

**Geotechnical and Geo-Environmental
Report**

Proposed Residential Development, Builders
Yard, Elwyn Drive, Merthyr Tydfil

Prepared for:

Mr J. Cox

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Executive Summary

Mr J Cox is proposing the redevelopment of a builder's yard, at Elwyn Drive in Merthyr Tydfil, CF47 0NJ. The development will entail the construction of a pair of semi detached houses with associated road and driveway access and garden areas.

The site is centred at an approximate National Grid Reference of 305580, 205960 and occupies a plan area of 0.06 hectares.

Historical mapping indicates that the site has not been physically developed but has lain within the builder's yard since the late 1960's/early 1970's.

Geologically, the site is underlain by rocks of the South Wales Lower Coal Measures Formation, Carboniferous in age and comprising grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones. Superficial Deposits are indicated to overlie the bedrock comprising Boulder Clay (Till).

A geo-technical and geo-environmental site investigation (phase 1) was undertaken on the 14th of August 2015 comprising five windowless sampling boreholes using a tracked mini percussive rig.

Terra Firma (Wales) Ltd concluded that the site was potentially at risk of unrecorded abandoned mine workings. In order to determine the level of mining related risk, an intrusive drilling exercise (phase 2) was undertaken on the 22nd and 23rd of October, 2015. Three rotary boreholes were installed by open hole drilling methods (water flush) using a T44 Beretta drilling rig.

The ground conditions established comprised Made Ground to 0.20/1.60m depth, underlain by Glacial Boulder Clay to 3.90/4.80m which is in turn underlain by Mudstone Coal Measures. The three rotary boreholes identified a single seam of coal, 0.60m to 0.80m thick at a depth of between 9.30m and 9.60m below ground level.

The coal was intact in all three boreholes with no evidence of workings and it was concluded that there was an insignificant risk to the development from past unrecorded shallow workings.

However, there is a possibility of shallow unrecorded workings having taken place within influencing distance of the proposed houses. In order to cater for such an eventuality it is recommended that a reinforced concrete raft type foundation/floor slab solution would then be suitable engineering solution for the development. The raft should be capable of spanning a crown hole of 3.0m with a cantilever effect on corners of 1.5m. The maximum load beneath the foundation should not exceed 75kN/m². Total settlement of the foundation should not exceed 30mm with angular distortions caused as a result of differential settlements should be less than 1:750.

The Made Ground underlying the site may have the potential to generate gases such as methane and carbon dioxide. As an economical alternative to gas monitoring we consider it appropriate to install a 2000g DPM/reinforced gas membrane with passive under floor venting. In addition, all joints and penetrations should be sealed. These mitigation measures conform to gas characteristic 2 in accordance with CIRIA C665 (low risk).

No radon protection measures are necessary in the construction of a new dwelling.

Soil laboratory chemical analysis identified an elevated level of lead in WS05 and elevated PAHs in WS02 and WS05. In addition, asbestos containing tile fragments are occasionally evident, lying upon the site surface. Construction workers will come into contact with Made Ground beneath the site. The principal contractor should therefore ensure that an appropriate level of health and safety is put in place. All ACM present upon the surface of the site should be handpicked and suitably disposed of at licensed landfill. All garden and landscaped areas should be capped with at least 0.60m of imported inert Topsoil/Subsoil.

A Japanese Knotweed Management Plan should be prepared for the site detailing the proposed remediation measures to be put in place.

All buried concrete should as a minimum conform to ACEC Class AC-1 of BRE Special Digest 1 (2001).

We recommend that a CBR design value of 2% is used for new roads, pavements and driveways.

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SECTION 1 Introduction and Proposed Development

Mr J Cox is proposing the redevelopment of a builder's yard at Elwyn Drive in Merthyr Tydfil, CF47 0NJ. The development will entail the construction of a pair of semi detached houses with associated road and driveway access and garden areas.

Terra Firma (Wales) Limited (TFW) has been commissioned to undertake a desk study and geotechnical and geo-environmental ground investigation of the site.

The main objectives of the geo-environmental assessment programme were to:

- Identify the potential environmental liabilities at the site associated with any soil and groundwater contamination from past site uses.
- Provide a summary of the environmental conditions at the site.
- Provide recommendations with regard to any other geo-environmental aspects pertaining to the development.

The main objectives of the geotechnical site investigation were to:

- Determine the type, strength and bearing characteristics of the shallow soil deposits.
- Determine the presence of, depth to and condition of shallow mine workings beneath the site.
- Provide recommendations for a suitable and economic foundation/floor slab solution for the development.
- Provide recommendations with regard to any other geotechnical aspects pertaining to the development.

In order to achieve the above objectives, Terra Firma (Wales) Limited carried out an assessment programme including a review of existing data, followed by a two phase field investigation to determine the prevailing ground conditions and also to collect and analyse soil samples from selected locations around the site.

1.1 Limitations and Exceptions of Investigation

The geo-environmental and geotechnical investigation was conducted and this report has been prepared for the sole internal reliance of Mr J Cox and his design and construction team.

This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geo-environmental and geo-technical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required. The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

SECTION 2 Review of Existing Data

2.1 Physical Setting, Current Use and Site Conditions

The site is centred at an approximate National Grid Reference of 305580, 205960 and occupies a plan area of 0.06 hectares.

The site lies within a builder's yard and is accessed at its southern point via Elwyn Drive through a locked gate. Topographically, the site slopes from the east to the west and southeast. The northern, southern and south-western site margins are marked by retaining walls and fencing. Sections of the retaining walls are in a state of disrepair. To the east of the development area are a 'lock up' and offices associated with the builder's yard business.

Prior to the site visit by a Terra Firma Engineer, a partial site strip and cut exercise had been undertaken along the northern site area, reducing the ground level in this area by between typically 0.5m and 2m. We understand that the objective of removing the soil in this area was to remove Japanese Knotweed. Colliery spoil was seen within the cut along the northern boundary of the site, with, in areas, possible naturally occurring orange grey brown Boulder Clay at the base of the cutting. Asbestos containing tile fragments were noted on top of the cutting bank. Terra Firma did not visit the site prior to the site strip/cut exercise. The soil within the cutting exhibits localised slumping due to the over steepened slope and exposure to the weather etc.

Areas of scrub vegetation exist within the site, predominantly along site margins. Within the northern, southern and western site areas, new growth of Japanese Knotweed was evident. Knotweed growth is also evident outside of the western site boundary.

Made Ground was evident at ground level across the site in the form of colliery spoil with inclusions of building materials comprising concrete fragments and bricks. In addition, there were occasional fragments of asbestos containing tile fragments across the surface of the site. In the west of the site by the site entrance the ground is surfaced with tarmac.

Within the northwest corner of the site is a single storey outhouse building of breeze block construction. Building materials including timber, bricks and concrete are found here.

Site photographs are presented in **Annex D**.

The site location, existing and proposed site layouts are presented in **Drawings 01, 02 and 03**.

2.2 Site History

The history of the site has been traced using historical Ordnance Survey maps obtained from a Landmark Information Group Envirocheck Report. This report is presented in **Annex A**. A summary of the history of the site is given below. Distances are approximate.

2.2 Site History (Continued)

1875 - 1876

The site situates upon undeveloped open ground within the wider area of a Brick Works. The map indicates that the surface of the site itself and immediate surrounding area is marked by batters possibly indicating the placement of fill materials such as colliery spoil or materials from the brick works. Some surface vegetation is also indicated. A Tramway locates 26m to the north of the site. The following features locate further afield; a cemetery 132m west/southwest, railway land 200m southeast and an old quarry 250m northwest. The most proximal housing locates 40m to the south of the site but the wider areas of Twyn-yr-Oden and Thomas Town locate 100m to the southwest and 220m to the northwest respectively.

1900

The site remains undeveloped land however the surface batters are no longer evident upon the site or within the immediate local area. The southern, western and eastern site margins are marked by linear features; a field boundary or a fence line for example. A slightly curved yet linear feature enters the eastern site area; this may represent a stream or spring line. The land surrounding the site is also parcelled into individual fields/plots. With exception to the cemetery to the west/southwest being disused, there is no discernible change to the local area.

1919 (partial map)

There is no discernible change to the study site from the previous map edition. The local area has been developed residentially with housing and associated roads locating to the immediate west of the site and 30m to the north of the site. The tramway to the north of the site remains. The Brick Works is still evident 140m to the west of the site. The Old Quarry to the far northwest of the site has been reinstated and landscaped into a park and playground.

1957

The possible stream feature entering the eastern site area is no longer evident. There is no other discernible change to the study site from the previous map edition. Three buildings, of unknown use, have been built upon land directly south of the site. Further residential development has taken place within the wider locality including redevelopment of the former Brick Works to the west of the site. The Tramway to the north of the site is no longer evident. The Railway Line to the far south of the site is no longer evident and has been partially infilled.

1969-1977

Two buildings have also been constructed directly east of the study area, what are believed to be the offices currently within the wider area of the builder's yard. The site itself lies within the builder's yard. The two buildings directly south of the site are no longer evident. Residential development has taken place east and north of the site including two houses built directly north of the site; Kibworth and Lyndale.

1984 - 1989

There is no discernible change to the study site from the previous map edition. The land to the south of the site is no longer parcelled into individual plots but is now one large open space. A steep batter is still evident to the southeast of the site associated with the historical placement of fill as previously mentioned.

1993, 1994-1995

There is no discernible change to the study site from the previous map edition. Land directly south of the site has been residentially developed with housing at Elwyn Drive.

2.2 Site History (Continued)

2006, 2015

There is no discernible change to the study site from the previous map edition.

2.3 Agency and Hydrological

2.3.1 Discharge Consents

There are no recorded discharge consents for sewerage or liquid effluent, within a 250m radius of the study site. The most proximal discharge consent positions 636m south of the site.

2.3.2 Integrated Pollution Controls

There are no businesses operating within 250m radius of the site which are monitored under environmental permit regulations. The most proximal is a petrol filling station locating 545m southwest of the site.

2.3.3 Nearest Surface Water Features

The most proximal surface water feature is recorded 300m east of the site. Between 300m and 1km east of the site are a number of issues, sinks and drains. Typically, the prevailing drainage direction is towards the south. The River Taff locates 640m to the west/southwest of the site and flows in a southerly direction.

2.3.4 Pollution Incidents to Controlled Waters

Within a 250m radius of the site there have been no recorded pollution incidents to controlled waters. The most proximal incident is recorded as occurring 652m east of the site.

2.3.5 River Quality

The local Rivers Taff and Morlais have been assessed by NRW as Grade A and Grade C respectively for both biological and chemical quality.

2.3.6 Water Abstractions

There are no recorded water abstractions within a 250m radius of the site. The most proximal abstraction point situates 865m west of the site.

2.3.7 Hydrogeology

The Bedrock beneath the site (Coal Measures) is defined as a Secondary A aquifer; 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.

