	2	235	155				
47	3	282	202				
4	4	286	206				
6	5	292	212				
41	6	333	253				
42	7	375	295				
31	8	406	326				
32	9	438	358				
26	10	464	384				
31	11	495	415				
41	12	536	456				
34	13	570	490				
32	14	602	522				
32	15	634	554				
26	16	660	580				
35	17	695	615				
29	18	724	644				
31	19	755	675				
29	20	784	704				
27	21	811	731				
20	22	831	751				
21	23	852	772				
12	24	864	784				
8	25	872	792				
9	26	881	801				
9	27	890	810				
15	28	905	825				
5	29	910	830				
10	30	920	840				
8	31	928	848				
13	32	941	861				
7	33	948	868				

Test started at: 0 m below ground level

Zero Reading: 80 mm

Zero reading = start depth below ground surface



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Data checked by: SR

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TETRA TECH

PROJECT No.:	Plas Y Felin
PROJECT NAME:	784-B40567
CLIENT:	CCBC
FIGURE No.:	TRL04

DCP-CBR Corellation

$Log_{10}(CBR) = 2.48\text{-}1.057 \times Log_{10}$ (mm/blow)

DCP -Modulus E Corellation

$E = 17.6\ (CBR)^{0.64}$ MPa

In situ CBR by TRL Probe

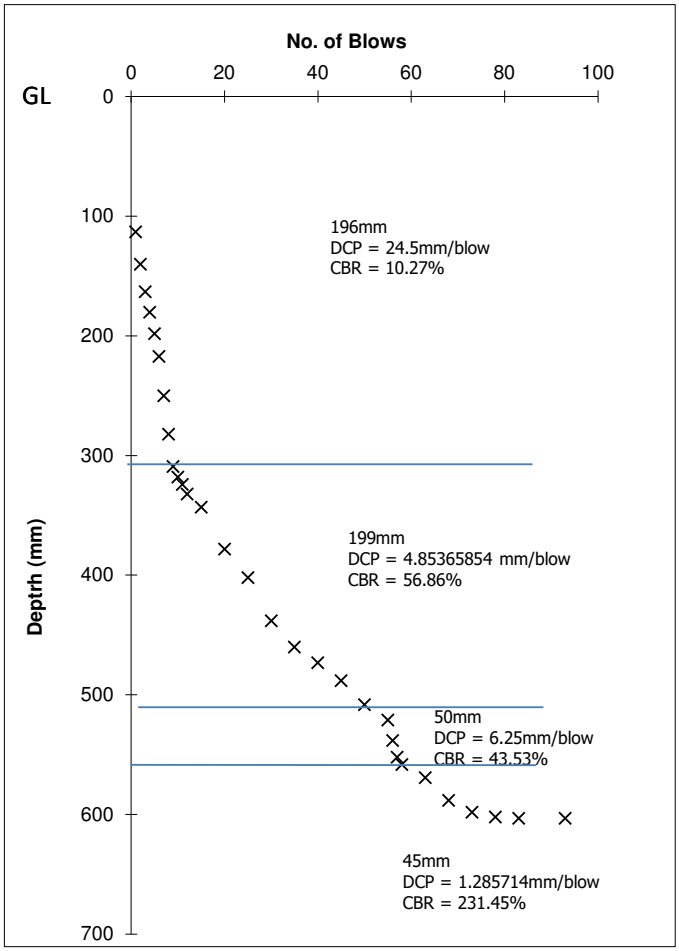
Reference: TRL04 Position: TRL04 Date: 06 January 2023

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
113	1	185	113				
27	2	212	140				
23	3	235	163				
17	4	252	180				
18	5	270	198				
19	6	289	217				
33	7	322	250				
32	8	354	282				
27	9	381	309				
9	10	390	318				
6	11	396	324				
8	12	404	332				
11	15	415	343				
35	20	450	378				
24	25	474	402				
36	30	510	438				
22	35	532	460				
13	40	545	473				
15	45	560	488				
20	50	580	508				
13	55	593	521				
17	56	610	538				
14	57	624	552				
6	58	630	558				
11	63	641	569				
19	68	660	588				
10	73	670	598				
4	78	674	602				
1	83	675	603				
	93	675	603				

Test started at: 0 m below ground level

Zero Reading: 72 mm

Zero reading = start depth below ground surface



Test notes: Refusal on hard strata at 675mm

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TETRA TECH

PROJECT No.:	Plas Y Felin
PROJECT NAME:	784-B40567
CLIENT:	CCBC
FIGURE No.:	TRL05

DCP-CBR Corellation
$Log_{10}(CBR) = 2.48-1.057 \times Log_{10}$ (mm/blow)

DCP -Modulus E Corellation
$E = 17.6\ (CBR)^{0.64}$ MPa

In situ CBR by TRL Probe

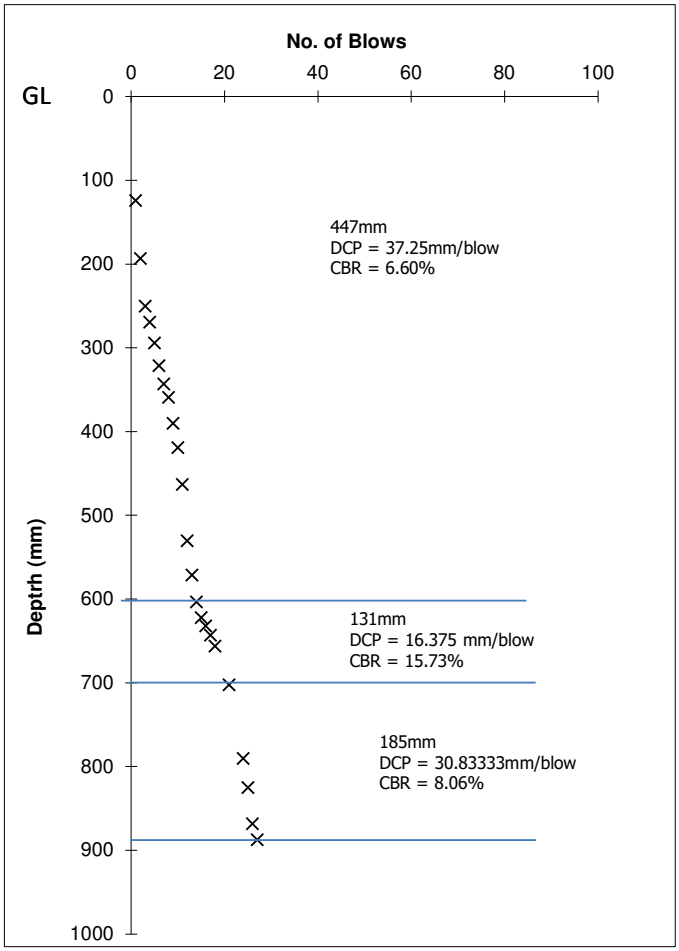
Reference: TRL05 Position: TRL05 Date: 06 January 2023

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
124	1	195	124				
69	2	264	193				
57	3	321	250				
19	4	340	269				
25	5	365	294				
27	6	392	321				
22	7	414	343				
16	8	430	359				
31	9	461	390				
29	10	490	419				
44	11	534	463				
67	12	601	530				
41	13	642	571				
32	14	674	603				
19	15	693	622				
10	16	703	632				
11	17	714	643				
13	18	727	656				
46	21	773	702				
88	24	861	790				
35	25	896	825				
43	26	939	868				
19	27	958	887				

Test started at: 0 m below ground level

Zero Reading: 71 mm

Zero reading = start depth below ground surface



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Data compiled by: JC
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TETRA TECH

PROJECT No.:	Plas Y Felin
PROJECT NAME:	784-B40567
CLIENT:	CCBC
FIGURE No.:	TRL06

DCP-CBR Corellation

$Log_{10}(CBR) = 2.48\text{-}1.057 \times Log_{10}$ (mm/blow)

DCP -Modulus E Corellation

$E = 17.6\ (CBR)^{0.64}$ MPa

In situ CBR by TRL Probe

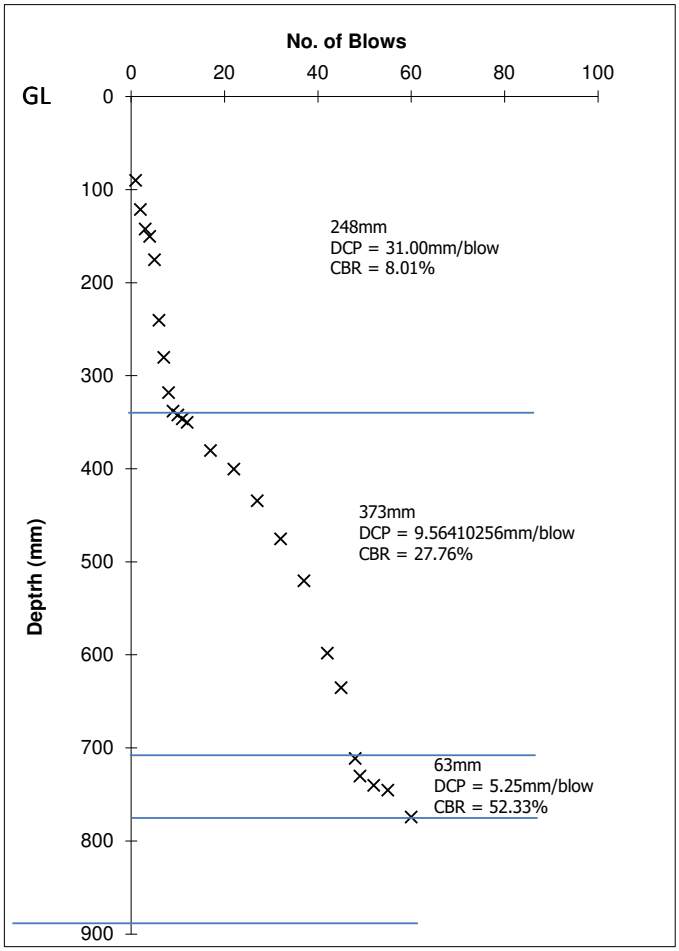
Reference: TRL06 Position: TRL06 Date: 06 January 2023

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
90	1	260	90				
31	2	291	121				
21	3	312	142				
8	4	320	150				
25	5	345	175				
65	6	410	240				
40	7	450	280				
38	8	488	318				
20	9	508	338				
4	10	512	342				
4	11	516	346				
4	12	520	350				
30	17	550	380				
20	22	570	400				
34	27	604	434				
41	32	645	475				
45	37	690	520				
78	42	768	598				
37	45	805	635				
76	48	881	711				
19	49	900	730				
10	52	910	740				
5	55	915	745				
29	60	944	774				

Test started at: 0 m below ground level

Zero Reading: 170 mm

Zero reading = start depth below ground surface



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Data compiled by: JC
Data checked by: SR

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TETRA TECH

PROJECT No.:	Plas Y Felin
PROJECT NAME:	784-B40567
CLIENT:	CCBC
FIGURE No.:	TRL07

DCP-CBR Corellation

$Log_{10}(CBR) = 2.48\text{-}1.057 \times Log_{10}$ (mm/blow)

DCP -Modulus E Corellation

$E = 17.6\ (CBR)^{0.64}$ MPa

In situ CBR by TRL Probe

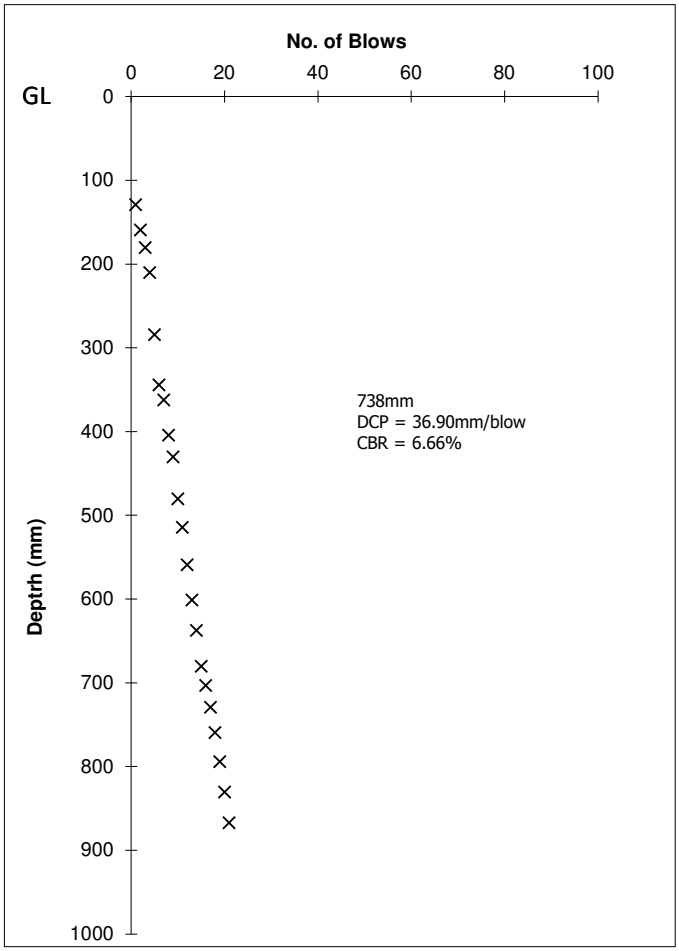
Reference: TRL07 Position: TRL07 Date: 06 January 2023

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
129	1	210	129				
30	2	240	159				
21	3	261	180				
30	4	291	210				
74	5	365	284				
60	6	425	344				
18	7	443	362				
42	8	485	404				
26	9	511	430				
50	10	561	480				
34	11	595	514				
45	12	640	559				
42	13	682	601				
36	14	718	637				
43	15	761	680				
23	16	784	703				
26	17	810	729				
30	18	840	759				
35	19	875	794				
36	20	911	830				
37	21	948	867				

Test started at: 0 m below ground level

Zero Reading: 81 mm

Zero reading = start depth below ground surface



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Data compiled by: JC
Data checked by: SR

APPENDIX G – SOIL INFILTRATION TEST RESULTS

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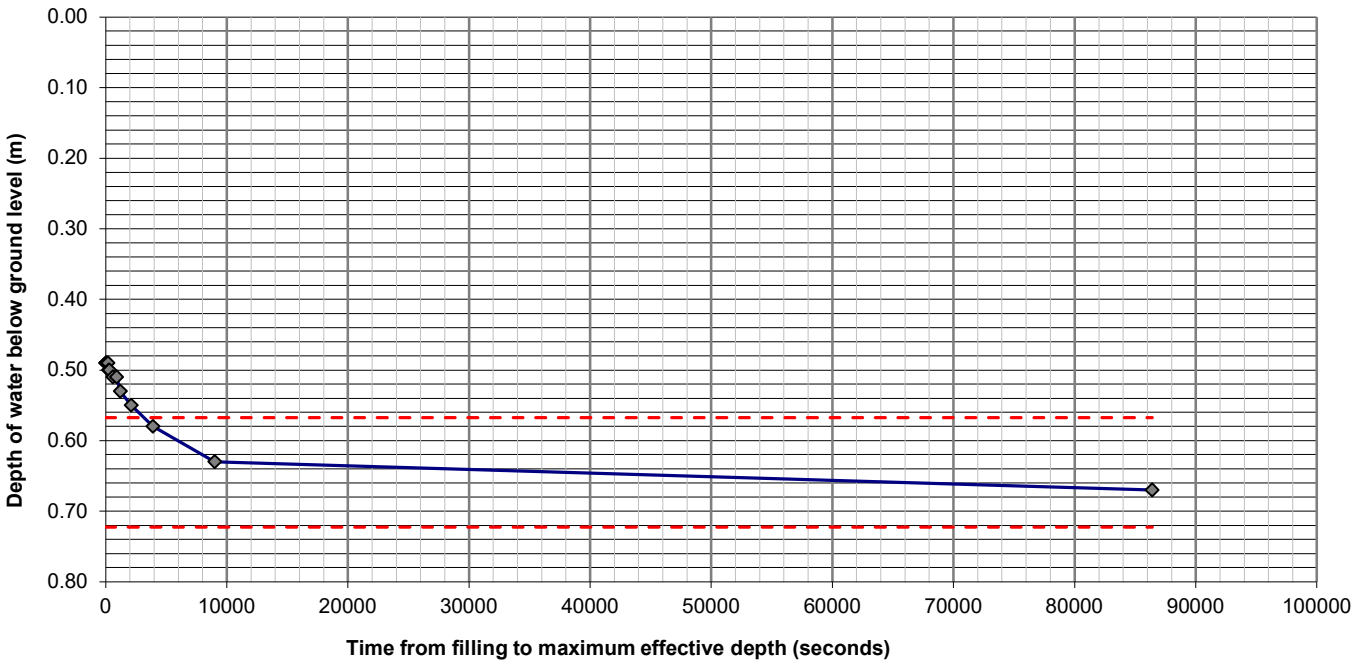
Tel: 029 2082 9200
Environmental Consultancy
Ground Engineering Services

TETRA TECH

DATE:	05/01/2023
PROJECT No:	784-B040567
PROJECT NAME:	Plas Y Felin
CLIENT:	CCBC
TRIAL PIT ID:	TP01
TEST NUMBER:	1

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION



Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)
	0.00	0.490
30	0.50	0.490
60	1.00	0.490
120	2.00	0.490
180	3.00	0.490
240	4.00	0.500
300	5.00	0.500
600	10.00	0.510
900	15.00	0.510
1200	20.00	0.530
2100	35.00	0.550
3900	65.00	0.580
9000	150.00	0.630
86400	1440.00	0.670

PIT LENGTH (m):	2.00	**Pit construction**
PIT WIDTH (m):	0.70	Open - No gravel
PIT DEPTH (m):	0.80	

INPUT PARAMETERS:		
Total volume of pit	(m^3)	0.43
Pit volume between 75% and 25% depths = L x W x ½D	(m^3)	0.22
Effective depth of Pit	(m)	0.31
Proportion of pit volume occupied by gravel solids	(0-1)	0.00
Maximum potential volume of Water	(m^3)	0.43
Level of water in pit at 75% effective depth (p_{75})	(m)	0.08
Level of water in pit at 25% effective depth (p_{25})	(m)	0.23
Effective volume between 75% & 25% depth Vp_{75-25} = V x Pg	(m^3)	0.22
Surface area of pit up to 50% effective depth (A_{p50})	(m^2)	2.24
Time at 75% effective depth (p_{75})	(s)	3154
Time at 25% effective depth (p_{25})	(s)	#N/A
Time for outflow for 75% and 25% effective depth (Tp75-25)	(s)	#N/A

OUTPUT:			
SOIL INFILTRATION RATE (f)	$\frac{V_{p75-25}}{A_{p50} \times T_{p75-25}}$	(m/s)	**#N/A**

WATER INPUT:	200	l	2 mins

GEOLOGY OF TEST SECTION:

Superfical Deposits

Compiled by: JC
Checked by: SR

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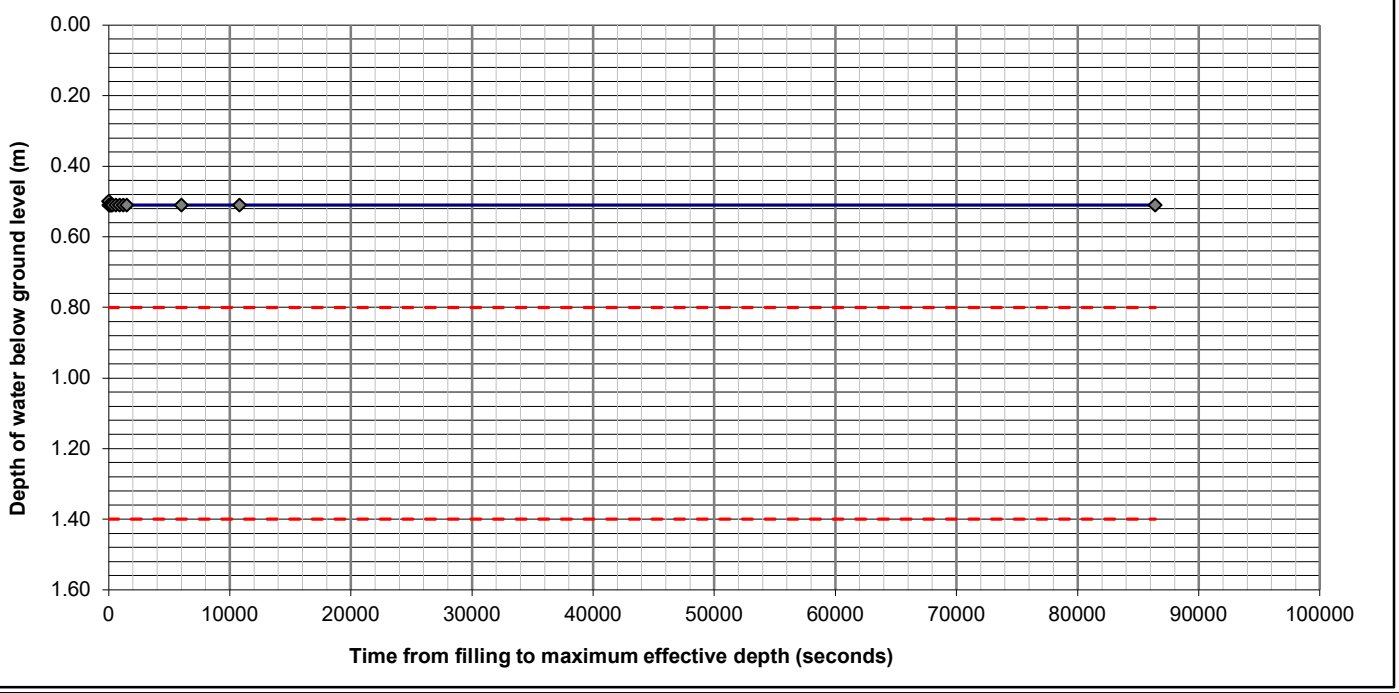
Tel: 029 2082 9200
Environmental Consultancy
Ground Engineering Services