Superficial Deposits are noted to comprise unproductive strata. In addition, the soils are classified as having a high leaching potential. This information is noted to be based upon fewer observations than elsewhere and therefore this worst case vulnerability is assumed, until proven otherwise.

2.3.8 Flood Risk

The site does not locate within a designated flood plain.

2.4 Waste

There are no recorded historic or current landfill sites or waste management facilities within a 250m radius of the site. The most proximal landfill site and waste management facility position at respective distances of 651m east and 600m east of the site.

2.5 Geological

2.5.1 Geology

The 1:10560 scale geological map (SO 00 NE) of the area was consulted. The site is underlain by rocks of the South Wales Lower Coal Measures Formation, Carboniferous in age and comprising grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones.

Approximately 190m east of the site is the conjectured north to south crop of the Gellideg coal seam (4 to 5 feet thick). Stratigraphically beneath this coal seam is the Garw coal seam (1 foot thick) and Rosser Ironstone Veins. The coal seam stratigraphy indicates that the strata dip away from the site and therefore the Gellideg seam will not underlie the site. The crop of the Garw coal seam is not illustrated on the geological map and is therefore unknown. The seam may therefore crop within influencing distance of the site. The coal mining setting is considered further in **Sections 2.5.2 and Section 8**.

Superficial Deposits are indicated to overlie the bedrock comprising Boulder Clay (Till). Made Ground is expected to further overlie the natural geology.

2.5.2 Mining

A Coal Mining Report was procured from the Coal Authority, reference 51000967195001, see **Annex B**. The report provides the following information:

The site is not within the zone of likely influence on the surface from past underground workings. However, the site lies within an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. Referring to the coal stratigraphy described in **Section 2.5.1 (Geology)**, we conclude that this relates to the Garw coal seam and the underlying Rosser Ironstone Veins.

There are no known coal mine shaft entries within, or within 20 metres of, the boundary of the property. However the Coal Authority note that records may be incomplete and that there may exist in the local area mine entries of which there is no knowledge.

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

2.5.2 Mining (Continued)

The report adds the following; In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken. Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority.

A Coal Mining Consultants Report was also procured for the site (reference 51001026888001) which confirmed that shallow unrecorded workings associated with the Garw coal seam were 'probable'. This report is also presented in **Annex B**.

The level of risk from coal mining and mine entries is discussed in **Section 8**.

2.5.3 Radon

British Geological Survey data confirms that the site lies within a lower probability radon area, as less than 1% of homes are above the radon action level. No radon protection measures are necessary in the construction of new dwellings or extensions.

2.5.4 Mineral Sites

The most proximal mineral site is recorded as 351m northwest of the site. This relates to an opencast quarry (Sandstone) the presence of which was identified in **Section 2.2** (Site History).

2.5.5 Ground Stability

The British Geological Survey data indicates the following *preliminary* levels of risk for ground instability:

- Very low risk from collapsible ground. (*Note that this does not include mining related ground instability*)
- No hazard from compressible ground
- No hazard from ground dissolution
- Very low risk from landslides
- Very low risk from running sand
- Very low risk from shrinking or swelling clay

With regards to landslips, the South Wales Coal Field Landslip Survey has been consulted. There are no documented landslips on site or within influencing distance of the site. The very low risk of landslips noted above relates to the topography of the area which together with constructional activities and redevelopment could combine to create slope instability. However this risk can be mitigated through appropriate construction techniques and the design of safe slopes.

SECTION 3 Preliminary Risk Assessment

The following sub-sections detail a preliminary risk assessment, based upon the desk study information.

3.1 General

The contaminated land regime is set out in Part IIA of the Environmental Protection Act (EPA) 1990 and was introduced on the 1st April 2000 in England and 1st July 2001 in Wales. A similar regime was introduced in Scotland on 14th July 2000.

Part IIA was introduced to achieve two aims:

- (1) The identification of contaminated land
- (2) The remediation of contaminated land that poses an unacceptable risk to human health and/or the environment

Under Part IIA the statutory definition of 'contaminated land' is:

"any land which appears to the local authority in whose area it is situated, to be in such a condition, by reason of substances in, on, or under the land, that:

- (a) Significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) Pollution of controlled waters is being, or is likely to be, caused."

For land to be classified as 'Contaminated Land' there must be a '**pollutant linkage**'. A pollutant linkage requires three essential elements:

- (1) A **CONTAMINANT** (hazard) – a substance that is in, on or under the land and has the potential to cause harm or to cause pollution of **controlled waters**
- (2) A **RECEPTOR** (target) – something which could be adversely affected by a contaminant
- (3) A **PATHWAY** – a route or means which either allows the contaminant to cause significant harm to that receptor, or that there is a significant possibility of such harm being caused to the receptor, or that pollution of controlled waters is being or likely to be caused.

The term 'Risk' is widely used in different contexts and situations, but a prescriptive definition is given by the Guidelines for Environmental Risk Assessment and Management (DEFRA *et al*, 2000):

'Risk is a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence'.

A 'Hazard' is defined as '*a property or situation that in particular circumstances could lead to harm*'.

The classification of consequences and probability and determining the risk category are defined in the following sections.

3.2 Classification of Consequence

Table 3.1 Classification of Consequence	
Classification	Definition
Severe	• Short term (acute) risk to human health likely to result in significant harm • Short term risk to controlled waters • Catastrophic damage to buildings/structures • Short term risk to an ecosystem or organism within the particular ecosystem
Medium	• Chronic damage to human health (long term risk) • Pollution of a sensitive water resource • A significant change in an ecosystem or organism within the ecosystem
Mild	• Pollution of non-sensitive water resources • Significant damage to buildings/structures
Negligible	• Harm (not necessarily significant) which may result in financial loss • Non permanent health effects to humans (easily prevented by PPE for example) • Easily repairable effects of structural (building) damage

3.3 Classification of Probability

Table 3.2 Classification of Probability	
Classification	Definition
High	• There is a complete pollution linkage and an event appears very likely to occur in the short term and is inevitable in the long term. • Evidence of harm to the receptor
Medium	• There is a complete pollution linkage which means that it is probable that an event will occur • The event is not inevitable but possible in short term and likely in the long term
Low	• There is a complete pollution linkage and circumstances are possible under which an event could occur • It is not certain that an event will occur in the long term, and it is less likely to occur in the short term
Negligible	• There is a complete pollution linkage but circumstances are such that it is improbable that an event would occur even in the long term

3.4 Risk Assessment Matrix

By comparing the consequences of a risk and the probability of the risk of a pollution linkage, the likely risk category can be determined as shown in Table 3.3 below.

Table 3.3 Risk Assessment Matrix					
Increasing acceptability ↘		Consequence			
		Severe	Medium	Mild	Negligible
Probability	High	High	High	Medium / Low	Near zero
	Medium	High	Medium	Low	Near zero
	Low	High / medium	Medium / Low	Low	Near zero
	Negligible	High / medium / Low	Medium / Low	Low	Near zero

High Risk

There is a high probability that severe harm could risk a receptor, or there is evidence that a receptor is being harmed. The risk if realised is likely to result in liability, and urgent investigation or remediation will be required.

Medium Risk

It is probable that harm will arise to a receptor. However it is relatively unlikely that such harm would be severe, or if harm does occur the harm is likely to be relatively mild. Investigation will be required to determine the liability, and some remedial works may be required in the long term.

Low Risk

It is possible that harm may arise to a receptor, but it is likely that the harm would be mild.

Near Zero Risk

There is a very low risk of harm to the receptor. In the event of harm being realised the harm is not likely to be severe.

3.5 Potential Sources and Types of Contamination

3.5.1 On-Site Sources

Historical mapping indicates the potential for Made Ground to underlie the site, possibly associated with placement of fill materials such as colliery spoil or materials from the former brick works that positioned to the west of the site historically. The presence of substances such as metals, hydrocarbons and asbestos within the Made Ground will depend upon its composition.

In addition, the site walk over survey identified the presence of asbestos containing tile fragments upon the site surface.

Made ground also has the potential to generate ground gases such as carbon dioxide and methane.

3.5.2 Off Site Sources

As mentioned above, historical mapping indicates the potential for Made Ground to underlie the local area too, similarly associated with the possible placement of fill materials such as colliery spoil or materials.

3.5.2 Off Site Sources (Continued)

Historical land use within a 250m radius of the site has included a tramway 26m north, a cemetery 132m west/southwest, railway land 200m southeast and an old quarry 250m northwest.

Historical mapping suggests that the railway land and the quarry have been infilled (unknown material composition), the former only partially. As discussed above, Made Ground has the potential to generate ground gases such as carbon dioxide and methane.

Given the age of the cemetery (disused by 1900) and the distance between the cemetery and the study site (132m west/southwest), we do not consider this feature to be a potential source of ground contamination.

There are a number of potential contaminants associated with historical railway land (and tramway lines), including substations, running lines, workshops and depots. Substances include PAHs, fuels, PCBs, metals, asbestos and herbicides. Historical mapping does not identify any substations, depots or workshops within a 250m radius of the site. Given the distance between the study site and the identified features we do not consider these historic land uses to pose a potential source of ground contamination from spillages or leakages.

It is possible for contamination to occur through wind dispersal of airborne contaminants such as coal/ ash dust, metal particulates and asbestos fibres. Given the historical nature of the land use we consider this possibility to be negligible. However, these types of substances would be included within a traditional contamination analysis as standard.

3.6 Potential Pollution Linkages

The potential pollution linkages relating to human health, the aquatic environment, ecology and buildings are as follows:

3.6.1 Human Health

1. Ingestion of soil and soil dust
2. Ingestion of home-grown produce (vegetables, salads etc)
3. Inhalation of dust indoors and outdoors
4. Inhalation of ground gases such as radon, carbon dioxide, methane etc indoors and outdoors
5. Inhalation of asbestos
6. Dermal contact with soil and soil dust
7. Uptake of soil dust by eye contact
8. Contaminant permeation of drinking water pipes and ingestion of contaminated water supply

3.6.2 Aquatic Environment

1. Surface water runoff
2. Runoff during earth moving exercises
3. Migration of surface water into underlying soils and groundwater
4. Leaching of contaminants from soil into groundwater
5. Contaminant migration via groundwater transport into wider aquatic environment – rivers, streams, groundwater off site

3.6.3 Ecology

1. Phytotoxic substances may inhibit healthy plant growth
2. Surface runoff can introduce contamination/allow contamination to migrate

3.6.4 Buildings

1. Chemical attack of buried structures (concrete etc)

3.7 Potential Receptors

The potential receptors of any contamination and ground gas are considered to be:

3.7.1 During Construction

1. Construction workers
2. Neighbouring site users and passers-by
3. The aquatic environment - surface waters, groundwater within the superficial soils and the underlying bedrock
4. Flora and Fauna upon the site is potentially at risk from phytotoxic contaminants either introduced by construction traffic/processes or through surface runoff of materials/waters/soils

3.7.2 Following Construction

1. Site end users - residents and visitors
2. Neighbouring site users and passers-by
3. The aquatic environment - surface waters, groundwater within the superficial soils and the underlying bedrock
4. Building Materials - sulphates in the ground can damage buried concrete
5. Flora and Fauna upon the site is potentially at risk from phytotoxic contaminants

3.8 Preliminary Human Health and Environmental Risk Assessment

3.8.1 Construction Workers

The construction workers are potentially at risk from ingestion, inhalation and dermal contact with soil and/or soil dust in the short term. Airborne asbestos fibres may be a concern if the asbestos containing material is encountered on site and disturbed. There is a potential risk of ground gas migration into confined spaces such as excavations, in the short term. It is anticipated that all adverse health effects will be preventable by personal protection equipment and due diligence to health & safety and good site management.

3.8.2 Passersby / Neighbouring Site Users

Short term during the site construction phase, the passersby and/or neighbouring site users are potentially at risk from ingestion, inhalation and dermal contact with soil and/or soil dust. It is anticipated that adverse health effects will be preventable by due diligence to health & safety including dust suppression measures and screening off the site from the general public.

3.8.3 Future Site End Users

The future site end users, residents and visitors, are potentially at risk from ingestion, inhalation and dermal (including eye uptake) contact with soil and/or soil dust, exposure to ground gases and ingestion of unfit potable water.

Site investigation is required to determine the ground conditions, soil chemistry and any environmental liability associated with the land.

3.8.4 Aquatic Environment

Receptors such as adjacent land are potentially at risk from surface runoff of water, soils or materials during the site construction period. It is anticipated that any adverse effects will be preventable by due diligence to good construction practise in preventing surface runoff and the spillage of materials. Leaching from the soil and into ground leaching of substances and into the groundwater is a potential pathway into the aquatic environment (groundwater and the local river systems) that can lead to both short term and long term contamination issues depending upon the hydrogeological conditions and the physiochemical properties of the contaminant. Site investigation is required to determine the ground conditions, soil chemistry and any environmental liability associated with the land.

3.8.5 Ecosystems

Any new planting however may require imported suitable topsoil and subsoil. Soil sampling during the recommended ground investigation will identify the prevailing soil chemistry and possible reuse of site won soils.

3.8.6 Building Materials

Soil sampling during a site investigation should identify the presence of any aggressive substances of concern such as sulphates. Any buried concrete should conform to an appropriate concrete class in accordance with industry guidance.

3.9 Qualitative Preliminary Human Health and Environmental Risk Assessment

A Qualitative Preliminary Risk Assessment (QPRA) aims to make initial assumptions about potential risks posed towards the human health, the aquatic environment, ecology and buildings/materials, during all stages of the development. Where it is assumed that a potential pollution pathway exists, there is a potential source, a potential receptor and a likely pathway, which links the two. The QPRA can be refined into a qualitative and quantitative risk assessment once the site investigation and laboratory soil chemical testing/environmental assessment has been undertaken. The risk assessment is presented in **Table 3.4** on the following page.

3.9 Qualitative Preliminary Human Health and Environmental Risk Assessment (Continued)

Table 3.4 Preliminary Human Health and Environmental Risk Assessment

Source and potential contaminants	Receptor	Pathway	Viable pollution linkage	Mitigation
Made Ground is expected on site which may contain metals, organics and asbestos depending upon its composition and source.	Site end users	Ingestion of soil/dust, Inhalation of dust/asbestos, ingestion of home-grown produce Uptake of soil dust through the eye Dermal contact with soils Exposure to ground gases	This is a viable pollution linkage. However the development of the site offers the opportunity to mitigate any adverse health effects. Imported soils may be required for any planting/garden/landscaped areas.	Ground investigation, soil sampling and testing, quantitative risk assessment
	*** Construction workers	*** Ingestion of soil/dust, Inhalation of dust/asbestos Exposure to ground gases within excavations/confined spaces Uptake of soil dust through the eye Dermal contact with soils	*** This is a viable pollution linkage in the short term during construction. All adverse effects during construction should be controlled adequately through PPE, COSHH, and a good standard of site health and safety and hygiene.	
	*** Passers-by and neighbouring site occupants	*** Inhalation of soil dust, fugitive asbestos Uptake of soil dust through the eye	*** This is a viable pollution linkage in the short term during construction. All adverse effects should be easily mitigated through dust suppression, site screening and good site management	
	*** Perched water / Groundwater / controlled waters	*** Leaching of contaminants into groundwater	*** This is a viable risk depending upon the presence of made ground. However the development of the site offers the opportunity to mitigate any risks.	
Soil/water/construction materials	Adjacent land	Runoff of materials and earth during construction	This is a viable pollution linkage in the short term during construction. All adverse effects should be easily mitigated through good site management, prevent surface runoff and prevent spillage of materials.	Good construction site management

SECTION 4 Field Investigation

4.1 Site Works

The fieldworks were attended by a Terra Firma Wales Ltd Chartered Geologist. The field works were undertaken and the soils were logged in general accordance with BS 5930: 1999 + Annex 2: 2010, BS EN 1997-1 and -2.

4.1 Site Works (Continued)

The exploratory hole logs are presented in **Annex C** and field photographs are illustrated in **Annex D**. The locations of the exploratory holes are given in **Drawing 02**.

4.1.1 Phase 1

A geo-technical and geo-environmental site investigation was undertaken on the 14th of August 2015.

Five windowless sampling boreholes were installed across the study site using a tracked mini percussive drilling rig. In-situ penetration tests were performed at 1m intervals until refusal.

4.1.2 Phase 2

A rotary borehole drilling exercise was undertaken on the 22nd and 23rd of October, 2015.

Three rotary boreholes were installed by openhole drilling methods using a T44 Beretta drilling rig. Water flush was used.

4.2 Coal Authority Permit

Permissions are required for all activities that intersect, disturb or access any of the Coal Authorities interests. The Coal Authority was notified of the proposal for rotary drilling and the exercise was allowed under permit reference number 11463.

4.3 Ground Conditions

The ground conditions encountered are summarised as follows:

Table 4.1 Summary of Ground Conditions			
Depth from (m)	Depth to (m)	Thickness (m)	Stratum description
0.00	0.20 / 1.60	0.20/1.60	MADE GROUND comprising loose brown very clayey SAND / soft very sandy CLAY with some gravel. Gravel is fine to coarse angular mudstone and rare slag and brick. Occasional fine roots.
0.20 / 1.60	3.90 / 4.80	3.20 / 3.80	GLACIAL BOULDER CLAY - Soft becoming firm with depth brown mottled grey slightly sandy/sandy silty CLAY with many gravels. Occasional cobble. Gravel is fine to coarse angular to subrounded of mudstone, siltstone and coal.
3.90 / 4.80	9.30 / 9.60	4.80 / 5.20	MUDSTONE (COAL MEASURES BEDROCK) (Driller description)
9.30 / 9.60	10.00 / 10.20	0.60 / 0.80	COAL (Driller description)
10.00 / 10.20	>34.00 / >36.00	-	MUDSTONE (COAL MEASURES BEDROCK) (Driller description)

4.4 Groundwater

Groundwater was encountered during the drilling exercise (phase 1) within WS02 and WS04 at a depth of 2.5m.

The rotary boreholes (phase 2) were drilled using water as the flushing medium and therefore it cannot be determined with certainty if groundwater was encountered.

4.5 Visual / Olfactory Evidence of Contamination

The Made Ground contained coal, clinker and slag content which will typically exhibit elevated levels of metals and polyaromatic hydrocarbons.

4.6 Buried Obstructions

Buried obstructions were not encountered.

4.7 Laboratory Soil Chemical Testing

4.7.1 Soil Exploratory Strategy and Sampling Regime

During the first phase intrusive investigation, small disturbed soil samples were collected. The soil sampling regime was conducted to provide a preliminary assessment of types and concentrations of contamination.

The six soil sample locations and depths are listed in the following table.

Table 4.2 Soil Sample Locations and Depths		
Sample	Depth (m)	Stratum
WS02	0.1	Dark brown very sandy GRAVEL (sample matrix outside MCERTS scope of accreditation)
WS01	1.2	Dark brown slightly gravelly, clayey SAND
WS01	0.5	Dark brown, gravelly, sandy CLAY
WS03	0.1	Dark brown, gravelly, sandy CLAY (Made ground -brick)
WS04	0.1	Brown, gravelly, sandy CLAY
WS05	0.2	Dark brown, gravelly, sandy CLAY

4.7.2 Soil Laboratory Analysis

The soil samples taken were despatched to the laboratories of Derwentside Environmental Testing (DETS) for laboratory chemical testing. The following chemical tests were undertaken:

Metals	Inorganics	Others
Arsenic	Cyanide	pH
Cadmium	Sulphate	Asbestos (screen only)
Chromium		
Chromium III		
Hexavalent chromium	Organics	
Copper	Monohydric phenol	
Lead	Polyaromatic hydrocarbons (priority 16)	
Mercury		
Nickel		
Selenium		
Zinc		

The laboratory chemical test results are presented in **Annex E**.

4.8 Soil Geotechnical Testing

A small number of representative soil samples (disturbed) were sent to the laboratory of Apex Testing Services Ltd. The soil plasticity index has been determined in accordance with BS 1377: Part 2: 1990. The results are presented in **Annex F** and a summary is given below.

Table 4.3 Soil Plasticity Test Results

Sample	Depth (m)	Stratum	Modified plasticity index (soil shrinkage potential)
WS01	0.80	Grey brown gravelly slightly sandy SILT	12.16 (low)
WS01	3.00	Brown slightly gravelly slightly sandy CLAY	8.64 (low)
WS02	1.50	Grey brown slightly gravelly slightly sandy CLAY	7.70 (low)
WS02	2.50	Grey brown slightly gravelly sandy CLAY	9.00 (low)
WS04	3.75	Grey brown slightly gravelly slightly sandy CLAY	10.27 (low)
WS05	1.80	Brown grey slightly gravelly sandy CLAY	14.04 (low)

SECTION 5 Soil Analytical Results

5.1 Soil Assessment Methodology

Environmental risk assessment evaluates the risk to receptors via an analysis of the 'source-pathway-target' linkage. In order for a risk to be present, there must be a contaminant source capable of causing a health risk, a vulnerable receptor, and a pathway linking the two.

This sort of risk assessment is usually conducted using a tiered approach. A tiered approach consists of a comparison of the analytical results obtained from the site investigation with Soil Guideline Values (SGV's) specific to the type of development obtained from The Environment Agency Contaminated Land Exposure Assessment (CLEA) Guidelines.

At the time of writing the most contemporary Soil Guideline Values will be used in the risk assessments.