TETRA TECH

DATE:	05/01/2023
PROJECT No:	784-B040567
PROJECT NAME:	Plas Y Felin
CLIENT:	CCBC
TRIAL PIT ID:	TP05
TEST NUMBER:	1

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION



Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)
	0.00	0.500
30	0.50	0.510
60	1.00	0.510
120	2.00	0.510
180	3.00	0.510
240	4.00	0.510
300	5.00	0.510
600	10.00	0.510
900	15.00	0.510
1200	20.00	0.510
1500	25.00	0.510
6000	100.00	0.510
10800	180.00	0.510
86400	1440.00	0.510

PIT LENGTH (m):	2.00	**Pit construction**
PIT WIDTH (m):	0.70	Open - No gravel
PIT DEPTH (m):	1.70	

INPUT PARAMETERS:		
Total volume of pit	(m^3)	1.68
Pit volume between 75% and 25% depths = L x W x ½D	(m^3)	0.84
Effective depth of Pit	(m)	1.20
Proportion of pit volume occupied by gravel solids	(0-1)	0.00
Maximum potential volume of Water	(m^3)	1.68
Level of water in pit at 75% effective depth (p_{75})	(m)	0.30
Level of water in pit at 25% effective depth (p_{25})	(m)	0.90
Effective volume between 75% & 25% depth $Vp_{75\text{-}25}$ = V x Pg	(m^3)	0.84
Surface area of pit up to 50% effective depth (A_{p50})	(m^2)	4.64
Time at 75% effective depth (p_{75})	(s)	#N/A
Time at 25% effective depth (p_{25})	(s)	#N/A
Time for outflow for 75% and 25% effective depth (Tp75-25)	(s)	#N/A

OUTPUT:			
SOIL INFILTRATION RATE (f)	$\frac{V_{p75-25}}{A_{p50} \times T_{p75-25}}$	(m/s)	**#N/A**

WATER INPUT: 500 l 3 mins

GEOLOGY OF TEST SECTION:

Superfical Deposits

Compiled by: JC
Checked by: SR

After BRE Digest 365, Soakaway Design, 2016

APPENDIX H – GEOTECHNICAL LABORATORY TEST RESULTS

Laboratory Report

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES A PHENNA GROUP COMPANY

Contract Number: 63916

Client Ref: **784-B040567**
Client PO:

Date Received: **03-03-2023**
Date Completed: **29-03-2023**
Report Date: **29-03-2023**

Client: **Tetra Tech**
5th Floor
Longcross Court
47 Newport Road
Cardiff
CF24 0AD

This report has been checked and approved by:

B. Evans

Brendan Evans
Office Administrator

Contract Title: **Plasyfelin**
For the attention of: **sarah Roberts**

Test Description	Qty
Samples Received - @ Non Accredited Test	47
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	11
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	11
PSD Wet & Dry Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	16
PSD: Sedimentation by pipette carried out with Wet Sieve (Wet Sieve must also be selected) BS 1377:1990 - Part 2 : 9.4 - * UKAS	11
BRE Reduced Suite **includes pH, water & acid soluble sulphate and total sulphur** Sub-contracted Test	16
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould/CBR Mould) BS 1377:1990 - Part 4 : 3.3	6
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (Human Resources/ Health and Safety Manager)

GEO Site & Testing Services Ltd
Units 3-4, Heol Aur, Dafen, Llanelli, Carmarthenshire, Wales SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Summary of Soil Descriptions**	
Contract Number	63916	
Project Name	Plasyfelin	
Client Reference		

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
BH104	B1	B	0.00	-	0.50	Brown fine to coarse gravelly silty clayey fine to coarse SAND
BH104	B2	B	0.50	-	1.00	Brown slightly silty clayey fine to coarse sandy fine to coarse GRAVEL
BH104	B3	B	1.50	-	2.00	Brown slightly silty/ clayey fine to coarse sandy fine to coarse GRAVEL
BH105	B1	B	0.00	-	0.50	Brown silty clayey fine to coarse gravelly fine to coarse SAND
BH105	B2	B	0.50	-	1.00	Brown fine to coarse gravelly fine to coarse sandy silty CLAY
BH105	B4	B	1.50	-	2.00	Brown fine to coarse gravelly fine to coarse sandy silty CLAY
BH106	B1	B	0.05	-	0.50	Brown silty/ clayey fine to coarse gravelly fine to coarse SAND
BH106	B2	B	0.50	-	1.00	Brown silty/ clayey fine to coarse sgravelly fine to coarse SAND
BH107	B1	B	0.00	-	0.50	Brown slightly gravelly silty clayey fine to coarse SAND
BH107	B2	B	0.50	-	1.00	Brown silty fine to coarse gravelly clayey fine to coarse SAND
BH107	B4	B	1.50	-	2.00	Brown silty/ clayey fine to coarse sandy fine to coarse GRAVEL with cobbles
TP/SA101	B17	B	0.50	-		Brown fine to medium gravelly sandy silty CLAY
TP/SA107	B2	B	0.50	-		Brown/ black silty fine to coarse gravelly clayey fine to coarse GRAVEL with cobbles
TP102	B16	B	0.50	-		Brown fine to coarse gravelly silty clayey fine to coarse SAND
T103	B18	B	0.30	-		Brown silty clayey fine to coarse gravelly fine to coarse SAND
TP103	B20	B	1.00	-		Brown slightly silty clayey fine to coarse sandy fine to coarse GRAVEL with cobbles
TP106	B8	B	0.50	-		Brown silty/ clayey fine to coarse sandy fine to coarse GRAVEL with cobbles
				-		
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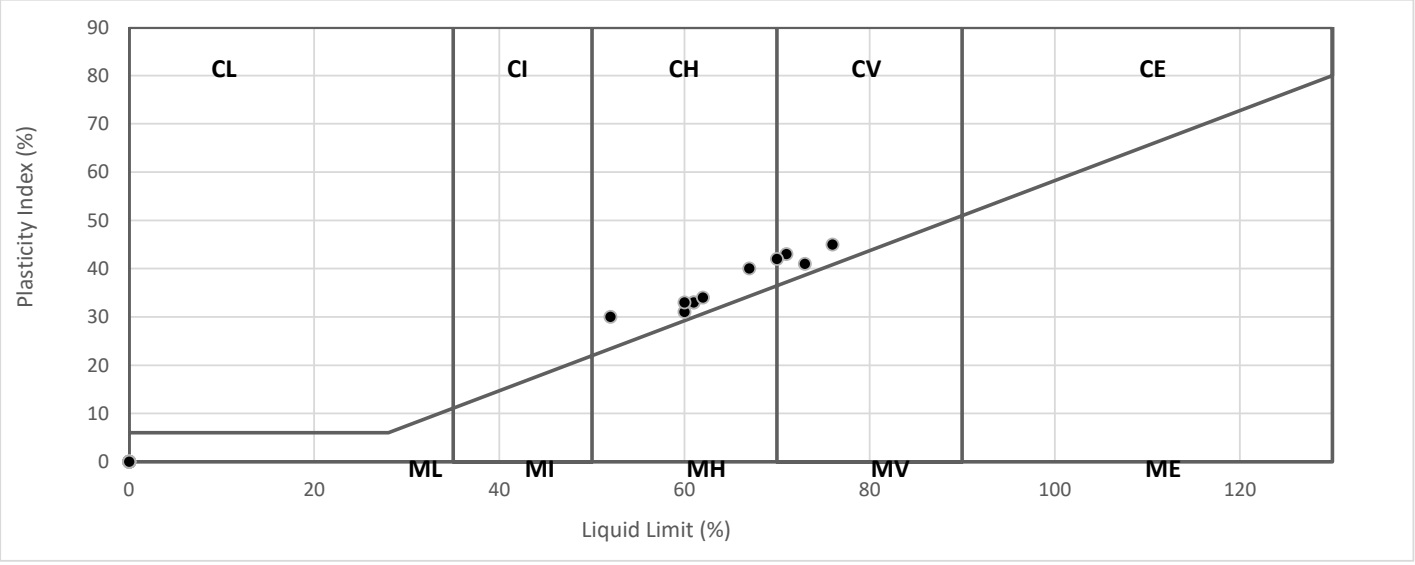
GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377:1990 - Part 2 : 4.3 & 5.3)	
Contract Number	63916	
Project Name	Plasyfelin	
Date Tested	20/03/2023	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
BH104	B1	B	0.00	-	0.50	31	61	28	33	75	CH High Plasticity
BH104	B2	B	0.50	-	1.00	24	52	22	30	37	CH High Plasticity
BH105	B1	B	0.00	-	0.50	48	73	32	41	70	CV Very High Plasticity
BH105	B2	B	0.50	-	1.00	47	76	31	45	74	CV Very High Plasticity
BH105	B4	B	1.50	-	2.00	38	71	28	43	82	CV Very High Plasticity
BH107	B1	B	0.00	-	0.50	40	60	29	31	79	CH High Plasticity
BH107	B2	B	0.50	-	1.00	36	70	28	42	68	CH/V High/HighPlasticity
TP/SA107	B2	B	0.50	-		33	61	28	33	39	CH High Plasticity
TP102	B16	B	0.50	-		38	67	27	40	75	CH High Plasticity
TP103	B18	B	0.30	-		32	62	28	34	64	CH High Plasticity
TP103	B20	B	1.00	-		30	60	27	33	43	CH High Plasticity
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

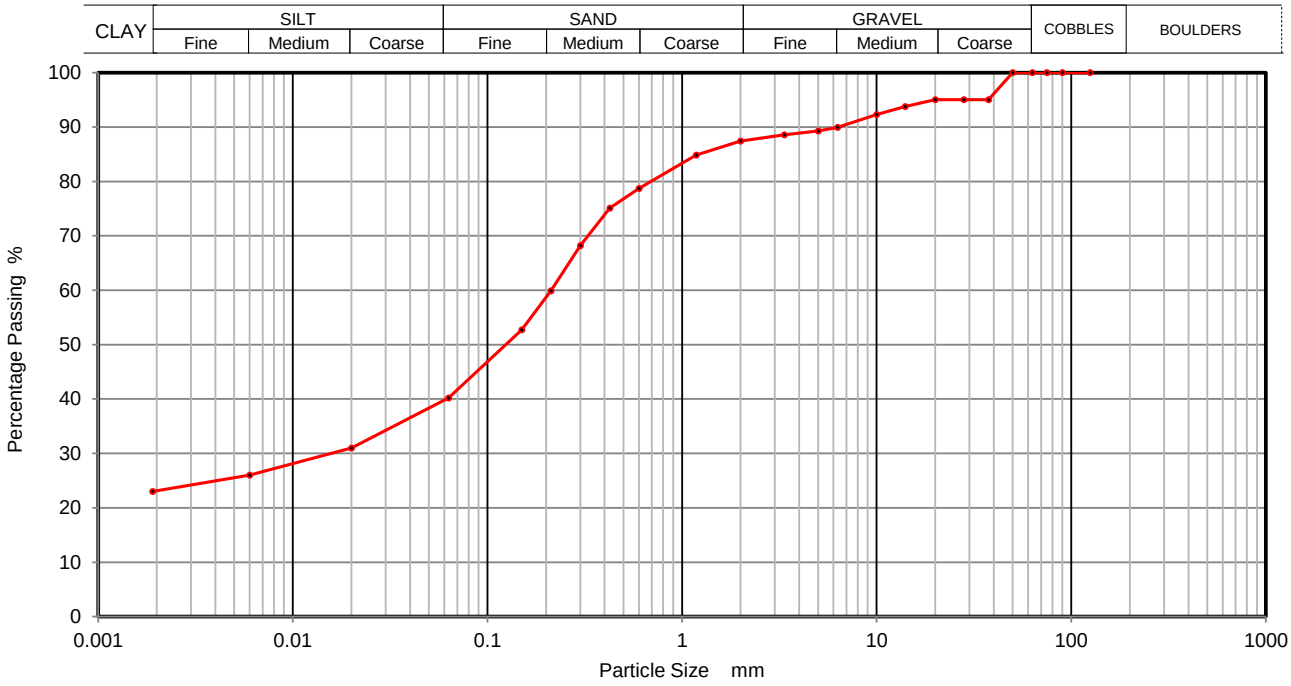
PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:2015+A1:2020



Operator
Darcy Etheridge

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	BH104
Project Name	Plasyfelin	Sample No.	B1
Soil Description	*See sample description sheet	Depth Top	0.00
		Depth Base	0.50
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	31
90	100	0.0060	26
75	100	0.0020	23
63	100		
50	100		
37.5	95		
28	95		
20	95		
14	94		
10	92		
6.3	90		
5	89		
3.35	89		
2	87		
1.18	85		
0.6	79		
0.425	75		
0.3	68		
0.212	60		
0.15	53		
0.063	40		

Sample Proportions	% dry mass
Cobbles	0
Gravel	13
Sand	47
Silt	17
Clay	23

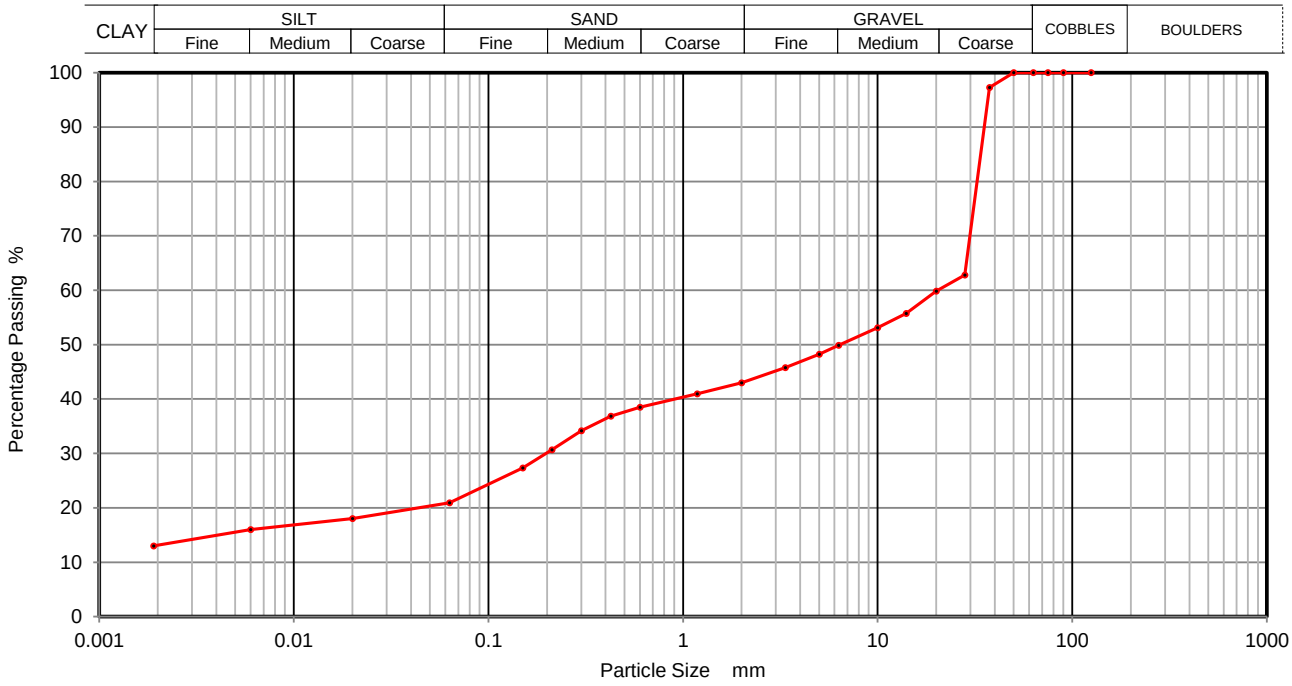
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	BH104
Project Name	Plasyfelin	Sample No.	B2
Soil Description	*See sample description sheet	Depth Top	0.50
		Depth Base	1.00
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	18
90	100	0.0060	16
75	100	0.0020	13
63	100		
50	100		
37.5	97		
28	63		
20	60		
14	56		
10	53		
6.3	50		
5	48		
3.35	46		
2	43		
1.18	41		
0.6	38		
0.425	37		
0.3	34		
0.212	31		
0.15	27		
0.063	21		

Sample Proportions	% dry mass
Cobbles	0
Gravel	57
Sand	22
Silt	8
Clay	13

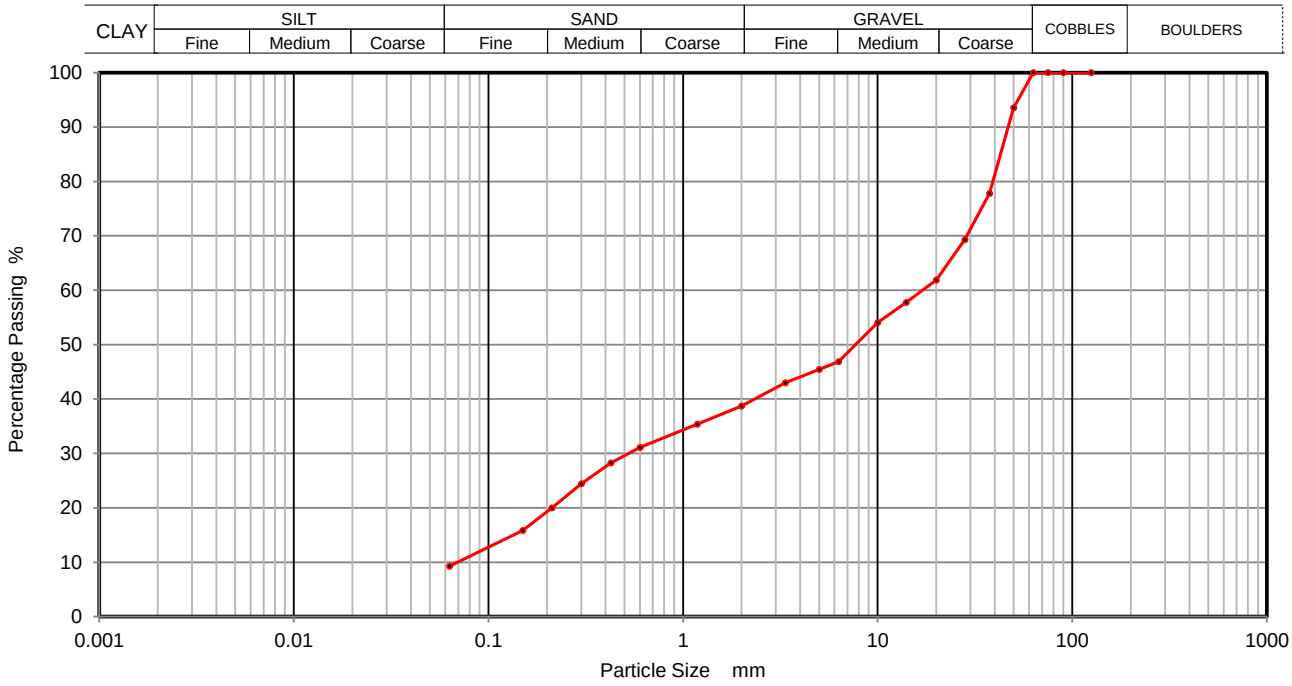
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	63916
		Borehole/Pit No.	BH104
Project Name	Plasyfelin	Sample No.	B3
Soil Description	*See sample description sheet	Depth Top	1.50
		Depth Base	2.00
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	94		
37.5	78		
28	69		
20	62		
14	58		
10	54		
6.3	47		
5	45		
3.35	43		
2	39		
1.18	35		
0.6	31		
0.425	28		
0.3	24		
0.212	20		
0.15	16		
0.063	9		