Where SGV values are not available reference has been made to the Chartered Institute of Environmental Health (CIEH) Generic Assessment Criteria (GAC).

Should Tier 1 levels be exceeded, a choice is made either to remediate the site to conservative Tier 1 levels, or proceed to Tier 2.

Tier 2 makes use of site-specific data to evaluate acceptable concentrations of chemicals for the particular conditions present at the site.

At each tier, the amount and detail of investigation work increases as more site specific data are needed to refine the characterisation of the site. Conversely, as site conditions are better understood, a more site-specific remediation strategy can be determined.

The chemical test results have been compared to a residential land use.

It is however important to note that the guideline values/generic assessment criteria are not reflective of the occupational health of the construction workers. This should be assessed independently by the principal contractor.

5.2 Evaluation of Soil Analytical Results

For Tier 1, the site itself is considered to be the receptor. Therefore, attenuation of contaminants between the source and receptor is not considered. A summary of the chemical test results which include the regulatory soil guideline values used in the Tier 1 assessment are given in Table 5.1.

Table 5.1 Summary of Soil Chemical Test Results - Metals and Inorganics						
Substance	SGV/ GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		95% UCL	Number of exceedences
			Min	Max		
Metals						
Arsenic	32	CLEA	8.4	24	20.893	0
Cadmium	10	CLEA	0.6	1.1	0.9865	0
Chromium	-	-	14	23	21.261	-
Chromium III	910	CIEH	14	23	21.261	0
Hexavalent Chromium	6	CIEH	<1	<1	1	0
Copper	2400	CIEH	17	68	56.004	0
Lead	342	ATRISK	26	480	300	1
Mercury	170	CLEA	<0.05	0.33	0.23	0
Nickel	130	CLEA	20	38	35.775	0
Selenium	350	CLEA	<0.5	0.8	0.6508	0
Zinc	3700	CIEH	86	210	196.59	0
Inorganics						
pH	-	-	6.7	8.6	8.1452	-
Cyanide Total	8	CLEA	<0.1	<0.1	0.1	0
Organic matter	-	-	1.7	22	14.533	-
Total Sulphate as SO4	0.24 %	BRE	0.04	0.13	0.1075	0
PAHs						
Naphthalene	13	CIEH	<0.03	0.64	0.4519	0
Acenaphthylene	920	CIEH	<0.03	0.17	0.1004	0
Acenaphthene	1100	CIEH	0.85	1.7	1.0182	0
Fluorene	860	CIEH	0.78	1.5	0.9074	0
Phenanthrene	440	CIEH	0.05	12	6.9174	0
Anthracene	11000	CIEH	<0.03	1.9	1.3056	0
Fluoranthene	890	CIEH	0.07	28	15.621	0
Pyrene	2000	CIEH	0.07	23	12.83	0
Benzo(a)anthracene	13	CIEH	<0.03	9.8	6.0775	0
Chrysene	27	CIEH	<0.03	10	6.6666	0
Benzo(b)fluoranthene	3.7	CIEH	<0.03	13	9.5	2
Benzo(k)fluoranthene	100	CIEH	<0.03	4.7	3.2495	0
Benzo(a)pyrene	3	CIEH	<0.03	9.9	6.6041	2
Indeno(1,2,3-c,d)pyrene	41	CIEH	<0.03	5.2	3.6997	0
Dibenzo(a,h)anthracene	0.3	CIEH	<0.03	1.8	1.2283	2
Benzo(g,h,i)perylene	350	CIEH	<0.03	5.8	4.0146	0
Total PAH - USEPA 16	-	CIEH	0.18	120	77.145	-
Phenols						
Phenol - monohydric	420	CLEA	<0.3	<0.3	0.3	0
Others						
Asbestos	Nil	-	No asbestos detected			

Table 5.1 Notes:

- CLEA - Soil Guideline Values (SGV) developed by the Contaminated Land Exposure Assessment - residential development
- CIEH - Chartered Institute for Environmental Health Land Quality Management (LQM) Generic Assessment Criteria (GAC) - residential development . 6% SOM used for organics.
- Atkins ATRISK^{soil} - soil screening value (SSV) for a residential development - 6% SOM
- C4SL - Category 4 Screening Levels
- BRE Building Research Establishment
- Six samples of soil were analysed

5.3 Contaminants of Concern in Soils

Contaminants of concern are those whose measured concentrations or 95% Upper Confidence Limit exceeds the relevant Generic Assessment Criteria for a residential land end use.

All measured concentrations of metals, metalloids, inorganics and organics were within acceptable limits with the following exceptions for samples collected from WS02 and WS05:

Table 5.2 Summary of Substances of Concern				
Substance	SGV/ GAC (mg/kg)	Source	Sample WS02 0.10m	Sample WS05 0.20m
Lead	342	ATRISK	-	480
Benzo(k)fluoranthene	3.7	CIEH	3.8	4.7
Benzo(a)Pyrene	3	CIEH	7.3	9.9
Dibenzo(ah)anthracene	0.3	CIEH	1.4	1.8

In addition, there was no asbestos identified within the soil matrix. However as described previously, asbestos containing tile fragments are occasionally evident, lying upon the site surface.

Please refer to **Section 7** for associated Risk Assessments and Mitigation Measures.

SECTION 6 Assessment of Ground Gas Risk

The Made Ground underlying the site may have the potential to generate gases such as methane and carbon dioxide. Inspection of the Made Ground and laboratory chemical analysis does not identify any risk from volatiles.

As an economical alternative to gas monitoring we consider it appropriate to install a 2000g DPM/reinforced gas membrane with passive under floor venting. In addition, all joints and penetrations should be sealed.

These mitigation measures are equivalent to gas characteristic 2 in accordance with CIRIA C665 (low risk).

The installation of the gas resistant membrane in accordance with manufacturer's specification must be validated.

SECTION 7 Quantitative Risk Assessment/Mitigation Measures

It should be noted that the following substances of concern are based upon a comparison of measured concentrations with Generic Assessment Criteria for a residential land use. These assessment criteria are not reflective of the occupational health of the construction workers. This should be assessed independently by the principal contractor.

7.1 Contaminants of Concern

7.1.1 Made Ground

The Made Ground sampled from WS05 contains an elevated level of lead. The 95% UCL indicates that the elevated level of lead may be an isolated hot spot.

The Made Ground in samples from WS05 and WS02 also contained elevated levels of benzo(k)fluoranthene, benzo(a)Pyrene and dibenzo(ah)anthracene. The 95% UCL indicates that the elevated PAHs are probably typical of the Made Ground as opposed to isolated hot spots.

Whilst asbestos was not identified within the soil matrix, asbestos containing tile fragments are occasionally evident, lying upon the site surface.

7.1.2 Volatiles

Whilst there are measurable levels of polyaromatic hydrocarbons within the subsurface Made Ground, none of the substances identified are volatile and there is therefore no risk from volatiles.

7.1.3 Radon Gas

Radon protection is not required.

7.1.4 Ground Gases

As discussed in **Section 6**, the Made Ground underlying the site may have the potential to generate gases such as methane and carbon dioxide. We consider the level of risk to be low and we recommend the installation of a 2000g DPM/reinforced gas membrane with passive under floor venting. In addition, all joints and penetrations should be sealed.

7.1.5 Japanese Knotweed

New growth of Japanese Knotweed locates within the northern, southern and western site areas. Knotweed poses a high risk to structures and the environment.

7.2 Potential Human Health Exposure Pathways

The relevant exposure pathways are as follows:

1. Ingestion of soil/soil dust/home-grown produce
2. Dermal contact with soil/dust
3. Inhalation of soil dust
4. Inhalation of ground gas
5. Ingestion and Inhalation of asbestos fibres
6. Ingestion of water

7.3 Potential Human Receptors

7.3.1 Construction Workers

Construction workers will come into contact with Made Ground beneath the site. The principal contractor should therefore ensure that an appropriate level of health and safety is put in place including but not limited to personal protection equipment (PPE), good site management, COSHH, a high standard of hygiene and regular and effective dust suppression.

The asbestos containing tile materials (ACM) identified upon the ground surface should be handpicked and suitably disposed of at a licensed landfill. It would be prudent to liaise with an asbestos specialist.

All service trenches should be backfilled with inert materials.

The principal contractor should prepare a Material Management Plan (MMP) for the site, which the contractor(s) must adhere to. This will control and document the import/export/moving of soils both within the site and off site.

A low risk from ground gases (carbon dioxide and methane etc) risk has been qualitatively assessed. Appropriate health and safety procedures should be in place when working in confined areas. As mentioned previously, there is no identified risk of volatile gases.

7.3.2 Neighbouring Site Users and Passers-by

Passersby and neighbouring site users will be at risk from the inhalation of dust and air borne asbestos fibres during construction activities. These risks should be managed by the Principal Contractor as previously outlined in **Section 7.3.1**.

7.3.3 Future Site Users of Residential Development

Site end users will come into contact with Made Ground beneath the site. However the development of the site offers the opportunity to mitigate any long term human health risks.

The proposed development largely comprises capping the site with the proposed properties, car parking and road access. The proposed infrastructure and hard-standing areas will effectively cap the site prevent exposure of the Made Ground to the site end users. All garden and landscaped areas must however be capped with cover soils. The minimum recommended capping thickness is 0.60m of imported inert Topsoil/Subsoil. This is likely to be achieved by excavating out 0.60m of Made Ground and replacing it with inert soils rather than raising the site ground levels. It is also recommended that all ACM present upon the surface of the site is handpicked and suitably disposed of at a licensed landfill.

There is no risk from radon gases exceeding the recommended Action Limit. As previously mentioned, gas mitigation measures are recommended comprising a 2000g damp proof membrane / reinforced gas membrane with under floor venting and all joints and penetrations sealed.

With regards to protection of the potable water supply, all pipes must be designed to appropriate UK Water Industry Research guidance; Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, Report Ref: 10/WM/03/21. The local Water Authority should be consulted at this stage.

7.4 Remediation Strategy and Validation of Remediation

A formal Remediation Strategy may be required as part of the planning application. This report is a separate document that describes the proposed development plan and discusses in detail the proposed remediation methods. The Remediation Strategy should be agreed with the Local Environmental Health Department. Once the remediation has been undertaken a Validation Report should be submitted to the Local Environmental Health Department to confirm that the site is suitable for use and confirm that there are no remnant intact significant pollution linkages.

7.5 Unusual Occurrences

If during the development materials are encountered that are significantly different to those encountered in the investigation, the occurrence should be reported to Terra Firma (Wales) Ltd and appropriate action taken prior to continuing with the works.

7.6 Importation of Materials

All imported soils/materials will require validation of their suitability for use at a residential site. This should entail chemical testing of a representative volume of the soils at source and once imported to site. The Welsh Land Contamination Working Group provides guidance for the sampling rationale and methodology.

7.7 Off Site Disposal at Landfill

Any materials for offsite disposal will require comprehensive waste classification. In accordance with EC Regulation 1272/2008 and Environment Agency Guidance WM2 (v. 2/2011) soils and other materials destined for off-site disposal should be classified on the basis of their hazard phases prior to disposal. Soils are classified as a mirror entry waste and should be classified on the basis of their specific chemical properties.

7.8 Aquatic Environment

7.8.1 Short Term

During the construction period, there is a risk to the environment/adjacent sites from digging foundations, moving soil, drainage misconnections, discharges to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washings and oil or chemical spills etc. These risks should be prevented by due diligence to good construction practise and housekeeping in preventing surface runoff and the spillage of materials.

7.8.2 Long Term

An assessment of the groundwater quality has not been undertaken. However, we do not consider the soil contamination identified to be gross, and we don't expect the Made Ground to pose an unacceptable risk to water resources.

7.9 Japanese Knotweed

A Japanese Knotweed Management Plan should be prepared for the site detailing the proposed remediation measures to be put in place. This may include a combination of excavation dig and dump and an approved programme of herbicide treatment. We recommend that a specialist ecologist be consulted.

7.9 Japanese Knotweed (Continued)

All the knotweed areas should be isolated with fencing prior to any construction works on site to prevent the risk of knotweed spread by site traffic and personnel. Isolation zones should be at least 7m laterally from any visible knotweed growth to ensure rhizomes close to the surface are not disturbed.

All site personnel should receive training on the identification of knotweed and be familiarised with proper hygiene methods to prevent it spread. No material should leave the site from the knotweed areas except as part of the specially supervised knotweed treatment works. No material should be stored within or adjacent to the isolated knotweed areas. No contaminated knotweed material should be moved across the site unless using a designated route and all care should be given to ensure there is no spillage of material. Where there is a risk of reinfestation from adjacent land owners, the landowner should be contacted to agree a co-ordinated programme of treatment.

Following successful remediation, it would be prudent to undertake monitoring as necessary under the cover of a guarantee agreement to the site.

7.10 Summary of Human Health and Environmental Risk Assessment

Table 7.1 Human Health and Environmental Risk Assessment

Source and potential contaminants	Receptor	Pathway	Viable pollution linkage	Mitigation
Made Ground at WS02 and WS05 – lead and (non volatile) PAHs	Site end users	Ingestion of soil/dust, Inhalation of dust/asbestos, ingestion of home-grown produce Uptake of soil dust through the eye Dermal contact with soils Exposure to ground gases	This is a viable pollution linkage with a low to medium level of risk	The proposed buildings, driveways and roads will cap the site and prevent physical exposure to the Made Ground./ All garden and landscaped areas should be capped with 0.60m inert suitable Topsoil/Subsoil.
	Construction workers	Ingestion of soil/dust, Inhalation of dust/asbestos Exposure to ground gases within excavations/confined spaces Uptake of soil dust through the eye Dermal contact with soils	This is a viable pollution linkage in the short term during construction with a low level of risk.	All adverse effects during construction should be controlled adequately through PPE, COSHH, and a good standard of site health and safety and hygiene.
	Passers-by and neighbouring site occupants	Inhalation of soil dust, fugitive asbestos Uptake of soil dust through the eye	This is a viable pollution linkage in the short term during construction with a low level of risk.	All adverse effects should be easily mitigated through dust suppression, site screening and good site management
	Perched water / Groundwater / controlled waters	Leaching of contaminants into groundwater	This is not considered to be a viable pollution linkage.	No further action is considered necessary
Soil/water/construction materials	Adjacent land	Runoff of materials and earth during construction	This is a viable pollution linkage in the short term during construction with a low level of risk.	All adverse effects should be easily mitigated through good site management, prevent surface runoff and prevent spillage of materials.
Japanese knotweed	Structures and adjacent land/water courses	Growth and spread	This is a viable pollution linkage with a high level of risk.	A specialist ecologist should be appointed to develop a knotweed management plan.

7.11 Site Conceptual Model

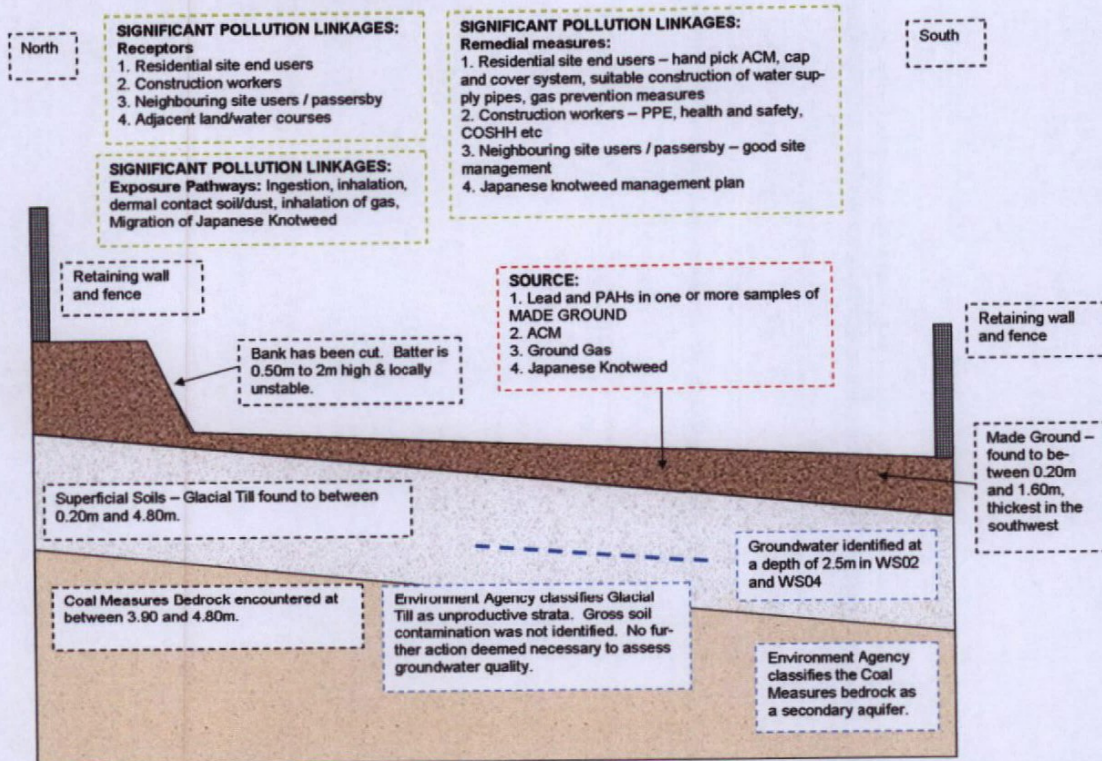


Figure 7.1 Conceptual Site Model (not to scale)

SECTION 8 Assessment of Potential Risks from Shallow Underground Coal Mining

8.1 Shallow Coal Mining Considerations

The site is not within the zone of likely influence on the surface from past underground workings. However, as discussed in **Sections 2.5.1 and 2.5.2**, the site lies within an area where the Coal Authority believe there is coal at or close to the surface; the Garw coal seam and the underlying Rosser Ironstone Veins.

The three rotary boreholes (phase 2) identified a single seam of coal, 0.60m to 0.80m thick at a depth of between 9.30m and 9.60m below ground level. This is thicker than the typical 0.30m (~1 foot) thickness of the Garw coal seam as indicated within the geological map vertical section.

No workings were encountered within the probeholes and it is concluded that there are no unrecorded workings beneath the proposed semi-detached houses.

However, unrecorded workings may be present within influencing distance of the site. In order to cater for such an eventuality it is recommended that a reinforced concrete raft type foundation/floor slab solution capable of spanning a crown hole of 3m with a cantilever effect on corners of 1.5m should be used for the development. The maximum load beneath the foundation should not exceed 75kN/m². Total settlement of the foundation should not exceed 30mm with angular distortions caused as a result of differential settlements should be less than 1:750.

To avoid damage from frost action, the depth to the underside of the foundation in frost susceptible ground should be at least 450mm (0.45m) below finished ground level.

Allowances should be made for the treatment of / removal of soft spots as previously described. It is recommended that a Terra Firma Engineer inspect all foundation excavations before concreted and any unusual occurrences/ground conditions should be reported immediately.

8.2 Mine Entry Considerations

The Coal Authority Mining Report does not identify any recorded mine shafts on site. However, the report states that records may be incomplete. Therefore, the possibility of unrecorded mine entries cannot be entirely discounted. During construction works, if any anomalous areas of fill, brick or stone work are identified, the occurrence should be reported immediately to Terra Firma and an appropriate investigation put in place.

8.3 Mine Gas Considerations

The Coal Authority Report confirms that there is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the study site.

SECTION 9 Geotechnical Risk Assessment

The following assessment of geotechnical risks is based upon the site investigation findings.

Table 9.1 Geotechnical Risk Assessment		
Hazard	Consequence	Comments and Design action required to reduce risk
Mining, quarrying		
Underground coal mining, surface subsidence, mine entries	Ground instability and geotechnical risk to proposed development.	No workings were encountered within the rotary boreholes (phase 2) and it is concluded that there are no unrecorded workings beneath the proposed semi-detached houses. There are no known mine entries but records may be incomplete. During construction works, if any anomalous areas of fill, brick or stone work are identified, the occurrence should be reported immediately to TFW and an appropriate investigation put in place.
Structures / Foundations and Geotechnical Hazards		
Ground dissolution / karstic features	Ground instability could pose an unacceptable and catastrophic risk to the proposed infrastructure.	The geology beneath the site is not at risk from karstic features. No further action.
Landslides	Landslides pose an unacceptable and catastrophic risk to the proposed infrastructure.	The local area is unaffected by landslides. There was no evidence of ground instability on site during the walk over survey or ground investigation.
Weak and/or compressible ground	Unacceptable settlement causing design failure of the structure.	The Glacial Till (Clay) soils beneath the site are compressible when loaded. The foundation recommendations are appropriate to the ground conditions found and take into account anticipated bearing capacity and predicted total/differential settlements. All foundations should be constructed in accordance with these recommendations. During construction works, if variable/unexpected ground conditions are encountered, TFW should be consulted immediately and appropriate design changes put in place if necessary.
Shrinking and swelling clay/silt	Shrinkable soils are subject to changes in volume as their moisture content is altered. Influenced by seasonal effects, tree roots. Soil movement can cause subsidence and heave, leading to failure of or disturbance to the infrastructure.	Samples of Glacial Till have been analysed and found to have a low shrinkage potential. The foundation depths must be constructed in accordance with soil shrinkage potential and with consideration to trees.
High water table / water logged soils	Buoyancy effects, ground loss and excessive settlements.	Groundwater was identified at a depth of 2.5m below ground level within WS02 and WS04. Allowances should be made for dewatering excavations and removal of soft spots. Foundations should be designed and constructed appropriately taking groundwater in to consideration.
Running sand	Difficult excavations, soil loss / ground collapse	Running sand conditions were not identified during the ground investigation. During construction works, if running sand is found, the occurrence should be reported immediately to TFW and appropriate excavation stability measures put in place.
Expansive soils	Soil movement can cause subsidence and heave, leading to failure of or disturbance to the infrastructure.	The quantity of slag identified within the Made Ground is low and not expected to cause a risk from expansion. If any anomalous areas of Slag/unusual ground conditions are identified, the occurrence should be reported immediately to TFW and an appropriate investigation put in place.
Unsuitable bearing stratum – soft, loose or weak soils	Excessive settlements, damage to structures, ultimate or serviceability state failure	The foundation recommendations are appropriate to the ground conditions found and take into account anticipated bearing capacity, predicted total/differential settlements and potential risk from mining. All foundations should be constructed in accordance with these recommendations. During construction works, if variable/unexpected ground conditions are encountered, TFW should be consulted immediately and appropriate design changes put in place if necessary.