Sample Proportions	% dry mass
Cobbles	0
Gravel	61
Sand	30
Silt and Clay	9

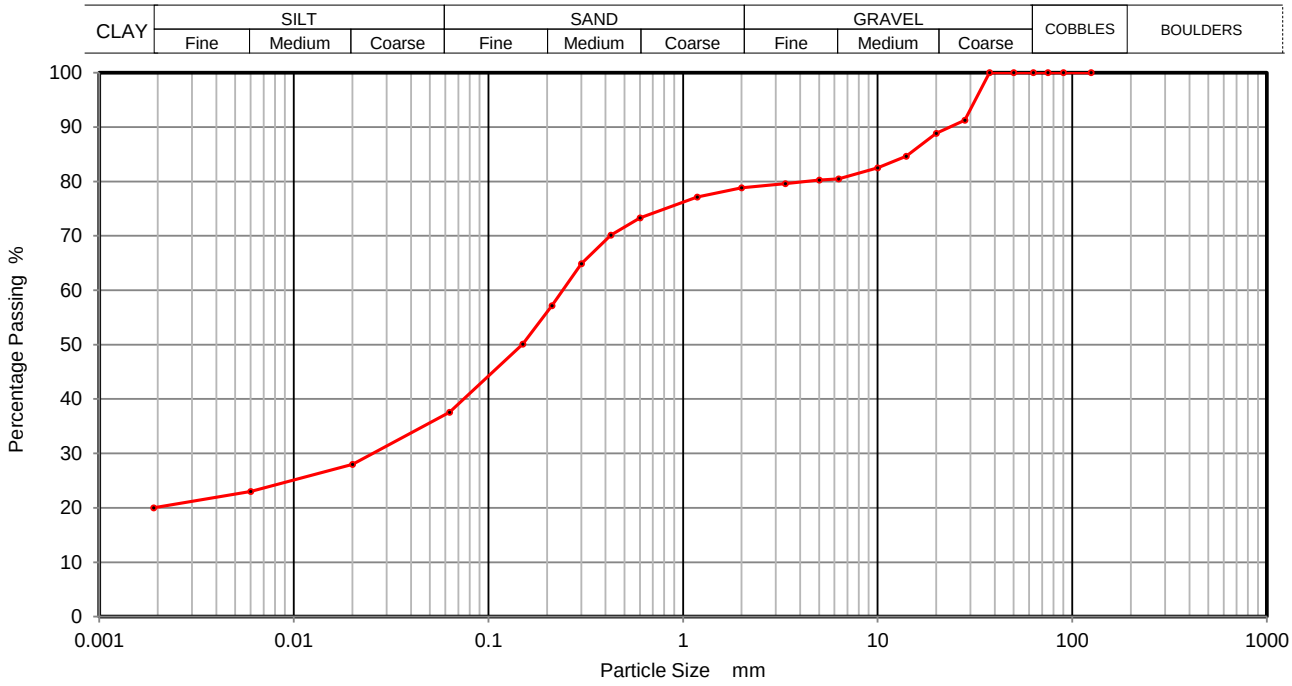
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	BH105
Project Name	Plasyfelin	Sample No.	B1
Soil Description	*See sample description sheet	Depth Top	0.00
		Depth Base	0.50
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	28
90	100	0.0060	23
75	100	0.0020	20
63	100		
50	100		
37.5	100		
28	91		
20	89		
14	85		
10	83		
6.3	80		
5	80		
3.35	80		
2	79		
1.18	77		
0.6	73		
0.425	70		
0.3	65		
0.212	57		
0.15	50		
0.063	38		

Sample Proportions	% dry mass
Cobbles	0
Gravel	21
Sand	41
Silt	18
Clay	20

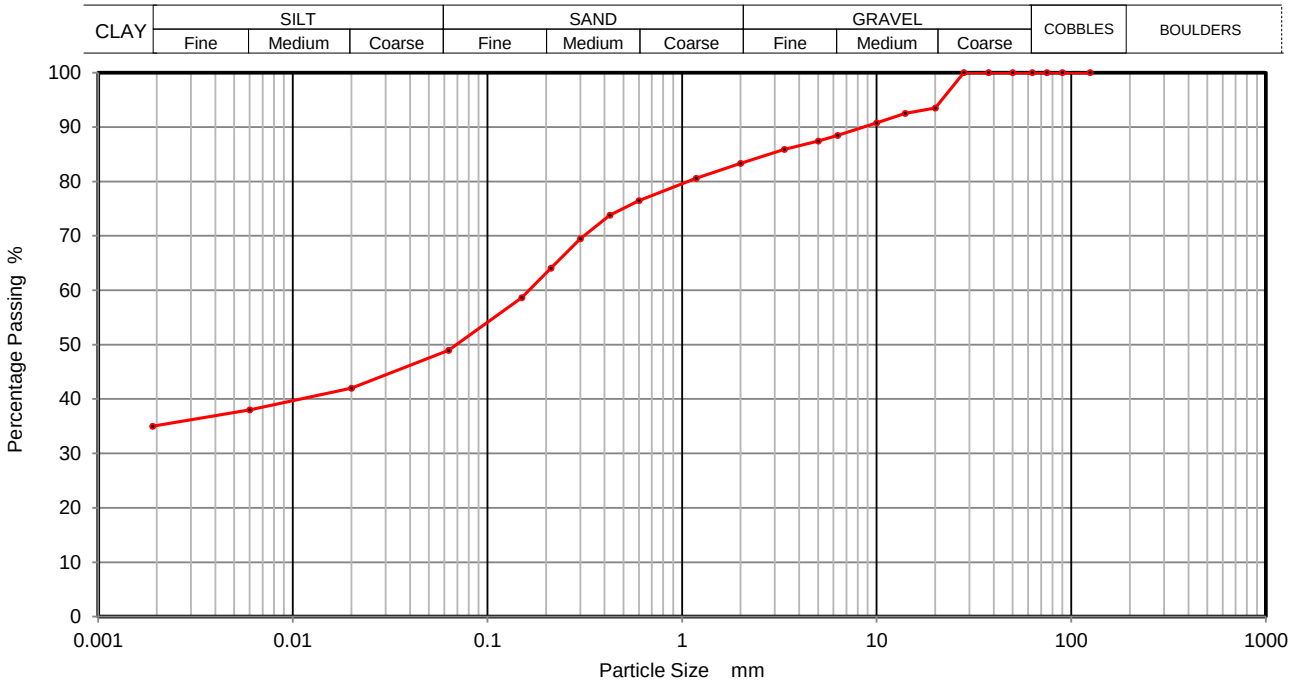
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	BH105
Project Name	Plasyfelin	Sample No.	B2
Soil Description	*See sample description sheet	Depth Top	0.50
		Depth Base	1.00
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	42
90	100	0.0060	38
75	100	0.0020	35
63	100		
50	100		
37.5	100		
28	100		
20	93		
14	93		
10	91		
6.3	88		
5	87		
3.35	86		
2	83		
1.18	81		
0.6	77		
0.425	74		
0.3	69		
0.212	64		
0.15	59		
0.063	49		

Sample Proportions	% dry mass
Cobbles	0
Gravel	17
Sand	34
Silt	14
Clay	35

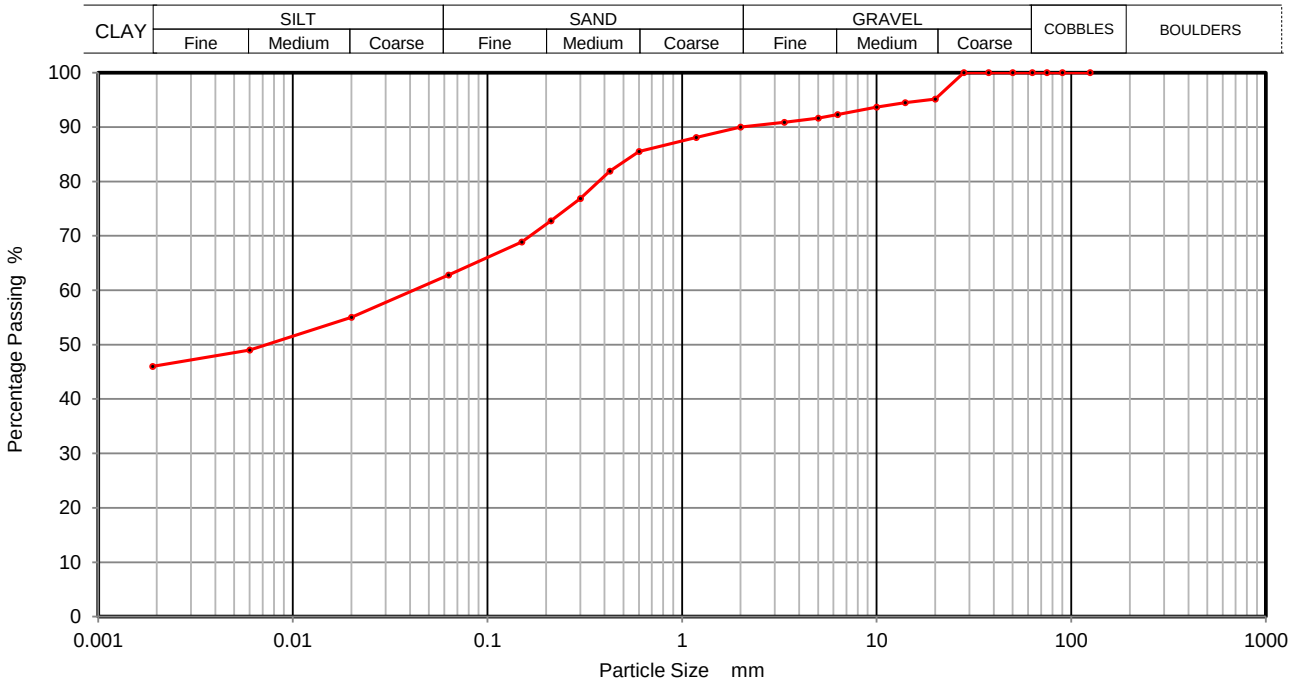
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	BH105
Project Name	Plasyfelin	Sample No.	B4
Soil Description	*See sample description sheet	Depth Top	1.50
		Depth Base	2.00
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	55
90	100	0.0060	49
75	100	0.0020	46
63	100		
50	100		
37.5	100		
28	100		
20	95		
14	94		
10	94		
6.3	92		
5	92		
3.35	91		
2	90		
1.18	88		
0.6	86		
0.425	82		
0.3	77		
0.212	73		
0.15	69		
0.063	63		

Sample Proportions	% dry mass
Cobbles	0
Gravel	10
Sand	27
Silt	17
Clay	46

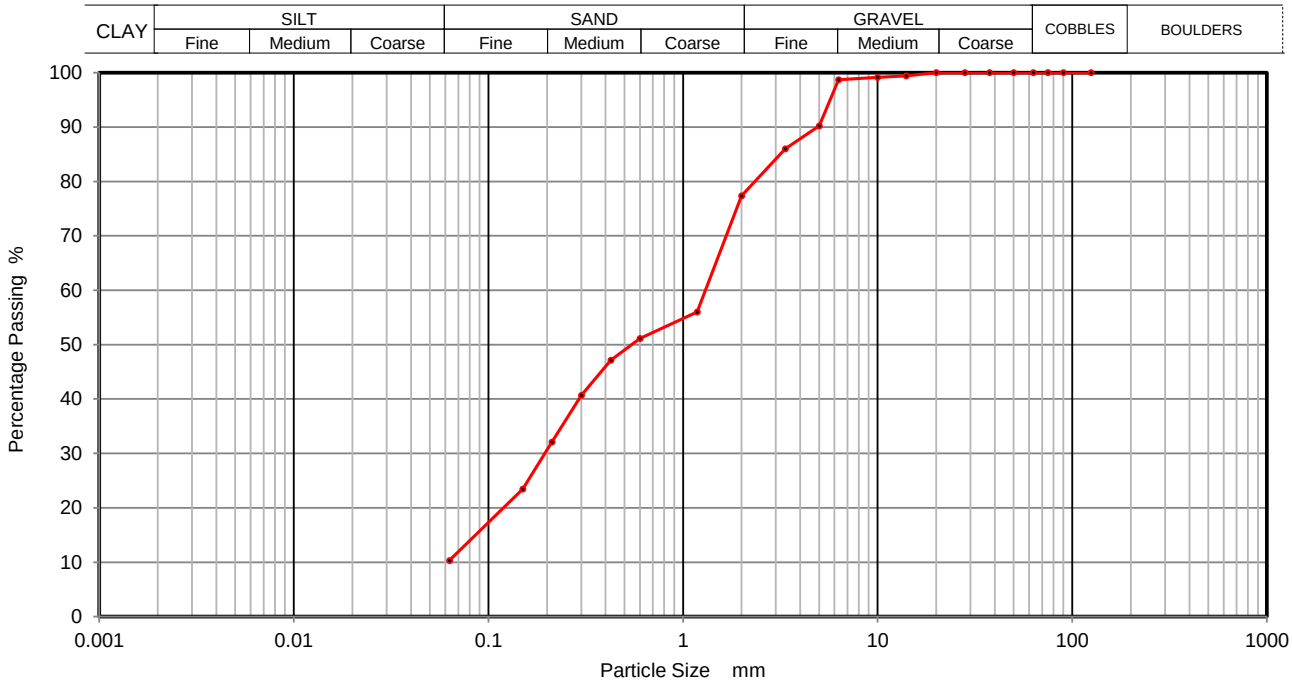
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	63916
		Borehole/Pit No.	BH106
Project Name	Plasyfelin	Sample No.	B1
Soil Description	*See sample description sheet	Depth Top	0.05
		Depth Base	0.50
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	99		
5	90		
3.35	86		
2	77		
1.18	56		
0.6	51		
0.425	47		
0.3	41		
0.212	32		
0.15	23		
0.063	10		

Sample Proportions	% dry mass
Cobbles	0
Gravel	23
Sand	67
Silt and Clay	10

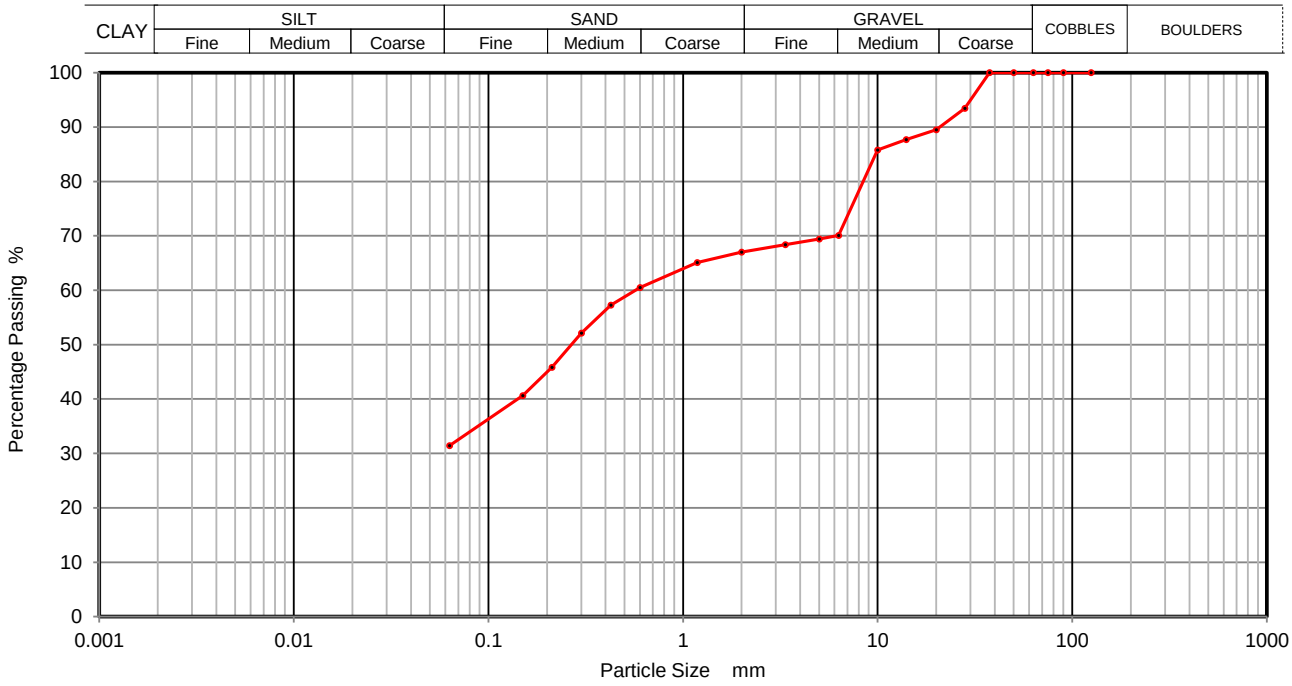
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	63916
		Borehole/Pit No.	BH106
Project Name	Plasyfelin	Sample No.	B2
Soil Description	*See sample description sheet	Depth Top	0.50
		Depth Base	1.00
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	93		
20	90		
14	88		
10	86		
6.3	70		
5	69		
3.35	68		
2	67		
1.18	65		
0.6	61		
0.425	57		
0.3	52		
0.212	46		
0.15	41		
0.063	31		

Sample Proportions	% dry mass
Cobbles	0
Gravel	33
Sand	36
Silt and Clay	31

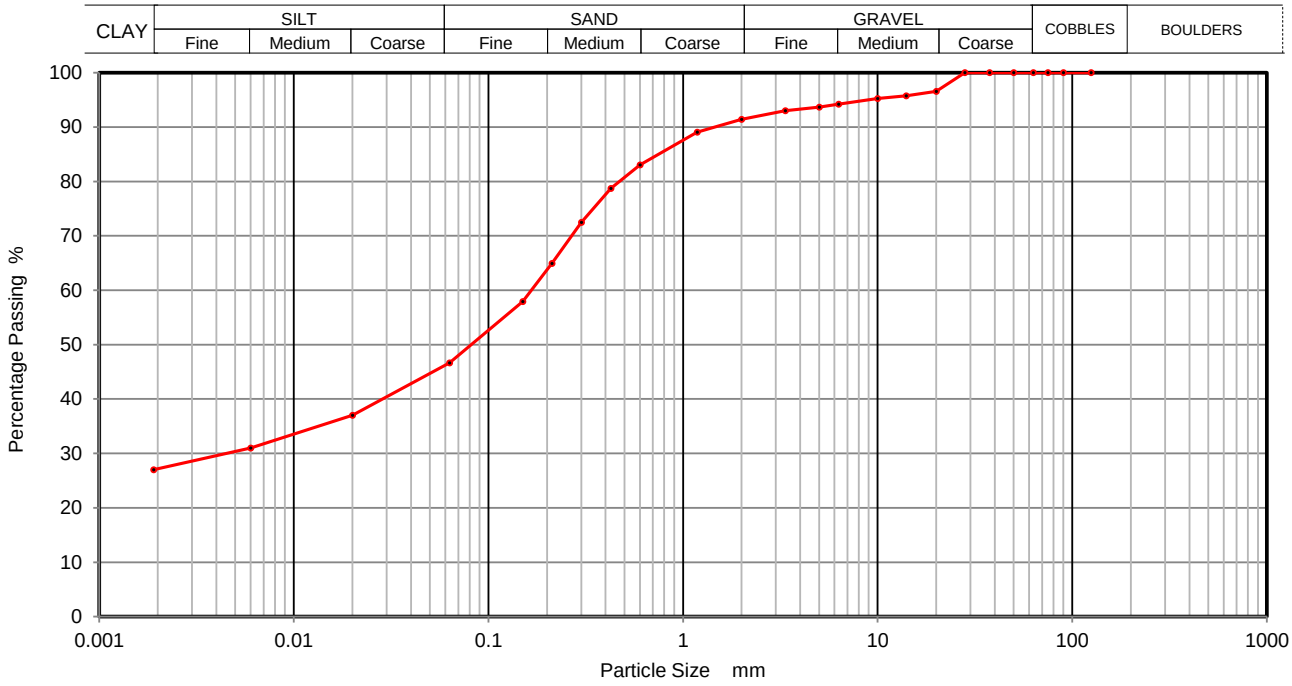
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	BH107
Project Name	Plasyfelin	Sample No.	B1
Soil Description	*See sample description sheet	Depth Top	0.00
		Depth Base	0.50
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	37
90	100	0.0060	31
75	100	0.0020	27
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	96		
10	95		
6.3	94		
5	94		
3.35	93		
2	91		
1.18	89		
0.6	83		
0.425	79		
0.3	72		
0.212	65		
0.15	58		
0.063	47		