9.0 Geotechnical Risk Assessment (Continued)

Table 9.1 Geotechnical Risk Assessment (Continued)		
Hazard	Consequence	Comments and Design action required to reduce risk
Below ground obstructions		
Buried obstructions	Unsuitable strata for the chosen foundation solution / service installation (time and cost impact) and geotechnical risk	Buried obstructions have not been encountered. If identified, all buried structures should be broken out and removed from beneath the proposed structures. Foundations should be suitably designed; deeper foundations may be needed.
Cuttings and Embankments		
Cuttings and slope instability	Ultimate or serviceability state failure due to unsuitably designed cuttings	Further cutting of the site is not envisaged. The existing cutting bank requires support via a retaining structure. The retaining wall should be designed and constructed appropriately.
Embankment settlement and stability	Surface subsidence, unacceptable settlement exceeding design tolerances, ultimate or service state failure	Embankment construction is not anticipated.
Unexpected occurrences		
Unexpected and variable ground conditions	Slowing down of construction process, design changes required, project delayed, time and cost implications	The GI findings should be communicated to the principal contractor and site workers. Any unusual occurrences should be reported TFW and design changes put into place as required.
Limited knowledge		
Limited knowledge of ground conditions	Unsuitable strata for the chosen foundation solution (time and cost impact) and geotechnical risk. Variable engineering properties and behaviour leading to unacceptable settlement. Obstructions in the ground leading to design changes, time and cost impact to project.	A ground investigation has been undertaken, the findings of which should be communicated to the principal contractor and site workers. All risk assessments and foundation /engineering recommendations have been based upon the ground conditions encountered. Any unusual occurrences or previously unidentified ground conditions must be reported immediately to TFW and appropriate investigation/design checks put in place.
Contamination and chemical attack		
Aggressive ground	High sulphates, low pH which may lead to chemical attack buried concrete	All buried concrete should be designed to DS-1, AC-1.
Soil contamination	Contaminants of concern in soils which may pose a health, environmental or construction material risk	Soil laboratory analysis has identified elevated levels of lead and PAH within the Made Ground. ACM is also evident at ground level. The principal contractor should therefore ensure that an appropriate level of health and safety is put in place. ACM should be handpicked and suitably disposed of. A cap and Cover System is recommended for the site end users, entailing a thickness of 0.60m inert soils in all garden and landscaped areas. Any unusual occurrences or previously unidentified deleterious materials must be reported immediately to TFW and appropriate investigation/remedial measures put in place.
Water contamination	Contaminants of concern in soils which may pose a health, environmental or construction material risk	An assessment of the groundwater quality has not been undertaken. The soil chemical testing has not identified levels of contamination expected to pose a risk to water resources and no further action is considered necessary. Any unusual occurrences or previously unidentified deleterious materials/water must be reported immediately to TFW and appropriate investigation/remedial measures put in place.
Utilities		
Underground or overhead services	Physical damage to utility, physical injury/loss of life	The contractor should liaise with the statutory providers. All service runs should be located and marked to avoid accidental damage and injury to persons. Buried services may need rerouting.

9.0 Geotechnical Risk Assessment (Continued)

Table 9.1 Geotechnical Risk Assessment (Continued)		
Hazard	Consequence	Comments and Design action required to reduce risk
Neighbouring properties		
Damage to existing structures or services around the scheme due to ground deformation or vibration	Third party claims, increased cost of proposed development	The design and construction team should identify the location of existing structures and potential problems before construction. Foundations should be designed to limit ground deformation. Potential monitoring of nearby structures during construction.

SECTION 10 Engineering Recommendations

10.1 Site Preparation

All ACM upon the ground surface should be handpicked by a specialist asbestos consultant and disposed of safely at a licensed landfill.

A Japanese Knotweed specialist/ecologist should be consulted, a knotweed management plan prepared for the site and the knotweed suitably remediated prior to any site works commencing.

All other scrub vegetation including all roots should be grubbed up and removed from beneath the proposed houses, access road and car parking areas.

The reduced levels should be brought up to the required levels with well-compacted imported granular materials. Department of Transport (DoT) type 2 sub base or similar should be used and should be compacted in layers to the requirements of the Specification for Highway Works. Alternatively, appropriate selected inert imported fill could be used.

Allowances should be made for removing any soft spots/areas and their replacement with well-compacted imported granular materials as previously described.

Contingencies should be allowed for the diversion and/or protection of any underground services brought about as a result of the proposed works.

We understand that no further enabling works (cut and fill) are required at the site. The northern site margin has already been cut back, this batter will require retaining. See **Section 10.3**.

10.2 Foundation and Floor Slab Solution

A reinforced concrete raft type foundation/floor slab solution will be a suitable engineering solution for the development. The raft should be capable of spanning a crown hole of 3.0m with a cantilever effect on corners of 1.5m. Provided all soft/spots/areas are removed and replaced with well compacted imported granular materials as previously described then the maximum load beneath the foundation should not exceed 75kN/m^2 . Total settlement of the foundation should not exceed 30mm with angular distortions caused as a result of differential settlements should be less than 1:750.

To avoid damage from frost action, the depth to the underside of the foundation in frost susceptible ground should be at least 450mm (0.45m) below finished ground level.

Where trees are nearby, especially where soils are shrinkable, foundations should be designed accordingly. Chapter 4.2 of the NHBC Standards provides minimum founding depths in accordance with tree types and soil shrinkage potential.

10.2 Foundation and Floor Slab Solution (Continued)

As summarised in **Section 4.8**, soil geotechnical analysis demonstrated that the cohesive superficial deposits are of low shrinkage potential.

The Boulder Clay/Glacial Till is typically soft to a depth of 1m / 1.5m below which depth the clay consistency becomes 'firm'. It is recommended that the soft materials are removed and replaced with well compacted imported materials as previously described.

It is recommended that an experienced engineer inspect all foundation excavations before concreted and any unusual occurrences/ground conditions should be reported immediately.

10.3 Retaining Walls

A cut exercise has been performed along the northern site margin. The resultant batter is typically 0.5m to 2m in height and is near vertical. The soil exhibits localised slumping due to the over steepened slope and exposure to the weather etc. This batter will require the construction of a retaining wall to ensure long term stability. The effective angles of shearing resistance of the encountered materials have been determined based upon past experience of the materials. Laboratory testing of representative soil samples should be undertaken at a future date to confirm the quoted parameters.

Table 10.1 Effective Shear Stress Parameters

Stratum Description	Bulk Weight kN/m ³	Unit (γ)	Effective Cohesion (c') kN/m ²	Effective Angle of Shearing Resistance (ϕ') degrees
Loose granular material (Made Ground)	18 – 19		0	<20
Soft cohesive material	18 - 20		0	<20
Firm to stiff cohesive material	18 - 20		0	25 - 30
Well compacted, granular materials, compacted as per Specification for Highway Works and other relevant guidance such as British Standards (BS) 6031: 2015. Code of Practice for Earthworks.	19 - 22		0	30 - 34

The design and construction of the retaining walls and cut and fill should be in accordance with BS 6031: 2015 Code of Practice for Earthworks and other relevant guidance. It is recommended that the construction of retaining walls be carried out in small sections.

Allowances should also be made for the removal of soft spots and their replacement with imported suitable selected inert granular materials or suitable inert site won materials. Any evidence of slope instability should be reported to a Terra Firma geotechnical engineer and appropriate remedial measure implemented. All retaining walls should have suitable drainage installed to the rear to prevent the build up of water pressure.

10.4 Excavations and Formations

Most of the shallow excavations should be possible with normal soil excavating machinery. Shallow excavations are likely to encounter groundwater flows. Any inflows together with rainwater infiltration should be dealt with by conventional pumping techniques. However it should be noted that during times of heavy rainfall a higher water table will be encountered.

The sides of any excavations deeper than 1.0m should be supported by planking and strutting or other proprietary means.

The sub-formations/formations will be highly susceptible to loosening, softening and deterioration by exposure to weather (rain, frost and drying conditions), the action of water (flood water or removal of groundwater) and site traffic.

Formations should never be left unprotected and continuously exposed to rain causing degradation, or left exposed/uncovered overnight, unless permitted by a qualified engineer.

Construction plant and other vehicular traffic should not be operated on unprotected formations.

As a minimum the formation/excavation surfaces must be protected by blinding concrete immediately after exposure.

Allowances should be made for the removal of soft spots/areas and their replacement with well compacted granular materials.

Allowances should also be made for special precautions to prevent formation deterioration in addition to the above.

It is recommended that approval be gained from a qualified engineer of the formation condition before covering them with any subsequent construction.

All materials to be removed from the site should be subject to Waste Acceptance Criteria Testing to allow classification for removal.

10.5 Protection of Buried Concrete

Laboratory chemical analysis identified pH (acidity) levels of between 6.7 and 8.6 pH units and total sulphate concentrations of between 0.04% and 0.13%. All buried concrete should as a minimum conform to ACEC Class AC-1 of BRE Special Digest 1 (2001).

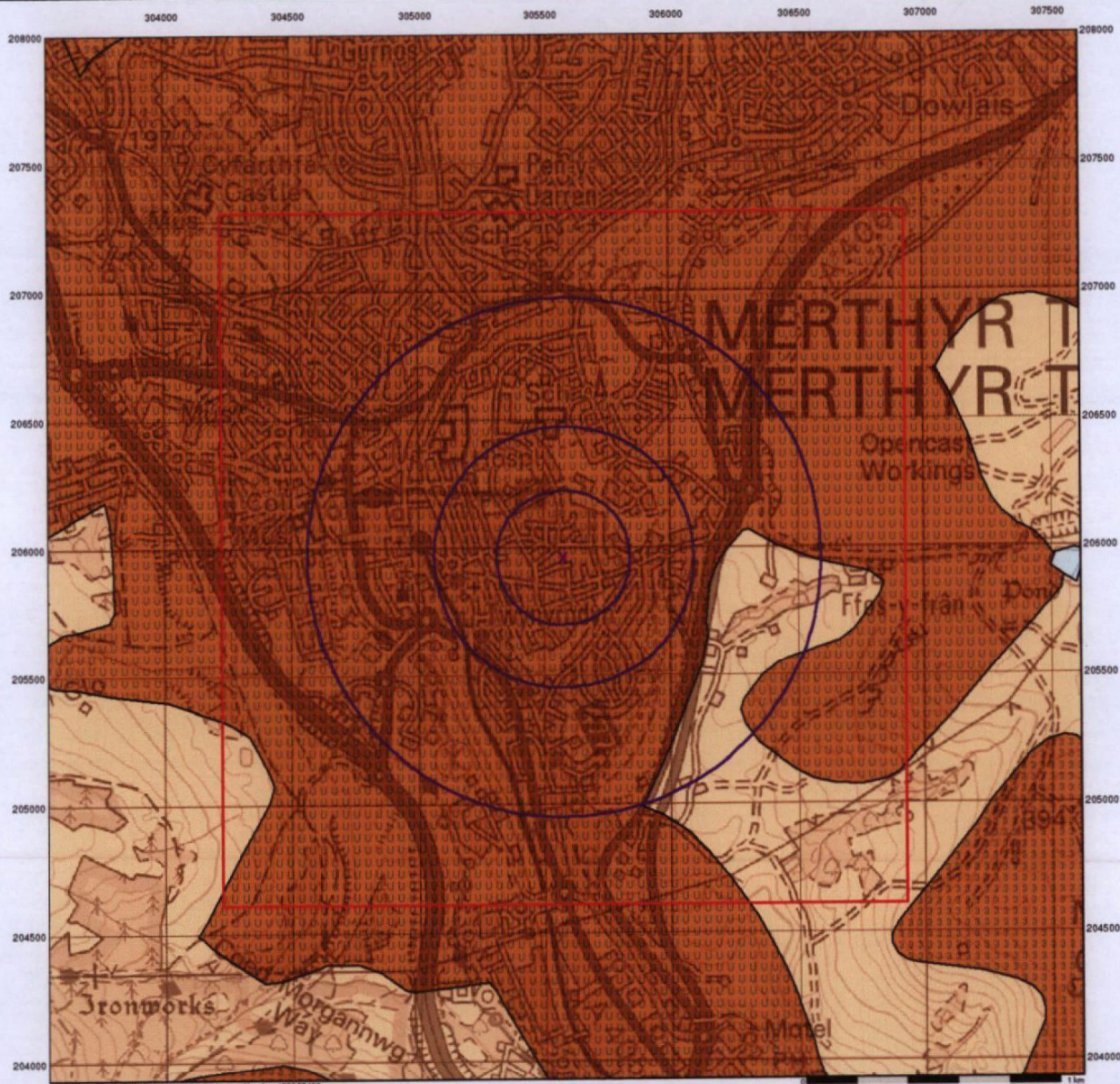
10.6 Soak Away Drainage

Field soakaway testing was not undertaken within this phase of ground investigation. The suitability of the Boulder Clay for drainage should be confirmed by excavating trial pits and performing soakaway tests in accordance with BRE 365. Any soakaways should be positioned a suitable distance away from below ground structures such as foundations. Based upon visual inspection of the Boulder Clay, we anticipate that this material will demonstrate poor drainage characteristics. Should the more granular Made Ground be targeted for soakaway drainage soakaway, we recommend further chemical analysis of the material to confirm contaminant leachability to demonstrate the risk level to groundwater from dissolved substances.

10.7 Roads, Pavements and Drive Ways

For new road, pavement and drive way formations, we recommend that a CBR design value of 2% is used. As previously described, allowances should be made for the removal of soft spots/areas and their replacement with well compacted granular materials.

ANNEX A
Landmark Envirocheck Report and Historical Maps



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Groundwater Vulnerability

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

Major Aquifer
(Highly Permeable)

Minor Aquifer
(Variably Permeable)

Non Aquifer
(Negligibly Permeable)

Water or Sea

Drift Deposit

Soil Classes

High (H) 1, 2, 3, U

Intermediate (I) 1, 2

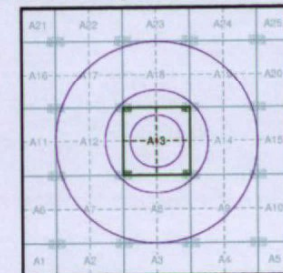
Low

High (H) 1, 2, 3, U

Intermediate (I) 1, 2

Low

Site Sensitivity Context Map - Slice A



Order Details

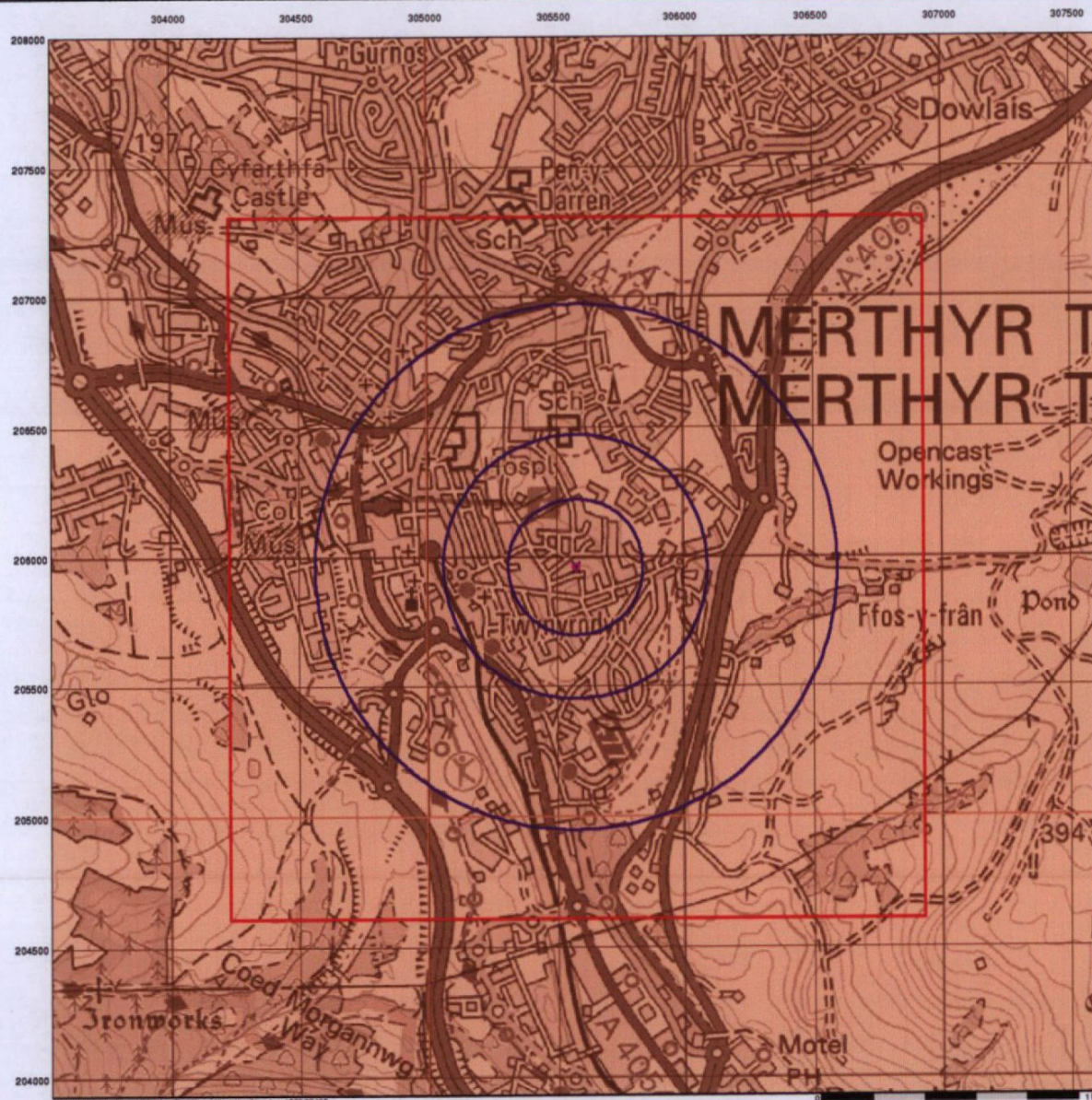
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 Customer Ref: 13319
 National Grid Reference: 305580, 205960
 Slice: A
 Site Area (Ha): 0.06
 Search Buffer (m): 1000

Site Details

Builders Yard, Elwyn Drive, Merthyr Tydfil, CF47 0NJ



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Bedrock Aquifer Designation

General

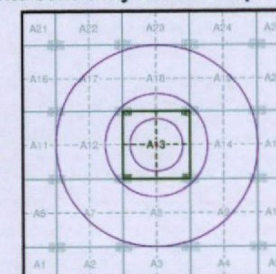
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