Sample Proportions	% dry mass
Cobbles	0
Gravel	9
Sand	44
Silt	20
Clay	27

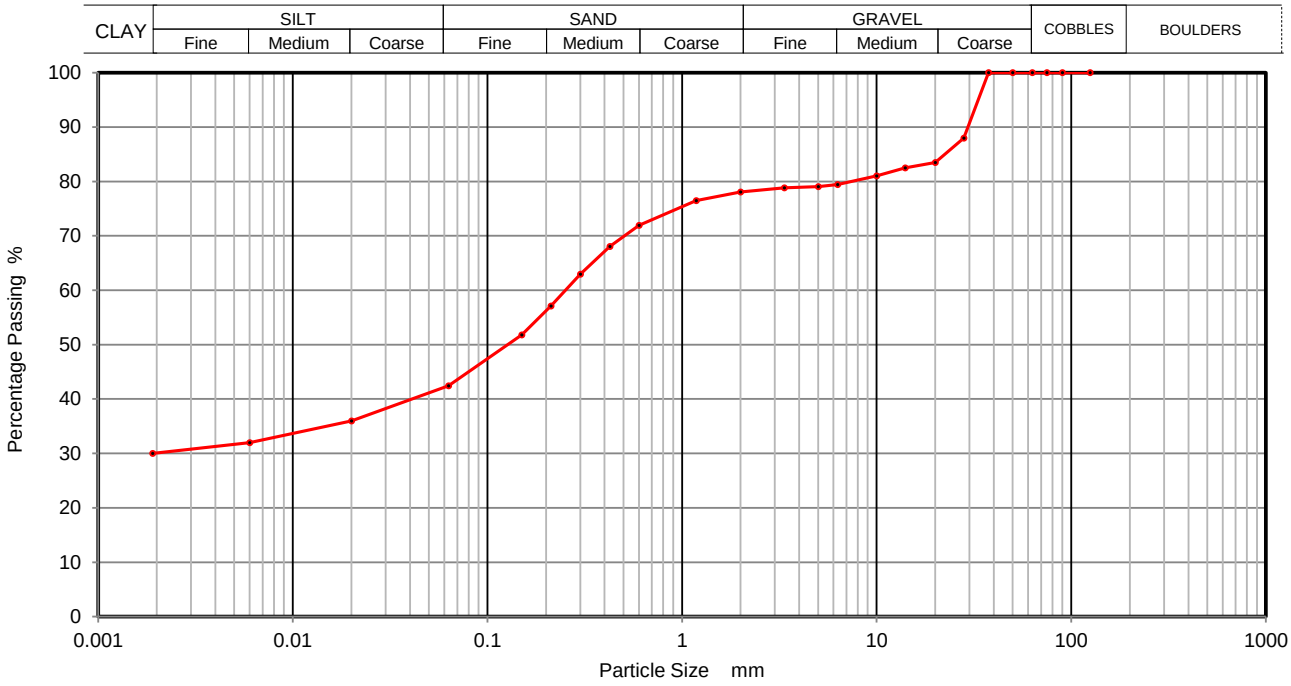
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	BH107
Project Name	Plasyfelin	Sample No.	B2
Soil Description	*See sample description sheet	Depth Top	0.50
		Depth Base	1.00
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	36
90	100	0.0060	32
75	100	0.0020	30
63	100		
50	100		
37.5	100		
28	88		
20	84		
14	83		
10	81		
6.3	79		
5	79		
3.35	79		
2	78		
1.18	76		
0.6	72		
0.425	68		
0.3	63		
0.212	57		
0.15	52		
0.063	42		

Sample Proportions	% dry mass
Cobbles	0
Gravel	22
Sand	36
Silt	12
Clay	30

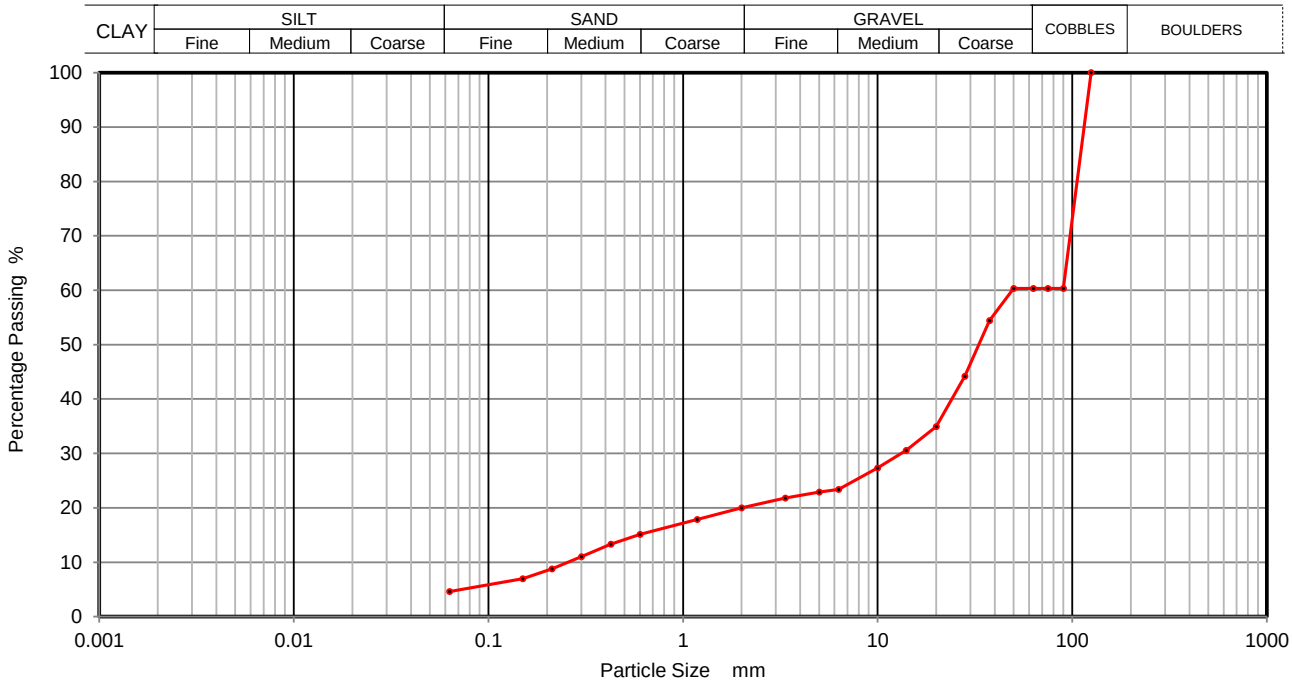
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	63916
		Borehole/Pit No.	BH107
Project Name	Plasyfelin	Sample No.	B4
Soil Description	*See sample description sheet	Depth Top	1.50
		Depth Base	2.00
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	60		
75	60		
63	60		
50	60		
37.5	54		
28	44		
20	35		
14	31		
10	27		
6.3	23		
5	23		
3.35	22		
2	20		
1.18	18		
0.6	15		
0.425	13		
0.3	11		
0.212	9		
0.15	7		
0.063	5		

Sample Proportions	% dry mass
Cobbles	40
Gravel	40
Sand	15
Silt and Clay	5

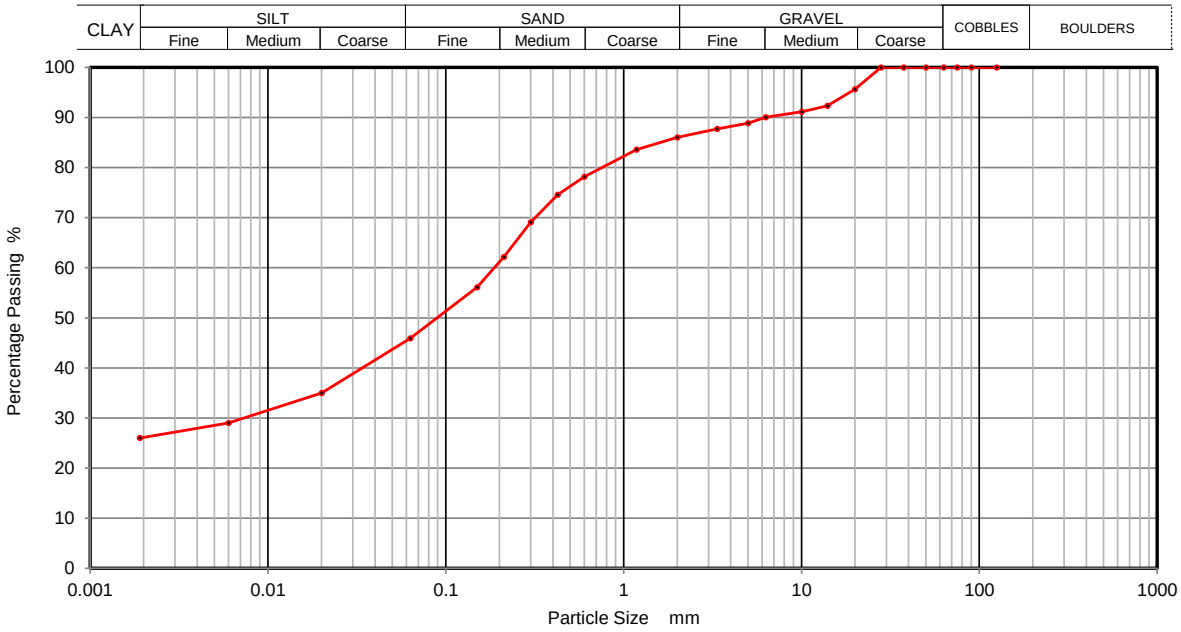
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	TP102
Project Name	Plasyfelin	Sample No.	B16
Soil Description	*See sample description sheet	Depth Top	0.50
		Depth Base	
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	35
90	100	0.0060	29
75	100	0.0020	26
63	100		
50	100		
37.5	100		
28	100		
20	96		
14	92		
10	91		
6.3	90		
5	89		
3.35	88		
2	86		
1.18	84		
0.6	78		
0.425	75		
0.3	69		
0.212	62		
0.15	56		
0.063	46		

Sample Proportions	% dry mass
Cobbles	0
Gravel	14
Sand	40
Silt	20
Clay	26

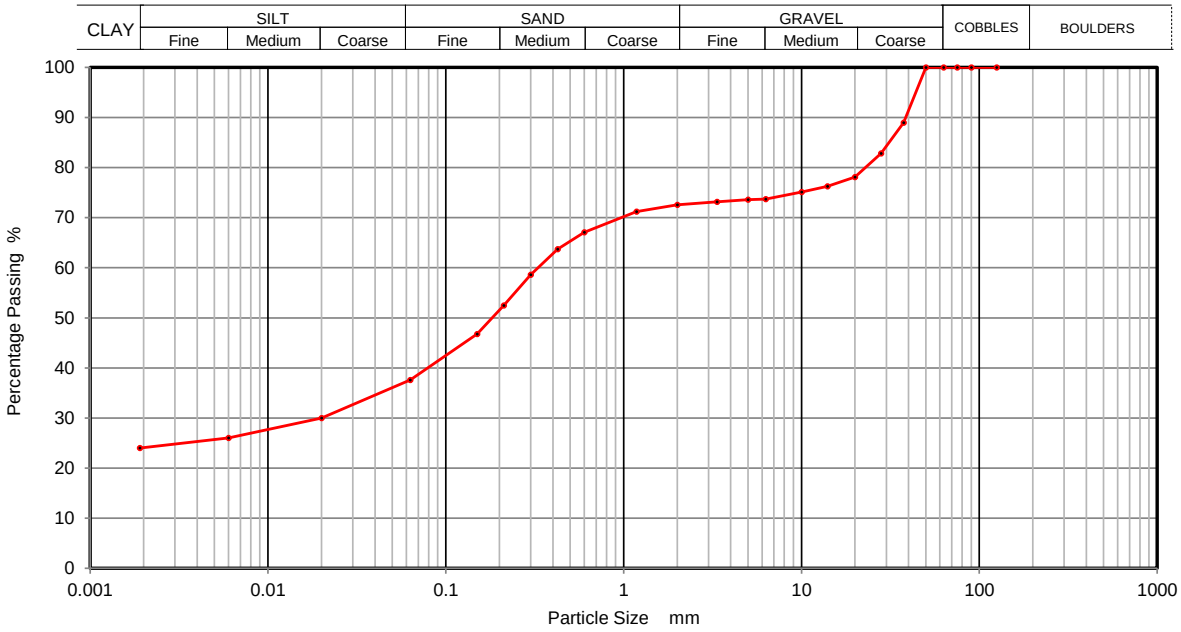
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	TP103
Project Name	Plasyfelin	Sample No.	B18
Soil Description	*See sample description sheet	Depth Top	0.30
		Depth Base	
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	30
90	100	0.0060	26
75	100	0.0020	24
63	100		
50	100		
37.5	89		
28	83		
20	78		
14	76		
10	75		
6.3	74		
5	74		
3.35	73		
2	73		
1.18	71		
0.6	67		
0.425	64		
0.3	59		
0.212	52		
0.15	47		
0.063	38		

Sample Proportions	% dry mass
Cobbles	0
Gravel	27
Sand	35
Silt	14
Clay	24

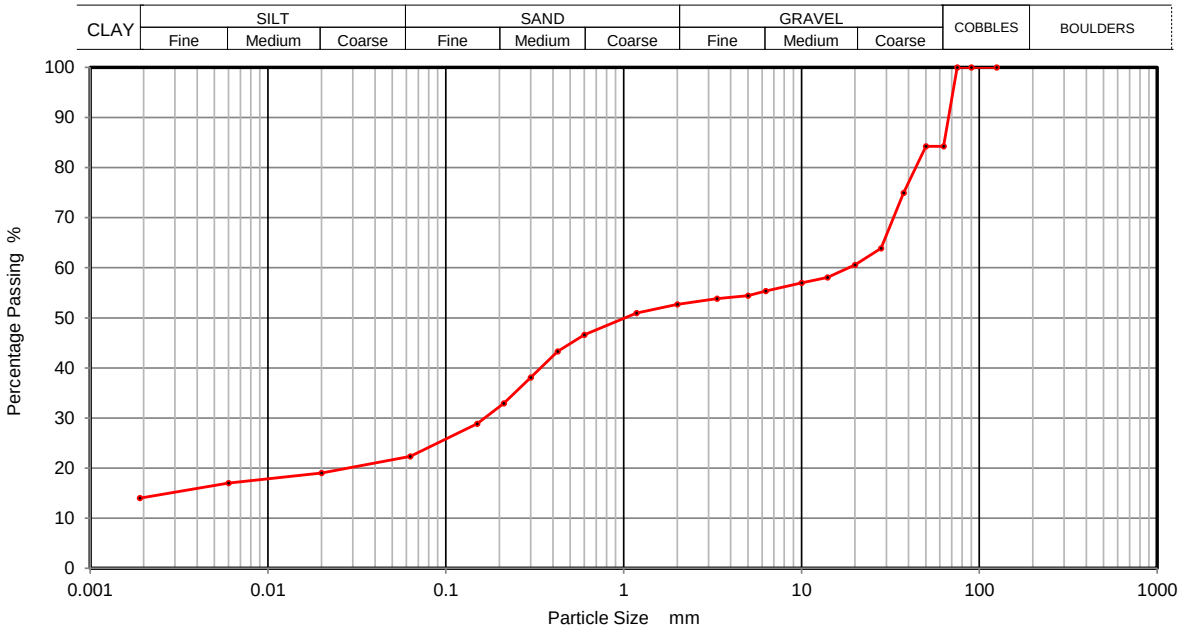
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	TP103
Project Name	Plasyfelin	Sample No.	B20
Soil Description	*See sample description sheet	Depth Top	1.00
		Depth Base	
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	19
90	100	0.0060	17
75	100	0.0020	14
63	84		
50	84		
37.5	75		
28	64		
20	61		
14	58		
10	57		
6.3	55		
5	54		
3.35	54		
2	53		
1.18	51		
0.6	47		
0.425	43		
0.3	38		
0.212	33		
0.15	29		
0.063	22		

Sample Proportions	% dry mass
Cobbles	16
Gravel	31
Sand	31
Silt	8
Clay	14

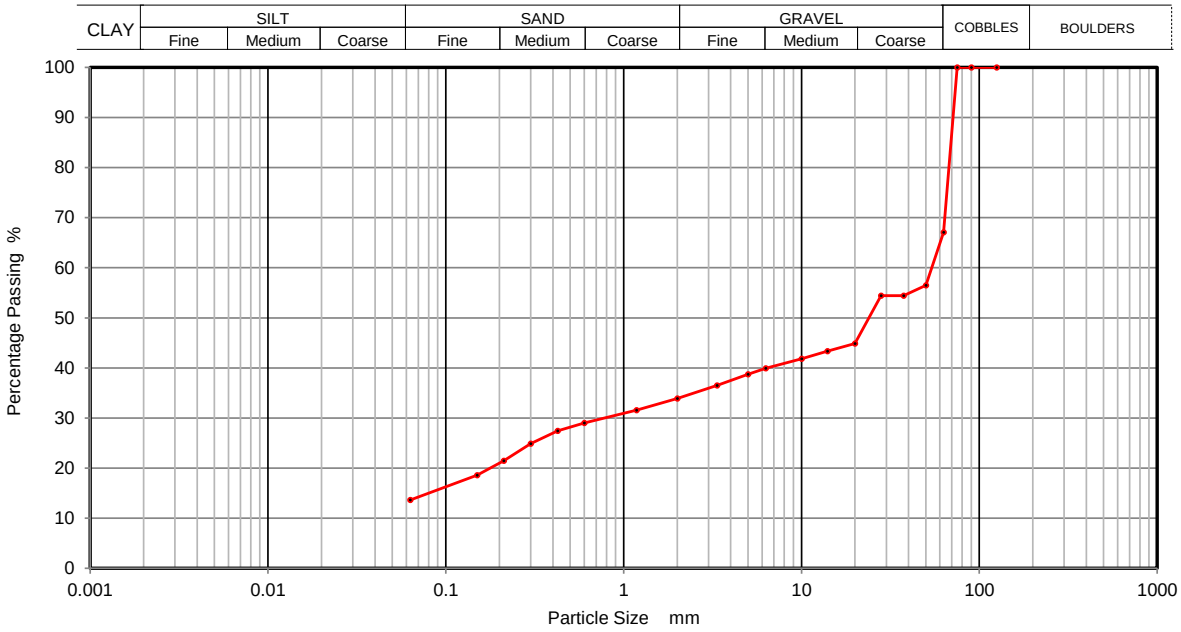
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION** **BS 1377 Part 2:1990** **Wet Sieve, Clause 9.2**	Contract Number	63916
		Borehole/Pit No.	TP106
Project Name	Plasyfelin	Sample No.	B8
Soil Description	*See sample description sheet	Depth Top	0.50
		Depth Base	
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	67		
50	56		
37.5	54		
28	54		
20	45		
14	43		
10	42		
6.3	40		
5	39		
3.35	36		
2	34		
1.18	32		
0.6	29		
0.425	27		
0.3	25		
0.212	21		
0.15	19		
0.063	14		

Sample Proportions	% dry mass
Cobbles	33
Gravel	33
Sand	20
Silt and Clay	14

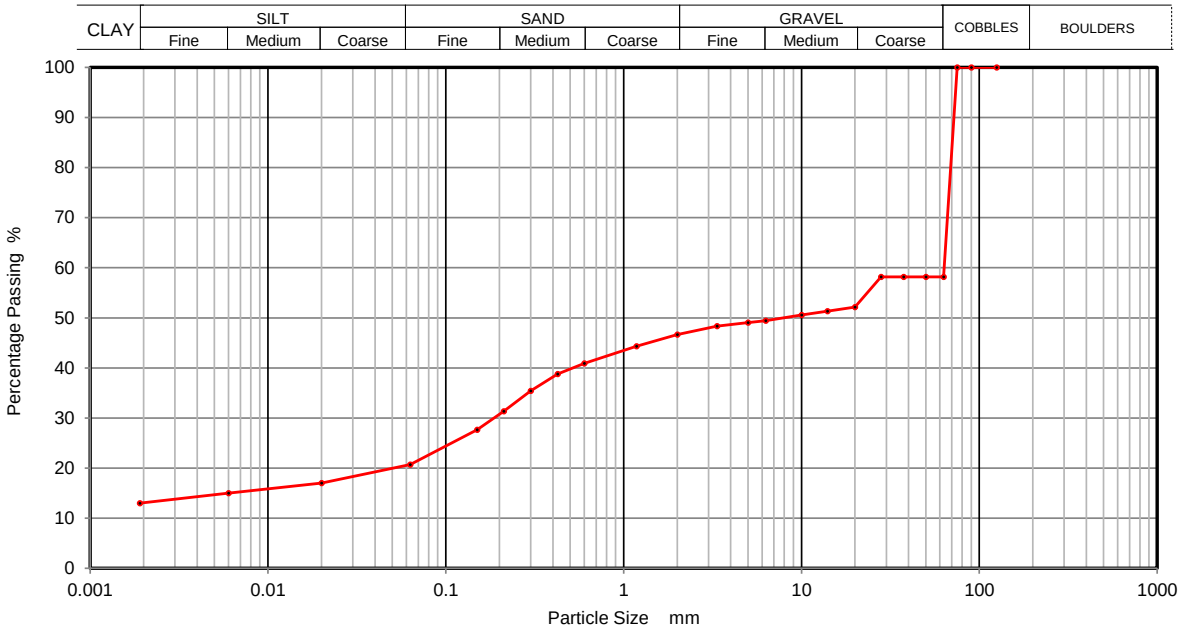
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**PARTICLE SIZE DISTRIBUTION BS 1377 Part 2:1990 Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4**	Contract Number	63916
		Borehole/Pit No.	TP/SA107
Project Name	Plasyfelin	Sample No.	B2
Soil Description	*See sample description sheet	Depth Top	0.50
		Depth Base	
Date Tested	22/03/2023	Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	17
90	100	0.0060	15
75	100	0.0020	13
63	58		
50	58		
37.5	58		
28	58		
20	52		
14	51		
10	51		
6.3	49		
5	49		
3.35	48		
2	47		
1.18	44		
0.6	41		
0.425	39		
0.3	35		
0.212	31		
0.15	28		
0.063	21		