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

Site Sensitivity Context Map - Slice A



Order Details

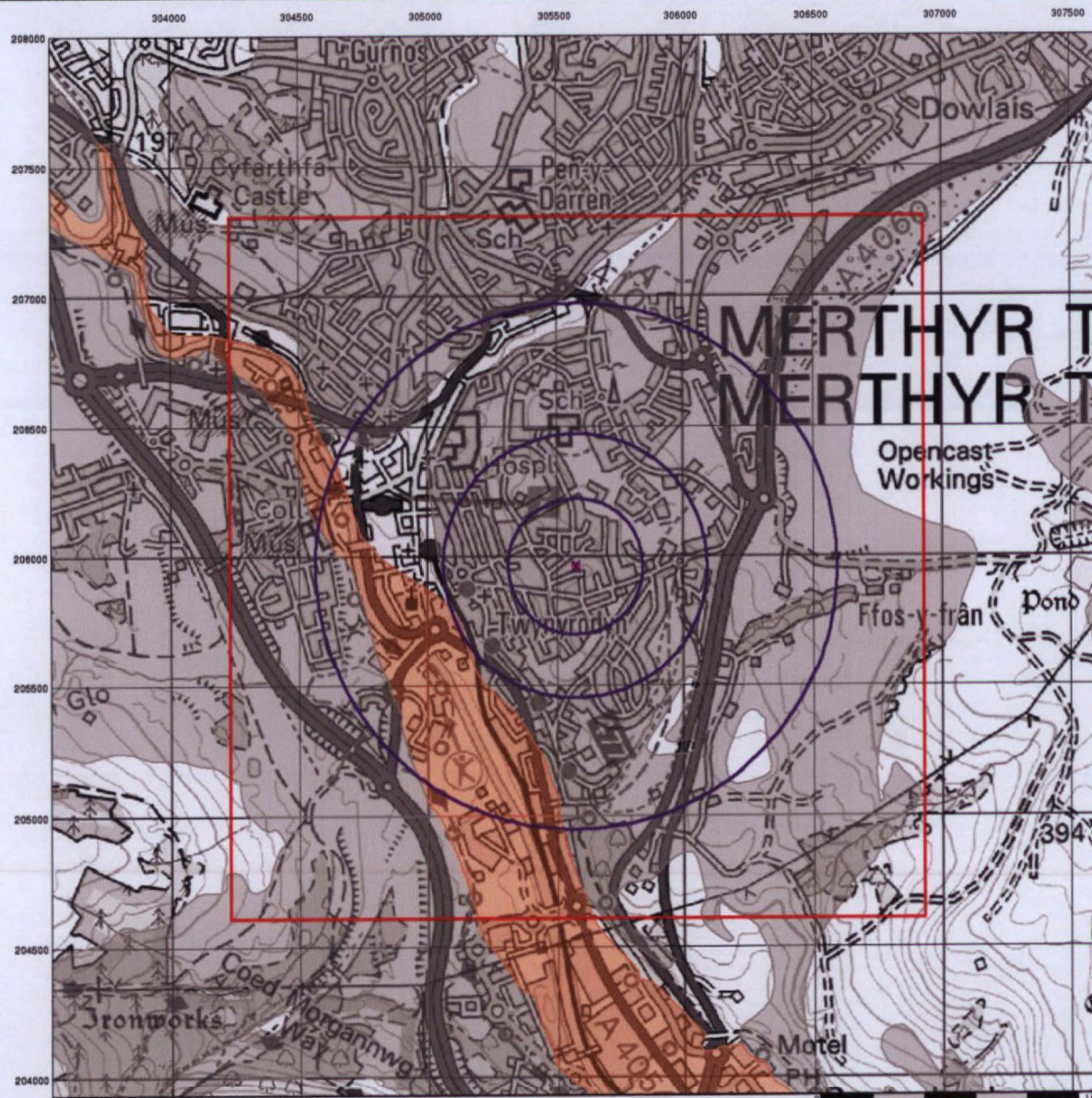
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Superficial Aquifer Designation

General

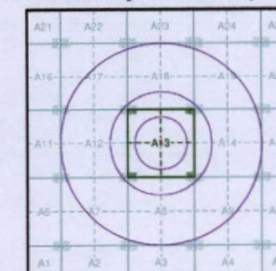
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- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

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- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

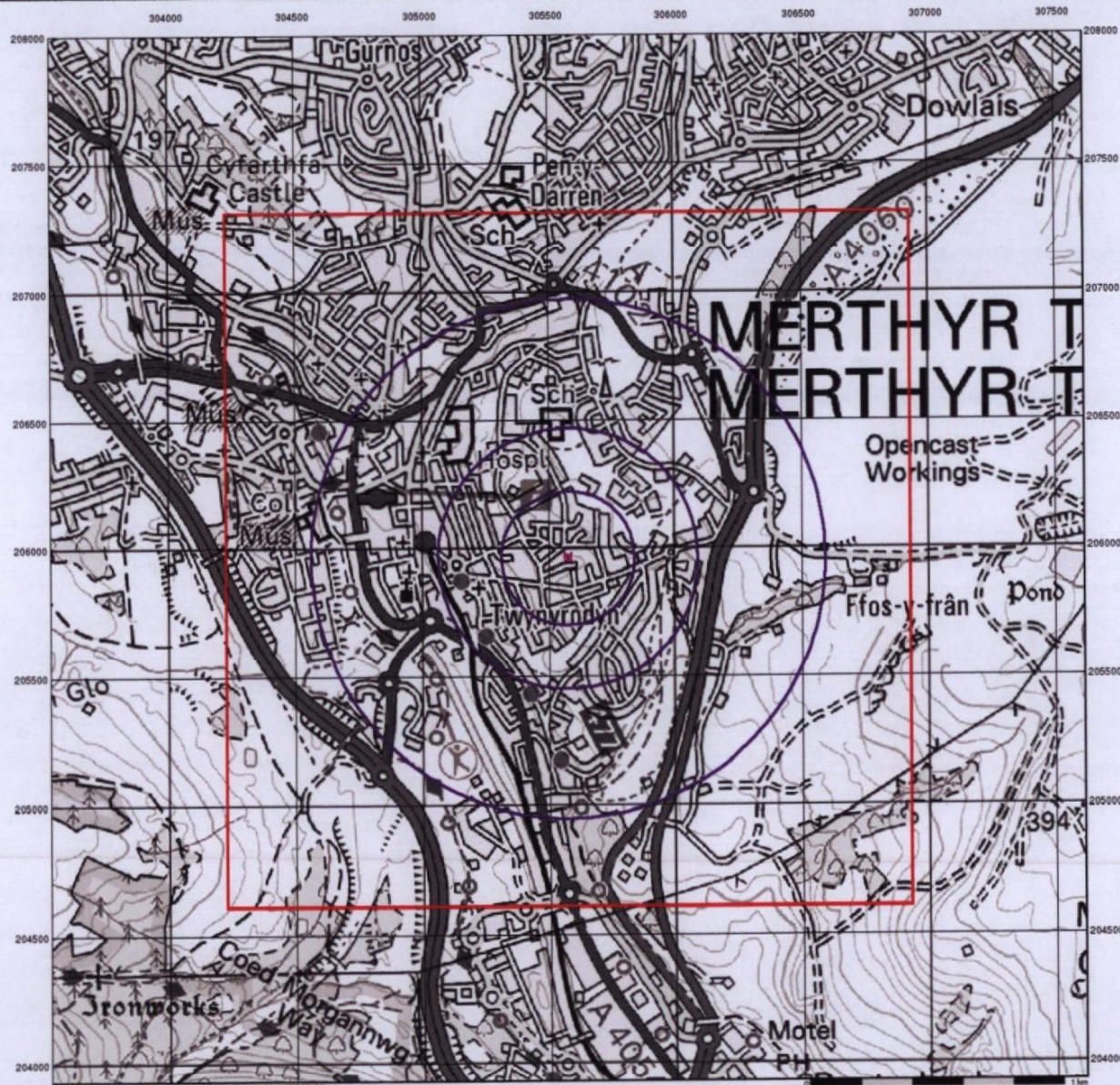
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Source Protection Zones

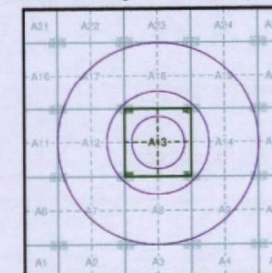
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

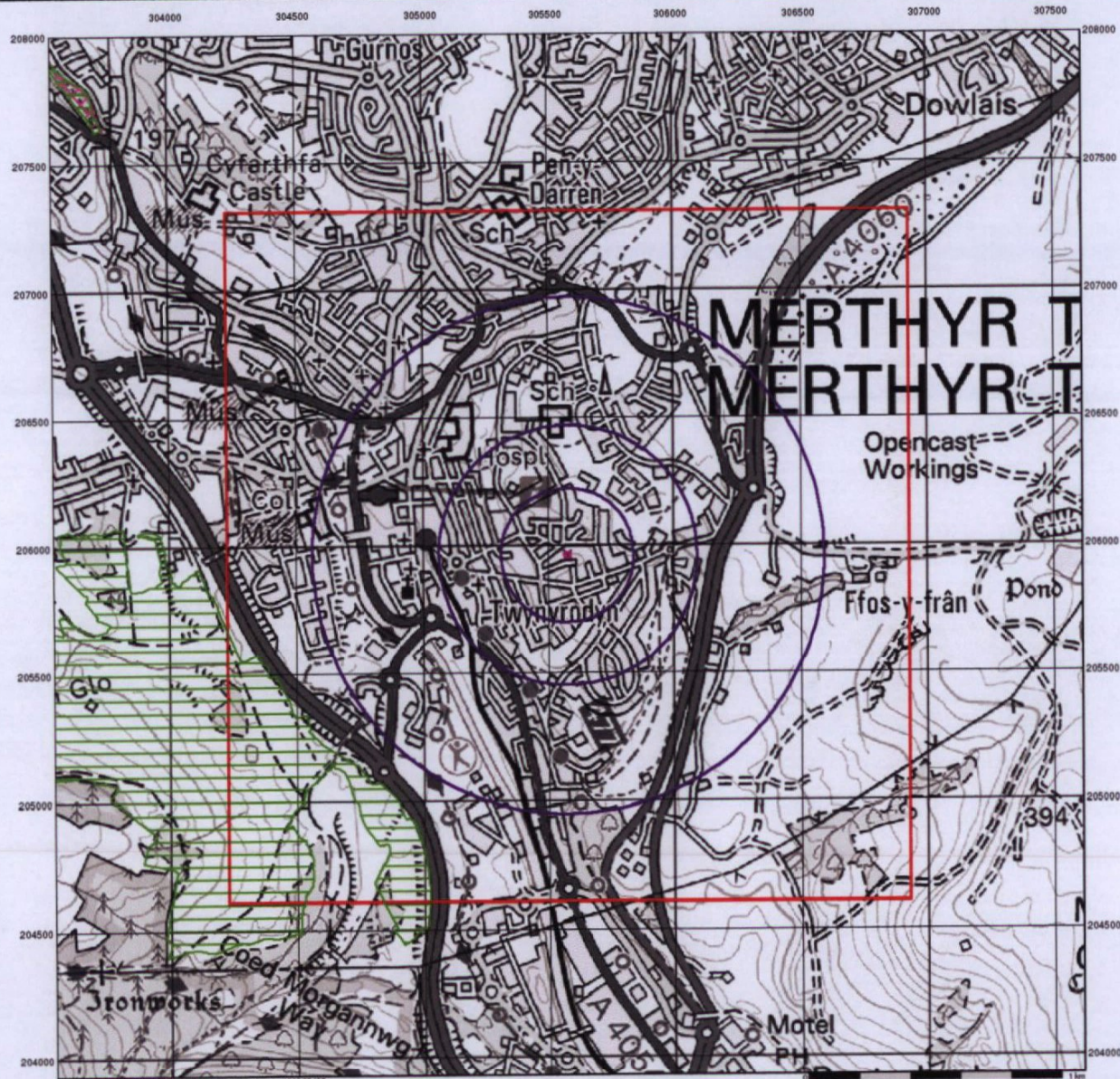
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Sensitive Land Uses

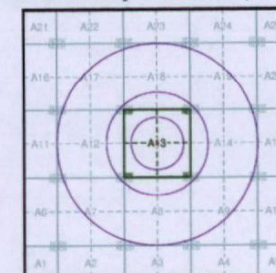
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area

Site Sensitivity Context Map - Slice A



Order Details

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