Sample Proportions	% dry mass
Cobbles	42
Gravel	11
Sand	26
Silt	8
Clay	13

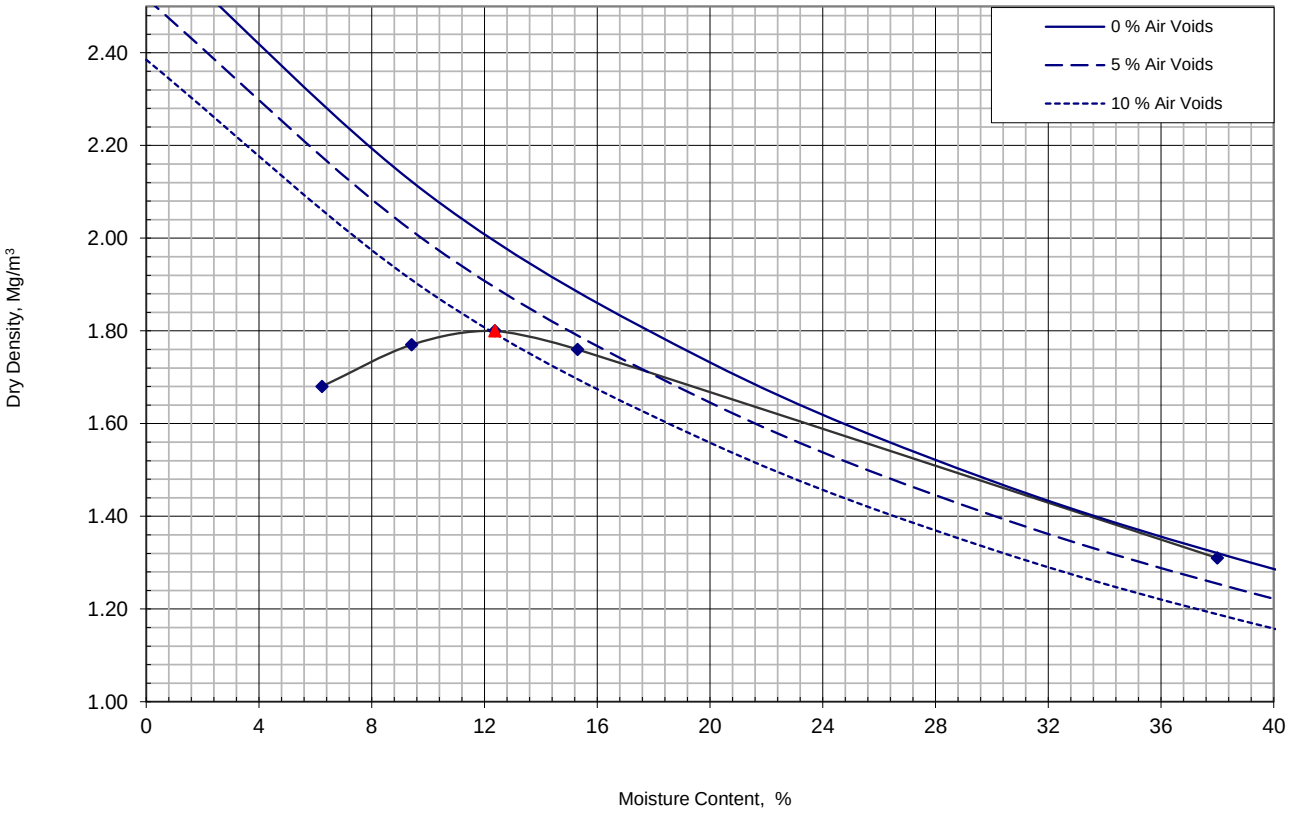
Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Dry Density / Moisture Content Relationship BS 1377:Part 4:1990**	Contract Number	63916
		Borehole / Pit No	TP102
Project Name	Plasyfelin	Sample No	B16
Date Tested	22/03/2023	Depth Top	0.50
Compaction Method	2.5 Kg Rammer	Depth Base	
Compaction Clause	BS1377:Part 4:1990, Clause 3.3	Sample Type	B
Sample Description	*See Sample Description Sheet	Single or Separate Sample Used	Single



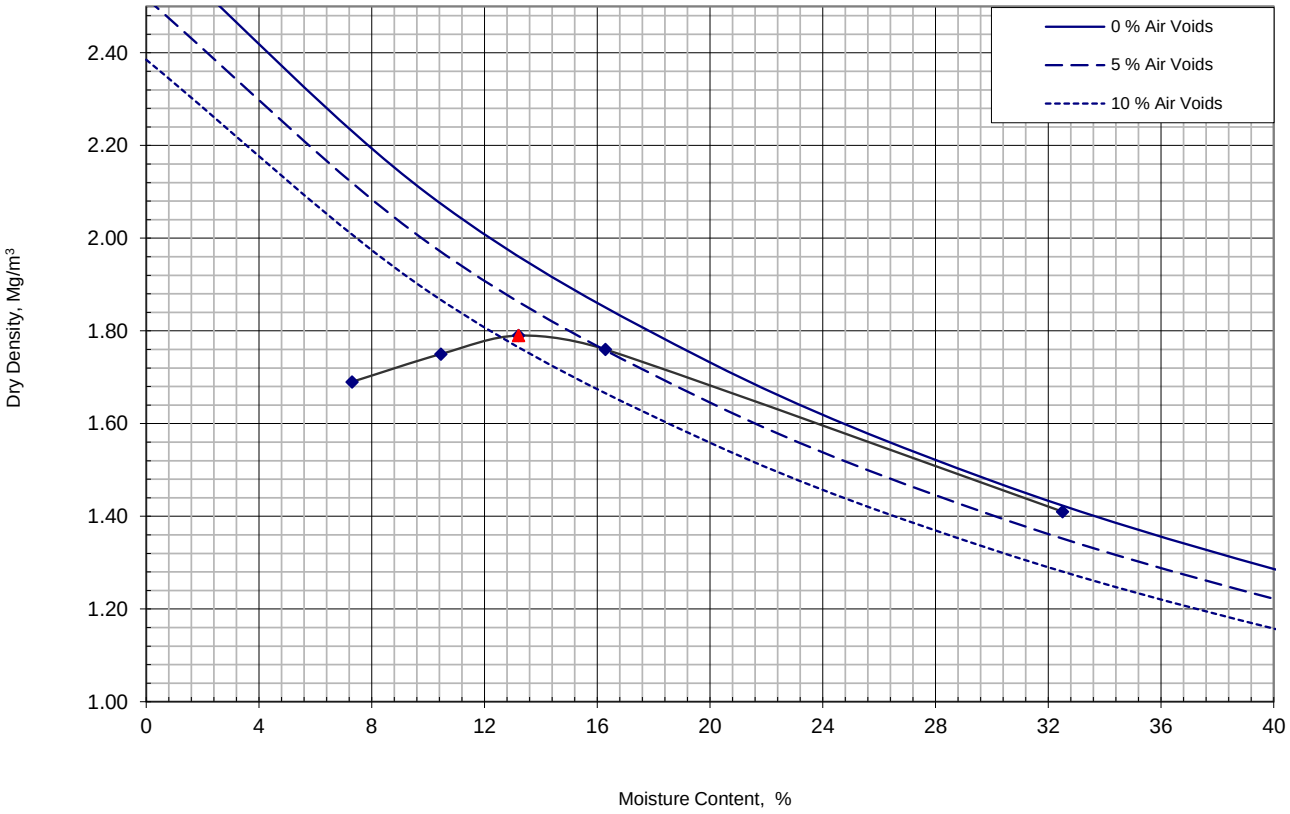
Compaction Point	1	2	3	4	5							
Moisture Content	6.2	9.4	12	15	38							
Bulk Density	1.78	1.94	2.02	2.03	1.81							
Dry Density	1.68	1.77	1.80	1.76	1.31							

Initial Moisture Content	38	%
Maximum Dry Density	1.80	Mg/m3
Optimum Moisture Content	12	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	0	%
Material Retained 20mm	4	%

Operator
Conor

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Dry Density / Moisture Content Relationship BS 1377:Part 4:1990**	Contract Number	63916
		Borehole / Pit No	TP103
Project Name	Plasyfelin	Sample No	B18
Date Tested	22/03/2023	Depth Top	0.30
Compaction Method	2.5 Kg Rammer	Depth Base	
Compaction Clause	BS1377:Part 4:1990, Clause 3.3	Sample Type	B
Sample Description	*See Sample Description Sheet	Single or Separate Sample Used	Single



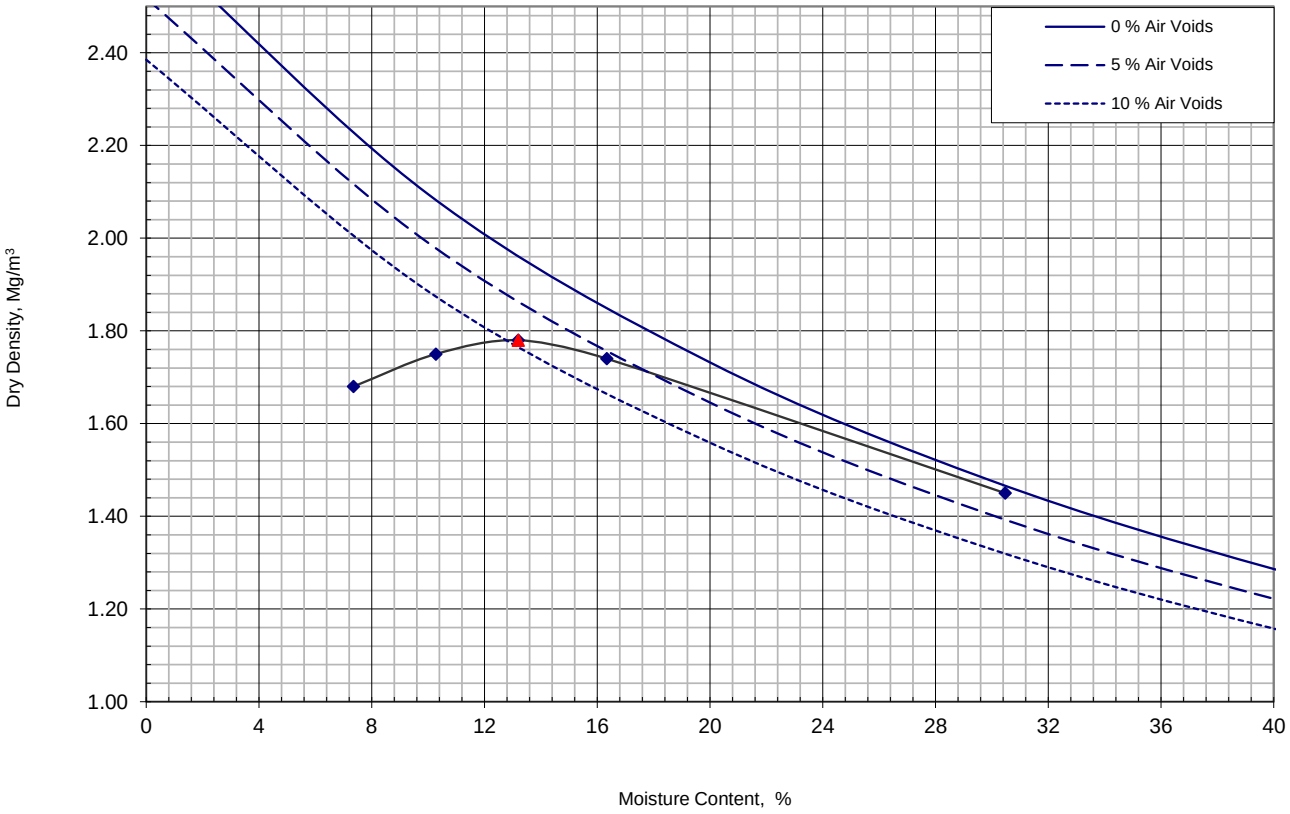
Compaction Point	1	2	3	4	5							
Moisture Content	7.3	10	13	16	33							
Bulk Density	1.81	1.93	2.03	2.05	1.87							
Dry Density	1.69	1.75	1.79	1.76	1.41							

Initial Moisture Content	33	%
Maximum Dry Density	1.79	Mg/m3
Optimum Moisture Content	13	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	11	%
Material Retained 20mm	11	%

Operator
Conor

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Dry Density / Moisture Content Relationship BS 1377:Part 4:1990**	Contract Number	63916
		Borehole / Pit No	TP103
Project Name	Plasyfelin	Sample No	B20
Date Tested	22/03/2023	Depth Top	1.00
Compaction Method	2.5 Kg Rammer	Depth Base	
Compaction Clause	BS1377:Part 4:1990, Clause 3.3	Sample Type	B
Sample Description	*See Sample Description Sheet	Single or Separate Sample Used	Single



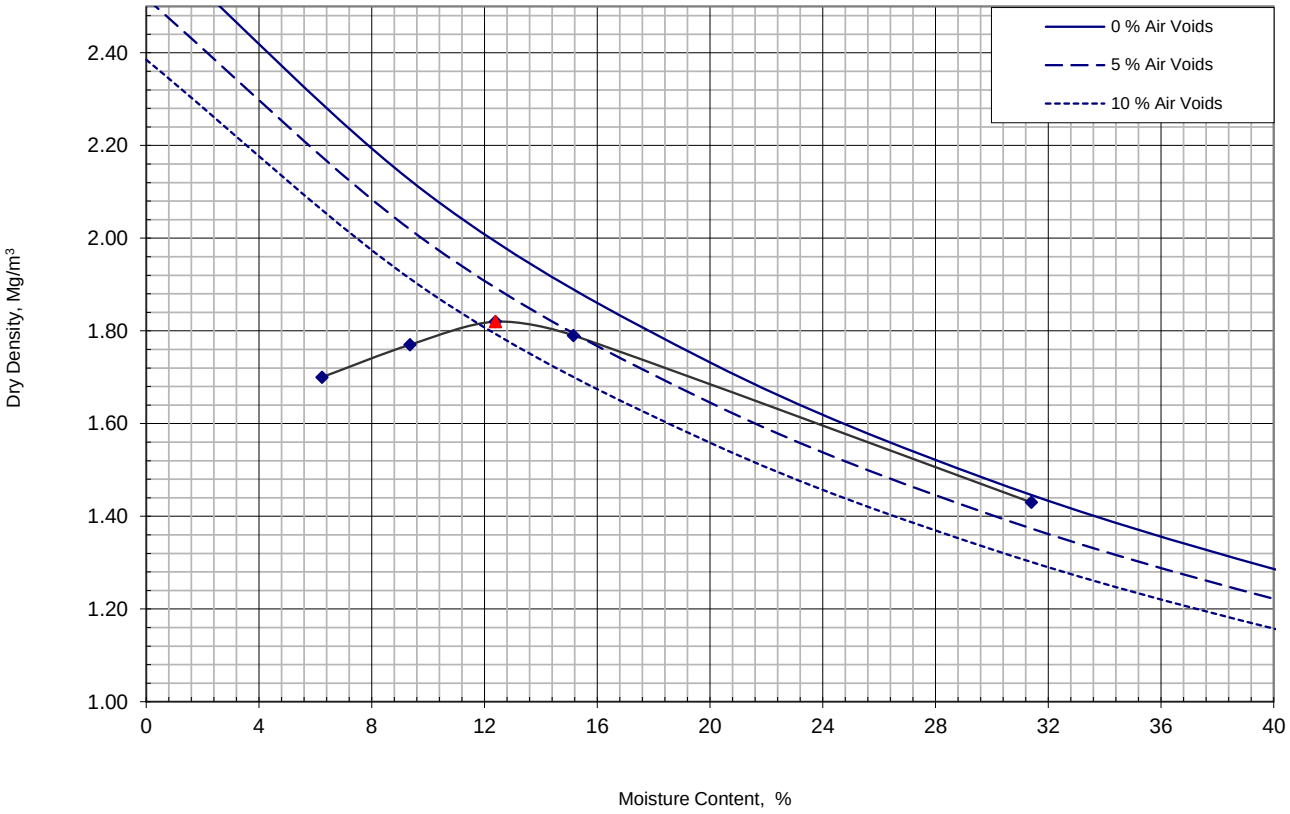
Compaction Point	1	2	3	4	5							
Moisture Content	7.4	10	13	16	30							
Bulk Density	1.80	1.93	2.01	2.02	1.89							
Dry Density	1.68	1.75	1.78	1.74	1.45							

Initial Moisture Content	30	%
Maximum Dry Density	1.78	Mg/m3
Optimum Moisture Content	13	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	25	%
Material Retained 20mm	14	%

Operator
Conor

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Dry Density / Moisture Content Relationship BS 1377:Part 4:1990**	Contract Number	63916
		Borehole / Pit No	TP106
Project Name	Plasyfelin	Sample No	B8
Date Tested	22/03/2023	Depth Top	0.50
Compaction Method	2.5 Kg Rammer	Depth Base	
Compaction Clause	BS1377:Part 4:1990, Clause 3.3	Sample Type	B
Sample Description	*See Sample Description Sheet	Single or Separate Sample Used	Single



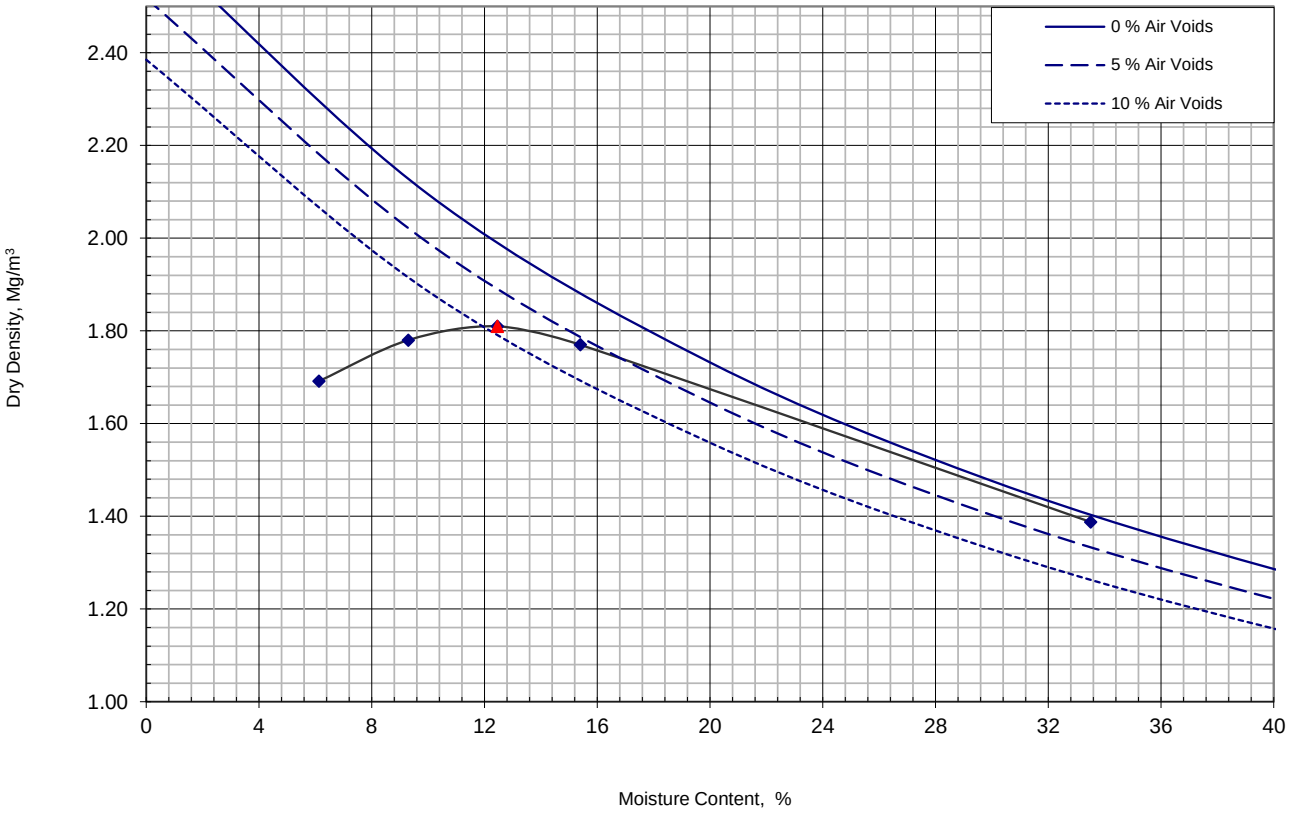
Compaction Point	1	2	3	4	5							
Moisture Content	6.2	9.4	12	15	31							
Bulk Density	1.81	1.94	2.05	2.06	1.88							
Dry Density	1.70	1.77	1.82	1.79	1.43							

Initial Moisture Content	31	%
Maximum Dry Density	1.82	Mg/m3
Optimum Moisture Content	12	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	46	%
Material Retained 20mm	9	%

UKAS TESTING 2788

Operator
Conor

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Dry Density / Moisture Content Relationship BS 1377:Part 4:1990**	Contract Number	63916
		Borehole / Pit No	TP/SA101
Project Name	Plasyfelin	Sample No	B17
Date Tested	22/03/2023	Depth Top	0.50
Compaction Method	2.5 Kg Rammer	Depth Base	
Compaction Clause	BS1377:Part 4:1990, Clause 3.3	Sample Type	B
Sample Description	*See Sample Description Sheet	Single or Separate Sample Used	Single



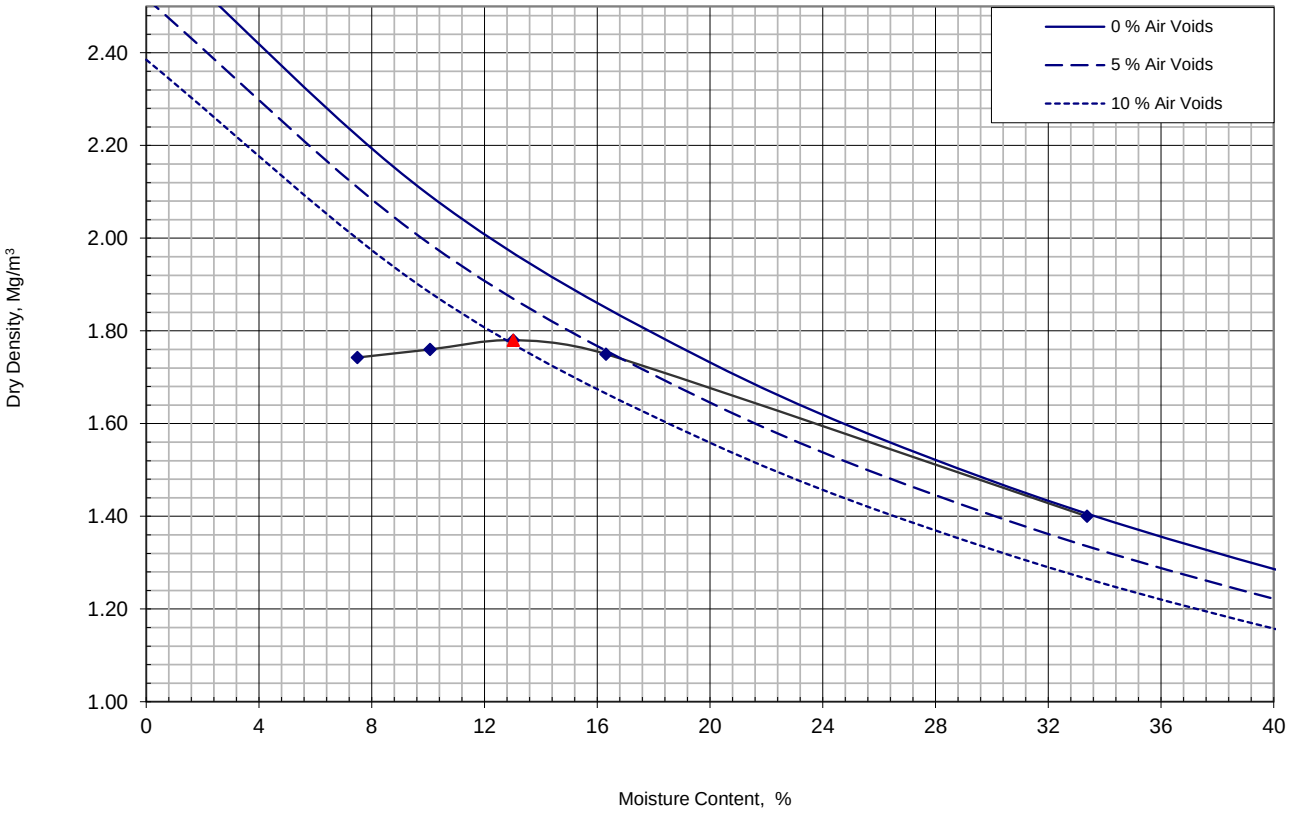
Compaction Point	1	2	3	4	5							
Moisture Content	6.1	9.3	12	15	34							
Bulk Density	1.79	1.95	2.04	2.04	1.85							
Dry Density	1.69	1.78	1.81	1.77	1.39							

Initial Moisture Content	34	%
Maximum Dry Density	1.81	Mg/m3
Optimum Moisture Content	12	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	0	%
Material Retained 20mm	0	%

Operator
Conor

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Dry Density / Moisture Content Relationship BS 1377:Part 4:1990**	Contract Number	63916
		Borehole / Pit No	TP/SA107
Project Name	Plasyfelin	Sample No	B2
Date Tested	22/03/2023	Depth Top	0.50
Compaction Method	2.5 Kg Rammer	Depth Base	
Compaction Clause	BS1377:Part 4:1990, Clause 3.3	Sample Type	B
Sample Description	*See Sample Description Sheet	Single or Separate Sample Used	Single



Compaction Point	1	2	3	4	5							
Moisture Content	7.5	10	13	16	33							
Bulk Density	1.87	1.94	2.01	2.04	1.87							
Dry Density	1.74	1.76	1.78	1.75	1.40							

Initial Moisture Content	33	%
Maximum Dry Density	1.78	Mg/m3
Optimum Moisture Content	13	%
Particle Density	2.65 Assumed	Mg/m3
Material Retained 37.5mm	46	%
Material Retained 20mm	9	%

Operator
Conor

UKAS TESTING 2788

2531

ANALYTICAL TEST REPORT

Contract no: 120475

Contract name: Plasyfelin

Client reference: 784-B040567

Clients name: Geo Site and Testing Services

Clients address: Unit 3 and 4 Heol Aur
Dafen Industrial Estate, Dafen
Llanelli, Carmarthenshire
SA14 8QN

Samples received: 16 March 2023

Analysis started: 16 March 2023

Analysis completed: 27 March 2023

Report issued: 27 March 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Samantha Rogerson
Reporting Manager

Chemtech Environmental Limited

SOILS

Lab number			120475-1	120475-2	120475-3	120475-4	120475-5	120475-6
Sample id			BH104	BH104	BH104	BH105	BH105	BH105
Depth (m)			0.00-0.50	0.50-1.00	1.50-2.00	0.00-0.50	0.50-1.00	1.50-2.00
Sample Type			B1	B2	B3	B1	B2	B4
Date sampled			-	-	-	-	-	-
Test	**Method**	**Units**						
pH	CE004 U	units	5.8	6.2	6.7	5.5	6.0	6.4
Sulphate (2:1 water soluble)	CE061 U	mg/l SO_4	20	<10	<10	<10	11	<10
Sulphate (acid extractable)	CE062 U	mg/kg SO_4	670	<100	<100	346	371	<100
Sulphate (acid extractable)	CE062 U	% w/w SO_4	0.07	<0.01	<0.01	0.03	0.04	<0.01
Sulphur (total)	CE119	mg/kg S	453	<100	<100	299	244	<100
Sulphur (total)	CE119	% w/w S	0.05	<0.01	<0.01	0.03	0.02	<0.01

Chemtech Environmental Limited

SOILS

Lab number			120475-7	120475-8	120475-9	120475-10	120475-11	120475-12
Sample id			BH106	BH106	BH107	BH107	BH107	TP/SA107
Depth (m)			0.05-0.50	0.50-1.00	0.00-0.50	0.50-1.00	1.50-2.00	0.50
Sample Type			B1	B2	B1	B2	B4	B2
Date sampled			-	-	-	-	-	-
Test	**Method**	**Units**						
pH	CE004 U	units	5.2	6.0	6.1	6.5	7.4	7.7
Sulphate (2:1 water soluble)	CE061 U	mg/l SO_4	<10	11	13	13	<10	12
Sulphate (acid extractable)	CE062 U	mg/kg SO_4	491	267	485	327	<100	499
Sulphate (acid extractable)	CE062 U	% w/w SO_4	0.05	0.03	0.05	0.03	<0.01	0.05
Sulphur (total)	CE119	mg/kg S	395	324	396	201	<100	569
Sulphur (total)	CE119	% w/w S	0.04	0.03	0.04	0.02	<0.01	0.06

Chemtech Environmental Limited

SOILS

Lab number			120475-13	120475-14	120475-15	120475-16
Sample id			TP102	TP103	TP103	TP106
Depth (m)			0.50	0.30	1.00	0.50
Sample Type			B16	B18	B20	B8
Date sampled			-	-	-	-
Test	**Method**	**Units**				
pH	CE004 U	units	5.9	5.8	5.7	7.5
Sulphate (2:1 water soluble)	CE061 U	mg/l SO_4	64	13	12	<10
Sulphate (acid extractable)	CE062 U	mg/kg SO_4	524	569	550	<100
Sulphate (acid extractable)	CE062 U	% w/w SO_4	0.05	0.06	0.05	<0.01
Sulphur (total)	CE119	mg/kg S	375	1455	337	<100
Sulphur (total)	CE119	% w/w S	0.04	0.15	0.03	<0.01

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO_4
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	100	mg/kg SO_4
CE062	Sulphate (acid extractable)	HCl extract, analysed by ICP-OES	Dry	U	0.01	% w/w SO_4
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		100	mg/kg S
CE119	Sulphur (total)	Aqua regia digest, analysed by ICP-OES	Dry		0.01	% w/w S

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
120475-1	BH104	0.00-0.50	Y	All (NSD)
120475-2	BH104	0.50-1.00	Y	All (NSD)
120475-3	BH104	1.50-2.00	Y	All (NSD)
120475-4	BH105	0.00-0.50	Y	All (NSD)
120475-5	BH105	0.50-1.00	Y	All (NSD)
120475-6	BH105	1.50-2.00	Y	All (NSD)
120475-7	BH106	0.05-0.50	Y	All (NSD)
120475-8	BH106	0.50-1.00	Y	All (NSD)
120475-9	BH107	0.00-0.50	Y	All (NSD)
120475-10	BH107	0.50-1.00	Y	All (NSD)
120475-11	BH107	1.50-2.00	Y	All (NSD)
120475-12	TP/SA107	0.50	Y	All (NSD)
120475-13	TP102	0.50	Y	All (NSD)
120475-14	TP103	0.30	Y	All (NSD)
120475-15	TP103	1.00	Y	All (NSD)
120475-16	TP106	0.50	Y	All (NSD)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.
For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones, where applicable.

APPENDIX I – CHEMICAL LABORATORY TEST RESULTS

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Tetra Tech
5th Floor, Longcross Court
47 Newport Rd
Cardiff
Cardiff
UK
CF24 OAD

Attention :	Sarah Roberts
Date :	27th January, 2023
Your reference :	B040567
Our reference :	Test Report 23/263 Batch 1
Location :	Plas Y Felin
Date samples received :	10th January, 2023
Status :	Final Report
Issue :	1

Eight samples were received for analysis on 10th January, 2023 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Liza Klebe
Project Co-ordinator

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts
EMT Job No: 23/263

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	15-17									LOD/LOR	Units	Method No.
Sample ID	TP/SA107	TP106											
Depth	0.20	0.00											
COC No / misc													
Containers	V T J	J V											
Sample Date	05/01/2023	05/01/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	10/01/2023	10/01/2023											
Arsenic #	10.2	8.0									<0.5	mg/kg	TM30/PM15
Beryllium	0.6	0.9									<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Chromium #	27.7	40.0									<0.5	mg/kg	TM30/PM15
Copper #	24	11									<1	mg/kg	TM30/PM15
Lead #	46	10									<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Nickel #	10.0	26.6									<0.7	mg/kg	TM30/PM15
Selenium #	<1	2									<1	mg/kg	TM30/PM15
Vanadium	22	17									<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.7	<0.1									<0.1	mg/kg	TM74/PM32
Zinc #	115	65									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.11	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.20	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	0.16	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.16	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	0.15	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.31	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.10	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.09	<0.04									<0.04	mg/kg	TM4/PM8
PAH 16 Total	1.3	<0.6									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.22	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.09	<0.02									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	90	90									<0	%	TM4/PM8

Element Materials Technology

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts
EMT Job No: 23/263

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	15-17											
Sample ID	TP/SA107	TP106											
Depth	0.20	0.00									Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V T J	J V											
Sample Date	05/01/2023	05/01/2023											
Sample Type	Soil	Soil											
Batch Number	1	1									LOD/LOR	Units	Method No.
Date of Receipt	10/01/2023	10/01/2023											
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C35-C44 (EH_1D_AL)	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-44 (EH+HS_1D_AL)	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC35-EC44 (EH_1D_AR)	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-44 (EH+HS_1D_AR)	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-44) (EH+HS_CU_1D_Total)	<52	<52									<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE#	<5	<5									<5	ug/kg	TM36/PM12
Benzene#	<5	<5									<5	ug/kg	TM36/PM12
Toluene#	<5	<5									<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	<5									<5	ug/kg	TM36/PM12
m/p-Xylene#	<5	<5									<5	ug/kg	TM36/PM12
o-Xylene#	<5	<5									<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15									<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	25.9	10.5									<0.1	%	PM4/PM0
Hexavalent Chromium#	<0.3	<0.3									<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.0076	0.0052									<0.0015	g/l	TM38/PM20
Chromium III	27.7	40.0									<0.5	mg/kg	NONE/NONE
Free Cyanide	<0.5	<0.5									<0.5	mg/kg	TM89/PM45
Fraction Organic Carbon	0.032	0.003									<0.001	None	TM21/PM24
pH#	7.86	7.41									<0.01	pH units	TM73/PM11

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts
EMT Job No: 23/263

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	15-17											
Sample ID	TP/SA107	TP106											
Depth	0.20	0.00									Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V T J	J V											
Sample Date	05/01/2023	05/01/2023											
Sample Type	Soil	Soil											
Batch Number	1	1									LOD/LOR	Units	Method No.
Date of Receipt	10/01/2023	10/01/2023											
Dissolved Antimony #	<2	<2									<2	ug/l	TM30/PM14
Dissolved Arsenic #	3.0	<2.5									<2.5	ug/l	TM30/PM14
Dissolved Barium #	129	6									<3	ug/l	TM30/PM14
Dissolved Beryllium #	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Boron #	<12	<12									<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Chromium #	<1.5	<1.5									<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7									<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5									<5	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1									<1	ug/l	TM30/PM14
Dissolved Molybdenum #	<2	<2									<2	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2									<2	ug/l	TM30/PM14
Dissolved Selenium #	<3	<3									<3	ug/l	TM30/PM14
Dissolved Zinc #	<3	<3									<3	ug/l	TM30/PM14
PAH MS													
Naphthalene	<0.1	<0.1									<0.1	ug/l	TM4/PM30
Acenaphthylene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Acenaphthene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Fluorene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Phenanthrene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Anthracene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Fluoranthene	0.006	0.009									<0.005	ug/l	TM4/PM30
Pyrene	0.006	0.009									<0.005	ug/l	TM4/PM30
Benzo(a)anthracene	0.006	0.006									<0.005	ug/l	TM4/PM30
Chrysene	0.009	0.007									<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene	0.016	0.011									<0.008	ug/l	TM4/PM30
Benzo(a)pyrene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene	0.005	<0.005									<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene	0.005	<0.005									<0.005	ug/l	TM4/PM30
PAH 16 Total	<0.173	<0.173									<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	0.012	<0.008									<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	<0.008									<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	74	83									<0	%	TM4/PM30

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts
EMT Job No: 23/263

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	15-17									LOD/LOR	Units	Method No.
Sample ID	TP/SA107	TP106											
Depth	0.20	0.00											
COC No / misc													
Containers	V T J	J V											
Sample Date	05/01/2023	05/01/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	10/01/2023	10/01/2023											
TPH CWG													
Aliphatics													
>C5-C6	<10	<10									<10	ug/l	TM36/PM69
>C6-C8	<10	<10									<10	ug/l	TM36/PM69
>C8-C10	<10	<10									<10	ug/l	TM36/PM69
>C10-C12	<5	<5									<5	ug/l	TM5/PM16/PM30
>C12-C16	<10	<10									<10	ug/l	TM5/PM16/PM30
>C16-C21	<10	<10									<10	ug/l	TM5/PM16/PM30
>C21-C35	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35	<10	<10									<10	ug/l	TM5/TM36/PM16/PM30/PM69
Aromatics													
>C5-EC7	<10	<10									<10	ug/l	TM36/PM69
>EC7-EC8	<10	<10									<10	ug/l	TM36/PM69
>EC8-EC10	<10	<10									<10	ug/l	TM36/PM69
>EC10-EC12	<5	<5									<5	ug/l	TM5/PM16/PM30
>EC12-EC16	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC16-EC21	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC21-EC35	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35	<10	<10									<10	ug/l	TM5/TM36/PM16/PM30/PM69
Total aliphatics and aromatics(C5-35)	<10	<10									<10	ug/l	TM5/TM36/PM16/PM30/PM69
MTBE	<5	<5									<5	ug/l	TM36/PM69
Benzene	<5	<5									<5	ug/l	TM36/PM69
Toluene	<5	<5									<5	ug/l	TM36/PM69
Ethylbenzene	<5	<5									<5	ug/l	TM36/PM69
m/p-Xylene	<5	<5									<5	ug/l	TM36/PM69
o-Xylene	<5	<5									<5	ug/l	TM36/PM69
Total Phenols HPLC	<0.05	<0.05									<0.05	mg/l	TM26/PM0
Sulphate as SO4 #	<0.5	<0.5									<0.5	mg/l	TM38/PM0
Chloride #	<0.3	<0.3									<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	4.3	2.9									<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	0.08	<0.02									<0.02	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH3 #	<0.03	0.04									<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	<0.03	0.04									<0.03	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01									<0.01	mg/l	TM89/PM0
Dissolved Organic Carbon	5	4									<2	mg/l	TM60/PM0
pH	8.12	6.91									<0.01	pH units	TM73/PM0
Total Alkalinity as CaCO3	98	16									<1	mg/l	TM75/PM0

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
23/263	1	TP/SA107	0.20	3	Anthony Carman	27/01/2023	**General Description (Bulk Analysis)**	Brown Soil/Stones
					Anthony Carman	27/01/2023	**Asbestos Fibres**	NAD
					Anthony Carman	27/01/2023	**Asbestos ACM**	NAD
					Anthony Carman	27/01/2023	**Asbestos Type**	NAD
23/263	1	TP106	0.00	15	Simon Postlewhite	26/01/2023	**General Description (Bulk Analysis)**	Brown soil/stones
					Simon Postlewhite	26/01/2023	**Asbestos Fibres**	NAD
					Simon Postlewhite	26/01/2023	**Asbestos ACM**	NAD
					Simon Postlewhite	26/01/2023	**Asbestos Type**	NAD

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 23/263						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/263

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 23/263

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM16/PM30/PM69	please refer to PM16/PM30 and PM69 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.			AD	Yes

EMT Job No: 23/263

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM69	One part soil is mixed with 10 parts water in a vial leaving no headspace. The mixture is shaken and then left to leach for 24 hours before VOC analysis.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes

EMT Job No: 23/263

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.			AR	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes		AR	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes

EMT Job No: 23/263

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

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Attention :	Sarah Roberts
Date :	27th January, 2023
Your reference :	B040567
Our reference :	Test Report 23/437 Batch 1
Location :	Plas Y Felin
Date samples received :	12th January, 2023
Status :	Final Report
Issue :	1

Fifteen samples were received for analysis on 12th January, 2023 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Liza Klebe
Project Co-ordinator

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts
EMT Job No: 23/437

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	13-15	16-18	28-30	37-39						LOD/LOR	Units	Method No.
Sample ID	WS101	WS102	WS103	WS104	WS105								
Depth	0.30	0.60	0.30	0.60	0.30								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T								
Sample Date	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1								
Date of Receipt	12/01/2023	12/01/2023	12/01/2023	12/01/2023	12/01/2023								
Arsenic #	11.8	6.7	16.6	6.5	14.2						<0.5	mg/kg	TM30/PM15
Beryllium	0.7	0.8	0.9	0.7	0.7						<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM30/PM15
Chromium #	45.6	40.3	43.3	43.2	41.0						<0.5	mg/kg	TM30/PM15
Copper #	16	10	21	7	19						<1	mg/kg	TM30/PM15
Lead #	33	9	40	8	60						<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	0.2	0.1	<0.1						<0.1	mg/kg	TM30/PM15
Nickel #	20.6	26.6	20.1	20.1	16.1						<0.7	mg/kg	TM30/PM15
Selenium #	2	1	2	<1	2						<1	mg/kg	TM30/PM15
Vanadium	26	17	32	18	31						<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.2	<0.1	0.3	0.1	0.4						<0.1	mg/kg	TM74/PM32
Zinc #	74	65	76	47	78						<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03						<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05						<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	0.04	<0.03	0.08						<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	0.08	<0.03	0.13						<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	0.06	<0.03	0.10						<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	0.09						<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	0.06	<0.02	0.09						<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	0.10	<0.07	0.18						<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	0.07						<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	0.05						<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	<0.6	<0.6	0.8						<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	0.07	<0.05	0.13						<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	0.03	<0.02	0.05						<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	90	87	86	82	90						<0	%	TM4/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts
EMT Job No: 23/437

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	13-15	16-18	28-30	37-39						LOD/LOR	Units	Method No.
Sample ID	WS101	WS102	WS103	WS104	WS105								
Depth	0.30	0.60	0.30	0.60	0.30								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T								
Sample Date	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1								
Date of Receipt	12/01/2023	12/01/2023	12/01/2023	12/01/2023	12/01/2023								
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	<0.2	<0.2	<0.2	<0.2						<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	<4	<4	<4	<4						<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
>C35-C44 (EH_1D_AL)	<7	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-44 (EH+HS_1D_AL)	<26	<26	<26	<26	<26						<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	<0.2	<0.2	<0.2	<0.2						<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	<4	<4	<4	<4						<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	<7	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	<7	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
>EC35-EC44 (EH_1D_AR)	<7	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-44 (EH+HS_1D_AR)	<26	<26	<26	<26	<26						<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-44) (EH+HS_CU_1D_Total)	<52	<52	<52	<52	<52						<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE#	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
Benzene#	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
Toluene#	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
m/p-Xylene#	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
o-Xylene#	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15						<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	37.8	14.5	28.6	19.7	30.7						<0.1	%	PM4/PM0
Hexavalent Chromium#	<0.3	<0.3	<0.3	<0.3	<0.3						<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.0084	0.0038	0.0086	0.0083	0.0048						<0.0015	g/l	TM38/PM20
Chromium III	45.6	40.3	43.3	43.2	41.0						<0.5	mg/kg	NONE/NONE
Free Cyanide	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	mg/kg	TM89/PM45
Fraction Organic Carbon	0.017	0.003	0.025	0.004	0.027						<0.001	None	TM21/PM24
pH#	5.84	6.30	5.60	6.42	7.65						<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts
EMT Job No: 23/437

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	13-15									LOD/LOR	Units	Method No.
Sample ID	WS101	WS102											
Depth	0.30	0.60											
COC No / misc													
Containers	V J T	V J T											
Sample Date	10/01/2023	10/01/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	12/01/2023	12/01/2023											
Dissolved Antimony #	<2	<2									<2	ug/l	TM30/PM14
Dissolved Arsenic #	<2.5	3.0									<2.5	ug/l	TM30/PM14
Dissolved Barium #	4	<3									<3	ug/l	TM30/PM14
Dissolved Beryllium #	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Boron #	17	<12									<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Chromium #	<1.5	<1.5									<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7									<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5									<5	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1									<1	ug/l	TM30/PM14
Dissolved Molybdenum #	<2	<2									<2	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2									<2	ug/l	TM30/PM14
Dissolved Selenium #	<3	<3									<3	ug/l	TM30/PM14
Dissolved Zinc #	<3	<3									<3	ug/l	TM30/PM14
PAH MS													
Naphthalene	<0.1	<0.1									<0.1	ug/l	TM4/PM30
Acenaphthylene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Acenaphthene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Fluorene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Phenanthrene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Anthracene	0.010	<0.005									<0.005	ug/l	TM4/PM30
Fluoranthene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Pyrene	0.006	<0.005									<0.005	ug/l	TM4/PM30
Benzo(a)anthracene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Chrysene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene	<0.008	<0.008									<0.008	ug/l	TM4/PM30
Benzo(a)pyrene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.005	<0.005									<0.005	ug/l	TM4/PM30
PAH 16 Total	<0.173	<0.173									<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008	<0.008									<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	<0.008									<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	86	85									<0	%	TM4/PM30

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts
EMT Job No: 23/437

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	13-15											
Sample ID	WS101	WS102											
Depth	0.30	0.60									Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J T	V J T											
Sample Date	10/01/2023	10/01/2023											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	12/01/2023	12/01/2023											
											LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6	<10	<10									<10	ug/l	TM36/PM69
>C6-C8	<10	<10									<10	ug/l	TM36/PM69
>C8-C10	<10	<10									<10	ug/l	TM36/PM69
>C10-C12	<5	<5									<5	ug/l	TM5/PM16/PM30
>C12-C16	<10	<10									<10	ug/l	TM5/PM16/PM30
>C16-C21	<10	<10									<10	ug/l	TM5/PM16/PM30
>C21-C35	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35	<10	<10									<10	ug/l	TM5/TM36/PM16/PM30/PM69
Aromatics													
>C5-EC7	<10	<10									<10	ug/l	TM36/PM69
>EC7-EC8	<10	<10									<10	ug/l	TM36/PM69
>EC8-EC10	<10	<10									<10	ug/l	TM36/PM69
>EC10-EC12	<5	<5									<5	ug/l	TM5/PM16/PM30
>EC12-EC16	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC16-EC21	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC21-EC35	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35	<10	<10									<10	ug/l	TM5/TM36/PM16/PM30/PM69
Total aliphatics and aromatics(C5-35)	<10	<10									<10	ug/l	TM5/TM36/PM16/PM30/PM69
MTBE	<5	<5									<5	ug/l	TM36/PM69
Benzene	<5	<5									<5	ug/l	TM36/PM69
Toluene	<5	<5									<5	ug/l	TM36/PM69
Ethylbenzene	<5	<5									<5	ug/l	TM36/PM69
m/p-Xylene	<5	<5									<5	ug/l	TM36/PM69
o-Xylene	<5	<5									<5	ug/l	TM36/PM69
Total Phenols HPLC	<0.05	<0.05									<0.05	mg/l	TM26/PM0
Sulphate as SO4 #	0.5	0.5									<0.5	mg/l	TM38/PM0
Chloride #	<0.3	<0.3									<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	1.2	0.5									<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	<0.02	<0.02									<0.02	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH3 #	<0.03	<0.03									<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	<0.03	<0.03									<0.03	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01									<0.01	mg/l	TM89/PM0
Dissolved Organic Carbon	4	<2									<2	mg/l	TM60/PM0
pH	6.37	6.38									<0.01	pH units	TM73/PM0
Total Alkalinity as CaCO3	6	6									<1	mg/l	TM75/PM0

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
23/437	1	WS101	0.30	2	Catherine Coles	27/01/2023	**General Description (Bulk Analysis)**	loose soil
					Catherine Coles	27/01/2023	**Asbestos Fibres**	NAD
					Catherine Coles	27/01/2023	**Asbestos ACM**	NAD
					Catherine Coles	27/01/2023	**Asbestos Type**	NAD
23/437	1	WS102	0.60	14	Anthony Carman	27/01/2023	**General Description (Bulk Analysis)**	Brown Soil/Stones
					Anthony Carman	27/01/2023	**Asbestos Fibres**	NAD
					Anthony Carman	27/01/2023	**Asbestos ACM**	NAD
					Anthony Carman	27/01/2023	**Asbestos Type**	NAD
23/437	1	WS103	0.30	18	Catherine Coles	27/01/2023	**General Description (Bulk Analysis)**	loose soil
					Catherine Coles	27/01/2023	**Asbestos Fibres**	NAD
					Catherine Coles	27/01/2023	**Asbestos ACM**	NAD
					Catherine Coles	27/01/2023	**Asbestos Type**	NAD
23/437	1	WS104	0.60	30	Anthony Carman	27/01/2023	**General Description (Bulk Analysis)**	Brown Soil/Stones
					Anthony Carman	27/01/2023	**Asbestos Fibres**	NAD
					Anthony Carman	27/01/2023	**Asbestos ACM**	NAD
					Anthony Carman	27/01/2023	**Asbestos Type**	NAD
23/437	1	WS105	0.30	39	Catherine Coles	27/01/2023	**General Description (Bulk Analysis)**	loose soil
					Catherine Coles	27/01/2023	**Asbestos Fibres**	NAD
					Catherine Coles	27/01/2023	**Asbestos ACM**	NAD
					Catherine Coles	27/01/2023	**Asbestos Type**	NAD

Client Name: Tetra Tech
Reference: B040567
Location: Plas Y Felin
Contact: Sarah Roberts

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 23/437						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/437

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 23/437

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM16/PM30/PM69	please refer to PM16/PM30 and PM69 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.			AD	Yes

EMT Job No: 23/437

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM69	One part soil is mixed with 10 parts water in a vial leaving no headspace. The mixture is shaken and then left to leach for 24 hours before VOC analysis.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes

EMT Job No: 23/437

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.			AR	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes		AR	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes

EMT Job No: 23/437

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

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CF24 OAD

Attention :	Sarah Roberts
Date :	27th January, 2023
Your reference :	B040567
Our reference :	Test Report 23/471 Batch 1
Location :	Plas y Felin
Date samples received :	13th January, 2023
Status :	Final Report
Issue :	1

Twenty eight samples were received for analysis on 13th January, 2023 of which nine were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Liza Klebe
Project Co-ordinator

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts
EMT Job No: 23/471

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4-6	10-12	19-21	25-27	34-36	46-48	52-54	64-66	73-75		LOD/LOR	Units	Method No.
Sample ID	TP101	TP102	TP103	TP104	WS106	WS107	WS108	WS109	WS110				
Depth	0.50	0.50	0.50	0.30	0.30	0.60	0.30	0.60	0.30				
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T				
Sample Date	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023				
Arsenic #	7.0	18.4	5.8	7.1	21.6	6.4	15.4	9.2	12.4		<0.5	mg/kg	TM30/PM15
Beryllium	0.6	0.8	0.8	0.7	<0.5	0.8	0.9	0.9	0.5		<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM30/PM15
Chromium #	44.3	48.5	53.4	44.0	29.9	43.0	47.6	44.3	40.4		<0.5	mg/kg	TM30/PM15
Copper #	8	25	8	18	15	12	21	10	13		<1	mg/kg	TM30/PM15
Lead #	13	57	9	14	26	14	43	15	32		<5	mg/kg	TM30/PM15
Mercury #	0.1	0.1	<0.1	<0.1	0.2	<0.1	0.3	<0.1	0.2		<0.1	mg/kg	TM30/PM15
Nickel #	19.0	18.3	26.5	30.4	10.3	26.8	23.2	14.1	11.8		<0.7	mg/kg	TM30/PM15
Selenium #	2	3	2	2	2	2	2	2	2		<1	mg/kg	TM30/PM15
Vanadium	24	38	18	27	20	19	30	31	25		<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.2	0.3	0.1	0.2	0.5	<0.1	0.3	0.1	0.4		<0.1	mg/kg	TM74/PM32
Zinc #	62	89	74	68	60	70	93	39	47		<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	0.08	<0.03	<0.03	0.06	<0.03	0.11	<0.03	<0.03		<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	0.16	<0.03	<0.03	0.13	<0.03	0.21	<0.03	<0.03		<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	0.13	<0.03	<0.03	0.09	<0.03	0.19	<0.03	<0.03		<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	0.12	<0.06	<0.06	<0.06	<0.06	0.16	<0.06	<0.06		<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	0.13	<0.02	<0.02	0.08	<0.02	0.17	<0.02	<0.02		<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	0.23	<0.07	<0.07	0.14	<0.07	0.30	<0.07	<0.07		<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.09	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04		<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	0.9	<0.6	<0.6	<0.6	<0.6	1.3	<0.6	<0.6		<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	0.17	<0.05	<0.05	0.10	<0.05	0.22	<0.05	<0.05		<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	0.06	<0.02	<0.02	0.04	<0.02	0.08	<0.02	<0.02		<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	94	92	91	95	91	72	90	96	91		<0	%	TM4/PM8

Please see attached notes for all abbreviations and acronyms

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts
EMT Job No: 23/471

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4-6	10-12	19-21	25-27	34-36	46-48	52-54	64-66	73-75		LOD/LOR	Units	Method No.
Sample ID	TP101	TP102	TP103	TP104	WS106	WS107	WS108	WS109	WS110				
Depth	0.50	0.50	0.50	0.30	0.30	0.60	0.30	0.60	0.30				
COC No / misc										Please see attached notes for all abbreviations and acronyms			
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T				
Sample Date	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023	10/01/2023				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023	13/01/2023				
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	<4	<4	<4	<4	<4	<4	<4	<4		<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
>C35-C44 (EH_1D_AL)	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-44 (EH+HS_1D_AL)	<26	<26	<26	<26	<26	<26	<26	<26	<26		<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	<4	<4	<4	<4	<4	<4	<4	<4		<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	<7	<7	<7	<7	<7	<7	<7	<7	20		<7	mg/kg	TM5/PM8/PM16
>EC35-EC44 (EH_1D_AR)	<7	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-44 (EH+HS_1D_AR)	<26	<26	<26	<26	<26	<26	<26	<26	<26		<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-44) (EH+HS_CU_1D_Total)	<52	<52	<52	<52	<52	<52	<52	<52	<52		<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE#	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM36/PM12
Benzene#	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM36/PM12
Toluene#	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM36/PM12
m/p-Xylene#	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM36/PM12
o-Xylene#	<5	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15		<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	37.4	29.8	13.9	25.0	25.4	13.0	24.9	28.2	45.8		<0.1	%	PM4/PM0
Hexavalent Chromium#	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.0126	0.0073	0.0206	0.0040	0.0138	0.0056	0.0058	0.0092	0.0085		<0.0015	g/l	TM38/PM20
Chromium III	44.3	48.5	53.4	44.0	29.9	43.0	47.6	44.3	40.4		<0.5	mg/kg	NONE/NONE
Free Cyanide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	mg/kg	TM89/PM45
Fraction Organic Carbon	0.008	0.032	0.003	0.008	0.014	0.003	0.024	0.009	0.033		<0.001	None	TM21/PM24
pH#	5.69	5.86	6.03	5.49	7.86	6.56	5.19	6.43	6.99		<0.01	pH units	TM73/PM11

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts
EMT Job No: 23/471

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4-6	25-27	64-66								LOD/LOR	Units	Method No.
Sample ID	TP101	TP104	WS109										
Depth	0.50	0.30	0.60										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	10/01/2023	10/01/2023	10/01/2023										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	13/01/2023	13/01/2023	13/01/2023										
Dissolved Antimony #	<2	<2	<2								<2	ug/l	TM30/PM14
Dissolved Arsenic #	<2.5	<2.5	<2.5								<2.5	ug/l	TM30/PM14
Dissolved Barium #	<3	<3	5								<3	ug/l	TM30/PM14
Dissolved Beryllium #	<0.5	<0.5	<0.5								<0.5	ug/l	TM30/PM14
Dissolved Boron #	12	<12	<12								<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5								<0.5	ug/l	TM30/PM14
Dissolved Chromium #	<1.5	<1.5	<1.5								<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7								<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5								<5	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1								<1	ug/l	TM30/PM14
Dissolved Molybdenum #	<2	<2	<2								<2	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	<2								<2	ug/l	TM30/PM14
Dissolved Selenium #	<3	<3	<3								<3	ug/l	TM30/PM14
Dissolved Zinc #	<3	<3	<3								<3	ug/l	TM30/PM14
PAH MS													
Naphthalene	<0.1	<0.1	<0.1								<0.1	ug/l	TM4/PM30
Acenaphthylene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Acenaphthene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Fluorene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Phenanthrene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Anthracene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Fluoranthene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Pyrene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Benzo(a)anthracene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Chrysene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene	<0.008	<0.008	<0.008								<0.008	ug/l	TM4/PM30
Benzo(a)pyrene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.005	<0.005	0.005								<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.005	<0.005	<0.005								<0.005	ug/l	TM4/PM30
PAH 16 Total	<0.173	<0.173	<0.173								<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008	<0.008	<0.008								<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	<0.008	<0.008								<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	85	89	88								<0	%	TM4/PM30

Please see attached notes for all abbreviations and acronyms

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts
EMT Job No: 23/471

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4-6	25-27	64-66								LOD/LOR	Units	Method No.
Sample ID	TP101	TP104	WS109										
Depth	0.50	0.30	0.60										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	10/01/2023	10/01/2023	10/01/2023										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1										
Date of Receipt	13/01/2023	13/01/2023	13/01/2023										
TPH CWG													
Aliphatics													
>C5-C6	<10	<10	<10 SV								<10	ug/l	TM36/PM69
>C6-C8	<10	<10	<10 SV								<10	ug/l	TM36/PM69
>C8-C10	<10	<10	<10 SV								<10	ug/l	TM36/PM69
>C10-C12	<5	<5	<5								<5	ug/l	TM5/PM16/PM30
>C12-C16	<10	<10	<10								<10	ug/l	TM5/PM16/PM30
>C16-C21	<10	<10	<10								<10	ug/l	TM5/PM16/PM30
>C21-C35	<10	<10	<10								<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35	<10	<10	<10								<10	ug/l	TM5/TM36/PM16/PM30/PM69
Aromatics													
>C5-EC7	<10	<10	<10 SV								<10	ug/l	TM36/PM69
>EC7-EC8	<10	<10	<10 SV								<10	ug/l	TM36/PM69
>EC8-EC10	<10	<10	<10 SV								<10	ug/l	TM36/PM69
>EC10-EC12	<5	<5	<5								<5	ug/l	TM5/PM16/PM30
>EC12-EC16	<10	<10	<10								<10	ug/l	TM5/PM16/PM30
>EC16-EC21	<10	<10	<10								<10	ug/l	TM5/PM16/PM30
>EC21-EC35	<10	<10	<10								<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35	<10	<10	<10								<10	ug/l	TM5/TM36/PM16/PM30/PM69
Total aliphatics and aromatics(C5-35)	<10	<10	<10								<10	ug/l	TM5/TM36/PM16/PM30/PM69
MTBE	<5	<5	<5 SV								<5	ug/l	TM36/PM69
Benzene	<5	<5	<5 SV								<5	ug/l	TM36/PM69
Toluene	<5	<5	<5 SV								<5	ug/l	TM36/PM69
Ethylbenzene	<5	<5	<5 SV								<5	ug/l	TM36/PM69
m/p-Xylene	<5	<5	<5 SV								<5	ug/l	TM36/PM69
o-Xylene	<5	<5	<5 SV								<5	ug/l	TM36/PM69
Total Phenols HPLC	<0.05	<0.05	0.05								<0.05	mg/l	TM26/PM0
Sulphate as SO4 #	2.2	0.6	1.3								<0.5	mg/l	TM38/PM0
Chloride #	<0.3	<0.3	0.6								<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	0.8	0.3	1.8								<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	<0.02	<0.02	<0.02								<0.02	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH3 #	<0.03	<0.03	0.54								<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	<0.03	<0.03	0.57								<0.03	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01	<0.01								<0.01	mg/l	TM89/PM0
Dissolved Organic Carbon	3	2	7								<2	mg/l	TM60/PM0
pH	9.42	6.40	6.68								<0.01	pH units	TM73/PM0
Total Alkalinity as CaCO3	18	6	18								<1	mg/l	TM75/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
23/471	1	TP101	0.50	5	Simon Postlewhite	26/01/2023	**General Description (Bulk Analysis)**	Brown soil/stones
					Simon Postlewhite	26/01/2023	**Asbestos Fibres**	NAD
					Simon Postlewhite	26/01/2023	**Asbestos ACM**	NAD
					Simon Postlewhite	26/01/2023	**Asbestos Type**	NAD
23/471	1	TP102	0.50	12	Charlotte Taylor	26/01/2023	**General Description (Bulk Analysis)**	brown soil/stones
					Charlotte Taylor	26/01/2023	**Asbestos Fibres**	NAD
					Charlotte Taylor	26/01/2023	**Asbestos ACM**	NAD
					Charlotte Taylor	26/01/2023	**Asbestos Type**	NAD
23/471	1	TP103	0.50	21	Charlotte Taylor	26/01/2023	**General Description (Bulk Analysis)**	brown soil/stones
					Charlotte Taylor	26/01/2023	**Asbestos Fibres**	NAD
					Charlotte Taylor	26/01/2023	**Asbestos ACM**	NAD
					Charlotte Taylor	26/01/2023	**Asbestos Type**	NAD
23/471	1	TP104	0.30	26	Remigiusz Blichowski	26/01/2023	**General Description (Bulk Analysis)**	Brown clay with a lot of roots
					Remigiusz Blichowski	26/01/2023	**Asbestos Fibres**	NAD
					Remigiusz Blichowski	26/01/2023	**Asbestos ACM**	NAD
					Remigiusz Blichowski	26/01/2023	**Asbestos Type**	NAD
23/471	1	WS106	0.30	36	Simon Postlewhite	26/01/2023	**General Description (Bulk Analysis)**	Brown soil/stones
					Simon Postlewhite	26/01/2023	**Asbestos Fibres**	NAD
					Simon Postlewhite	26/01/2023	**Asbestos ACM**	NAD
					Simon Postlewhite	26/01/2023	**Asbestos Type**	NAD
23/471	1	WS107	0.60	48	Remigiusz Blichowski	26/01/2023	**General Description (Bulk Analysis)**	Brown clay with roots and rock
					Remigiusz Blichowski	26/01/2023	**Asbestos Fibres**	NAD
					Remigiusz Blichowski	26/01/2023	**Asbestos ACM**	NAD
					Remigiusz Blichowski	26/01/2023	**Asbestos Type**	NAD
23/471	1	WS108	0.30	54	Simon Postlewhite	26/01/2023	**General Description (Bulk Analysis)**	Brown soil/stones
					Simon Postlewhite	26/01/2023	**Asbestos Fibres**	NAD
					Simon Postlewhite	26/01/2023	**Asbestos ACM**	NAD
					Simon Postlewhite	26/01/2023	**Asbestos Type**	NAD
23/471	1	WS109	0.60	65	Remigiusz Blichowski	26/01/2023	**General Description (Bulk Analysis)**	Brown clay with roots and rock
					Remigiusz Blichowski	26/01/2023	**Asbestos Fibres**	NAD
					Remigiusz Blichowski	26/01/2023	**Asbestos ACM**	NAD
					Remigiusz Blichowski	26/01/2023	**Asbestos Type**	NAD

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
23/471	1	WS110	0.30	75	Charlotte Taylor	26/01/2023	**General Description (Bulk Analysis)**	brown soil/stones
					Charlotte Taylor	26/01/2023	**Asbestos Fibres**	NAD
					Charlotte Taylor	26/01/2023	**Asbestos ACM**	NAD
					Charlotte Taylor	26/01/2023	**Asbestos Type**	NAD

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 23/471						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/471

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 23/471

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM16/PM30/PM69	please refer to PM16/PM30 and PM69 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.			AD	Yes

EMT Job No: 23/471

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM69	One part soil is mixed with 10 parts water in a vial leaving no headspace. The mixture is shaken and then left to leach for 24 hours before VOC analysis.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes

EMT Job No: 23/471

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.			AR	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes		AR	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes

EMT Job No: 23/471

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

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Attention :	Sarah Roberts
Date :	20th March, 2023
Your reference :	B040567
Our reference :	Test Report 23/3602 Batch 1
Location :	Plas y Felin
Date samples received :	8th March, 2023
Status :	Final Report
Issue :	1

Six samples were received for analysis on 8th March, 2023 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Liza Klebe
Project Co-ordinator

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts
EMT Job No: 23/3602

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-7	8-14	15-21	22-28	29-35	36-42					LOD/LOR	Units	Method No.
Sample ID	WS104	WS105	WS109	BH104	BH106	BH107							
Depth	2.00	1.70	2.00	5.00	3.00	3.00							
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G							
Sample Date	07/03/2023	07/03/2023	07/03/2023	07/03/2023	07/03/2023	07/03/2023							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	08/03/2023	08/03/2023	08/03/2023	08/03/2023	08/03/2023	08/03/2023							
Dissolved Antimony #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Arsenic #	<2.5	2.5	<2.5	<2.5	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Barium #	80	88	75	106	138	107					<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Boron	<12	30	12	21	<12	<12					<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Total Dissolved Chromium #	5.3	<1.5	6.0	10.6	6.6	8.8					<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7	<7	<7	<7					<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Molybdenum #	<2	2	<2	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	<2	3	2	<2					<2	ug/l	TM30/PM14
Dissolved Selenium #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM30/PM14
Dissolved Zinc #	8	8	8	5	4	4					<3	ug/l	TM30/PM14
PAH MS													
Naphthalene #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM4/PM30
Acenaphthylene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Acenaphthene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Fluorene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Phenanthrene #	<0.005	<0.005	<0.005	<0.005	0.008	<0.005					<0.005	ug/l	TM4/PM30
Anthracene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Fluoranthene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Pyrene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Chrysene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008					<0.008	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	ug/l	TM4/PM30
PAH 16 Total #	<0.173	<0.173	<0.173	<0.173	<0.173	<0.173					<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008					<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008					<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	82	81	86	91	94	86					<0	%	TM4/PM30
MTBE #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12

Element Materials Technology

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts
EMT Job No: 23/3602

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-7	8-14	15-21	22-28	29-35	36-42					LOD/LOR	Units	Method No.
Sample ID	WS104	WS105	WS109	BH104	BH106	BH107							
Depth	2.00	1.70	2.00	5.00	3.00	3.00							
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G							
Sample Date	07/03/2023	07/03/2023	07/03/2023	07/03/2023	07/03/2023	07/03/2023							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	08/03/2023	08/03/2023	08/03/2023	08/03/2023	08/03/2023	08/03/2023							
TPH CWG													
Aliphatics													
>C5-C6 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12 #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15					<0.15	mg/l	TM26/PM0
Sulphate as SO4 #	5.7	6.3	4.9	7.3	2.9	3.9					<0.5	mg/l	TM38/PM0
Chloride #	7.8	10.2	5.5	7.1	5.4	11.3					<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	0.8	1.3	<0.2	<0.2	2.1	1.3					<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01	0.02					<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as NH3 #	0.113	0.076	<0.030	<0.030	<0.030	<0.030					<0.030	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	0.12	0.08	0.03	<0.03	<0.03	<0.03					<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 #	258	538	196	188	222	212					<1	mg/l	TM75/PM0
Dissolved Organic Carbon #	2	4	4	3	<2	<2					<2	mg/l	TM60/PM0
pH #	7.41	7.42	7.65	7.86	7.55	7.53					<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Tetra Tech
Reference: B040567
Location: Plas y Felin
Contact: Sarah Roberts

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 23/3602						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/3602

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 23/3602

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			

EMT Job No: 23/3602

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			

APPENDIX J – GROUNDWATER AND GROUND GAS MONITORING DATA

Tetra Tech

LANDGAS AND GROUNDWATER MONITORING RESULTS

5th Floor, Longcross Court, 47 Newport Road, Cardiff, CF24 0AD

Site Name: Plas Y Felin
Job No.: 784-B040567
Client: Caerphilly County Borough Council

Date Monitored: 23/01/23
Monitoring Engineer: PM
Weather: Cold and clear

EQUIPMENT USED

Type	Make	Serial	Last Calibrated
Gas Analyser	**Landtec GA5000**	**G502044**	**Dec-20**
Interface Meter	**Solinst**	**122-004988-1**	**n/a**

LANDGAS CONCENTRATIONS - INSTALLATION CONDITIONS

Exploratory Hole No	Peak		Steady									
	CH_4 (% vol)	CO_2 (% vol)	CH_4 (% vol)	CO_2 (% vol)	O_2 (% vol)	BAL (%)	PID (ppm)	H_2S (ppm)	HCN (ppm)	CO (ppm)	Time	Remarks
WS101	0.2	0.6	0.2	0.6	20.4	78.8	nt	<1	nt	<1	12:30	
WS102	0.2	2.0	0.2	2.0	14.7	86.7	nt	<1	nt	<1	10:45	
WS104	0.2	3.0	0.2	3.0	19.0	87.9	nt	<1	nt	<1	10:15	
WS105	0.2	1.5	0.2	1.5	13.5	84.9	nt	<1	nt	<1	09:45	
WS109	<0.1	1.1	<0.1	1.1	18.8	80	nt	<1	nt	<1	13:50	
BH104	0.2	0.2	0.2	0.2	20.9	79	nt	<1	nt	<1	12:45	
BH106	0.2	1.7	0.2	1.6	18.5	81	nt	<1	nt	<1	13:00	
BH107	0.2	0.2	0.2	0.2	20.8	78	nt	<1	nt	<1	13:15	

LANDGAS - PHYSICAL PARAMETERS

Exploratory Hole No	Atmos Pressure (m bar)	Atmos Temp (°C)	BH Flow		BH Pressure		Remarks
			Peak (L/hr)	Steady (L/hr)	Peak (mbar)	Steady (mbar)	
WS101	1013	5.5	0.1	0.0	0.2	0.2	
WS102	1012	5.5	0.0	0.0	2.1	2.1	
WS104	1011	5.0	0.0	0.0	5.3	5.3	
WS105	1011	5.0	0.0	0.0	0.5	0.2	
WS109	1014	6.0	0.0	0.0	2.8	1.5	
BH104	1013	5.5	0.2	0.0	1.5	1.0	
BH106	1013	5.5	0.1	0.0	1.8	1.0	
BH107	1013	6.0	0.2	0.0	3.4	2.0	

AMBIENT ATMOSPHERIC CONDITIONS

Parameter	Before Monitoring	After Monitoring
CH_4 (% vol)	<0.1	<0.1
CO_2 (% vol)	<0.1	<0.1
O_2 (% vol)	21.0	21.0
PID (ppm)	nt	nt
Atmos Press. (m bar)	1012	1014

ATMOSPHERIC PRESSURE CONDITIONS

3 days prior (m bar)	999
2 days prior (m bar)	1009
1 day prior (m bar)	1011
during (m bar) am,midday,pm	1012, 1014, 1016
1 day post (m bar)	1017

GROUNDWATER / NAPL - PHYSIO-CHEMICAL PARAMETERS

Exploratory Hole No	Water Surface (mbgl)	Base Depth (mbgl)	LNAPL Surface (mbgl)	DNAPL Surface (mbgl)	Water Quality Indicators								Remarks
					ORP (mV)	SPC (µs/cm)	C (µs/cm)	Ph (value)	DO (mg/L)	Dissolved Solids (ppt)	Resistivity (Ω·cm)	Temp (°C)	
WS101	DRY	1.12	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS102	DRY	0.70	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS104	0.56	3.75	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS105	1.05	1.07	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS109	0.14	1.66	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
BH104	3.70	6.80	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
BH106	1.98	7.55	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
BH107	1.30	7.02	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	

Notes nt = not tested
nd = not detected

Data Compiled by: PM
Data Checked by: SR

Tetra Tech

LANDGAS AND GROUNDWATER MONITORING RESULTS

5th Floor, Longcross Court, 47 Newport Road, Cardiff, CF24 0AD

TETRA TECH

Site Name: Plas Y Felin
Job No.: 784-B040567
Client: Caerphilly County Borough Council

Date Monitored: 07/03/23
Monitoring Engineer: CS
Weather: Drizzle and fair

EQUIPMENT USED

Type	Make	Serial	Last Calibrated
Gas Analyser	**Landtec GA5000**	**G502044**	**Dec-22**
Interface Meter	**Solinst**	**122-004988-1**	**n/a**

LANDGAS CONCENTRATIONS - INSTALLATION CONDITIONS

Exploratory Hole No	Peak		Steady									
	CH_4 (% vol)	CO_2 (% vol)	CH_4 (% vol)	CO_2 (% vol)	O_2 (% vol)	BAL (%)	PID (ppm)	H_2S (ppm)	HCN (ppm)	CO (ppm)	Time	Remarks
WS101	0.2	2.2	0.2	2.0	20.5	77.3	nt	<1	nt	<1	09:25:00	
WS102	0.2	2.8	0.2	2.8	18.0	79	nt	<1	nt	<1	09:35:00	
WS104	0.2	2.0	0.2	1.9	20.7	77.2	nt	<1	nt	<1	08:42:00	
WS105	0.2	1.7	0.2	1.7	16.5	81.7	nt	<1	nt	<1	08:36:00	
WS109	0.2	0.8	0.2	0.8	4.2	94.7	nt	<1	nt	<1	08:20:00	
BH104	0.2	0.2	0.2	0.2	21.3	78.4	nt	<1	nt	<1	09:10:00	
BH106	0.2	2.0	0.2	2.0	18.0	79.8	nt	<1	nt	<1	08:53:00	
BH107	0.2	0.2	0.2	0.2	21.8	77.8	nt	<1	nt	<1	09:00:00	

LANDGAS - PHYSICAL PARAMETERS

Exploratory Hole No	Atmos Pressure (m bar)	Atmos Temp (°C)	BH Flow		BH Pressure		Remarks
			Peak (L/hr)	Steady (L/hr)	Peak (mbar)	Steady (mbar)	
WS101	993	8.0	0.3	0.3	-5.1	0.3	
WS102	993	8.0	0.3	0.3	-5.2	0.2	
WS104	993	8.0	-5.4	-2.2	-5.2	0.3	GW sampled at 2.00mbgl
ws105	993	8	0.2	0.2	0.02	-2.2	GW sampled at 1.70mbgl
WS109	992	8.0	-6.2	-6.2	-49.1	0.2	Gas Terminated due to water in line after 36s. GW sampled at 2.00mbgl
BH104	993	8.0	0.3	0.3	-0.8	-6.2	GW sampled at 5.00mbgl
BH106	993	8.0	0.2	0.2	-3.9	0.2	GW sampled at 3.00mbgl
BH107	993	8.0	-3.7	0.3	-1.4	0.3	Gas Terminated due to water in line after 15s. GW sampled at 3.0mbgl

AMBIENT ATMOSPHERIC CONDITIONS

Parameter	Before Monitoring	After Monitoring
CH_4 (% vol)	0.2	0.2
CO_2 (% vol)	0.2	0.2
O_2 (% vol)	21.2	21.9
PID (ppm)	nt	nt
Atmos Press. (m bar)	992	993

ATMOSPHERIC PRESSURE CONDITIONS

3 days prior (m bar)	1032
2 days prior (m bar)	1022
1 day prior (m bar)	1008
during (m bar) am,midday,pm	992, 993, 993
1 day post (m bar)	989

GROUNDWATER / NAPL - PHYSIO-CHEMICAL PARAMETERS

Exploratory Hole No	Water Surface (mbgl)	Base Depth (mbgl)	LNAPL Surface (mbgl)	DNAPL Surface (mbgl)	Water Quality Indicators						Remarks
					ORP (mV)	SPC (µs/cm)	C (µs/cm)	Ph (value)	DO (mg/L)	Temp (°C)	
WS101	1.07	1.10	nd	nd	nt	nt	nt	nt	nt	nt	
WS102	DRY	0.65	nd	nd	nt	nt	nt	nt	nt	nt	
WS104	0.75	3.65	nd	nd	640.30	515.85	nt	8.40	2.00	8.61	
WS105	1.5	1.84	nd	nd	595.30	342.18	nt	8.48	4.69	9.07	
WS109	0.44	2.63	nd	nd	616.90	355.16	nt	8.39	2.14	8,38	
BH104	3.63	6.82	nd	nd	655.80	361.40	nt	9.60	2.42	10.36	
BH106	1.95	7.60	nd	nd	676.50	392.23	nt	8.87	2.06	9.04	
BH107	1.23	6.99	nd	nd	662.80	407.86	nt	9.06	5.34	8.38	

Notes nt = not tested
nd = not detected

Data Compiled by: CS
Data Checked by: SR

Tetra Tech

LANDGAS AND GROUNDWATER MONITORING RESULTS

5th Floor, Longcross Court, 47 Newport Road, Cardiff, CF24 0AD

Site Name: Plas Y Felin
Job No.: 784-B040567
Client: Caerphilly County Borough Council

Date Monitored: 21/03/23
Monitoring Engineer: CS
Weather: Overcast

EQUIPMENT USED

Type	Make	Serial	Last Calibrated
Gas Analyser	**Landtec GA5000**	**G502044**	**Dec-22**
Interface Meter	**Solinst**	**122-004988-1**	**n/a**

LANDGAS CONCENTRATIONS - INSTALLATION CONDITIONS

Exploratory Hole No	Peak		Steady									
	CH_4 (% vol)	CO_2 (% vol)	CH_4 (% vol)	CO_2 (% vol)	O_2 (% vol)	BAL (%)	PID (ppm)	H_2S (ppm)	HCN (ppm)	CO (ppm)	Time	Remarks
WS101	0.2	2.6	0.2	2.6	17.2	80	nt	<1	nt	<1	10:40	
WS102	0.2	2.3	0.2	2.3	17.0	80.6	nt	<1	nt	<1	10:19	
WS104	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	10:08	Flooded well
WS105	0.2	1.4	0.2	1.3	14.6	84.6	nt	<1	nt	<1	11:00	
WS109	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	09:45	Flooded well
BH104	0.2	1.6	0.2	0.6	19.1	80.1	nt	<1	nt	<1	10:27	
BH106	0.2	0.6	0.2	0.3	20.2	79.4	nt	<1	nt	<1	10:13	
BH107	0.2	0.3	0.2	0.3	20.7	78.9	nt	<1	nt	<1	11:15	Water in tube

LANDGAS - PHYSICAL PARAMETERS

Exploratory Hole No	Atmos Pressure (m bar)	Atmos Temp (°C)	BH Flow		BH Pressure		Remarks
			Peak (L/hr)	Steady (L/hr)	Peak (mbar)	Steady (mbar)	
WS101	999	16.0	0.2	0.2	-3.5	-3.5	
WS102	999	16.0	4.9	4.9	15.9	15.9	
WS104	999	10.0	nt	nt	nt	nt	Flooded well
WS105	999	11.0	-5.6	-3.9	14.7	14.7	
WS109	998	11.0	nt	nt	nt	nt	Flooded well
BH104	999	14.0	0.4	0.4	-3.7	-3.7	
BH106	999	14.0	0.3	0.3	0.0	0.0	
BH107	999	14.0	nt	nt	nt	nt	Water in tube after 83s

AMBIENT ATMOSPHERIC CONDITIONS

Parameter	Before Monitoring	After Monitoring
CH_4 (% vol)	0.2	0.2
CO_2 (% vol)	0.2	0.2
O_2 (% vol)	20.8	20.7
PID (ppm)	nt	nt
Atmos Press. (m bar)	998	999

ATMOSPHERIC PRESSURE CONDITIONS

3 days prior (m bar)	1004
2 days prior (m bar)	1014
1 day prior (m bar)	1016
during (m bar) am,midday,pm	998/999/999
1 day post (m bar)	999

GROUNDWATER / NAPL - PHYSIO-CHEMICAL PARAMETERS

Exploratory Hole No	Water Surface (mbgl)	Base Depth (mbgl)	LNAPL Surface (mbgl)	DNAPL Surface (mbgl)	Water Quality Indicators								Remarks
					ORP (mV)	SPC (µs/cm)	C (µs/cm)	Ph (value)	DO (mg/L)	Dissolved Solids (ppt)	Resistivity (Ω·cm)	Temp (°C)	
WS101	1.08	1.08	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS102	0.61	0.65	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS104	GL	3.67	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS105	0.77	1.81	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS109	GL	2.62	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
BH104	2.68	6.70	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
BH106	1.10	6.52	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
BH107	0.31	6.92	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	

Notes nt = not tested
nd = not detected

Data Compiled by: CS
Data Checked by: SR

APPENDIX K – CIRIA C552 RISK METHODOLOGY

The following tables are derived from CIRIA C552 and have been used to define the risk rating presented in the Qualitative Risk Assessment matrix.

Classification of consequence

Classification	Definition
Severe	Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short term risk of pollution (note; Water Resources Act contains no scope for considering significant pollution) of sensitive water resource. Catastrophic damage to building/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem. (Note the definitions of ecological systems within the Draft Circular on Contaminated Land DETR, 2000).
Medium	Chronic damage to human health ('significant harm', as defined In DETR, 2000). Pollution of sensitive water resources (note; Water Resources Act contains no scope for considering significant pollution). A significant change in a particular ecosystem, or an organism forming part of such an ecosystem. (Note the definitions of ecological systems within the Draft Circular on Contaminated Land DETR, 2000).
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm', as defined In DETR, 2000). Damage to sensitive buildings/structures/services or the environment.
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.

Classification of probability

Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a 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.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period that such an event would take place, and is even less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Matrix of consequence against probability to gain a risk classification

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk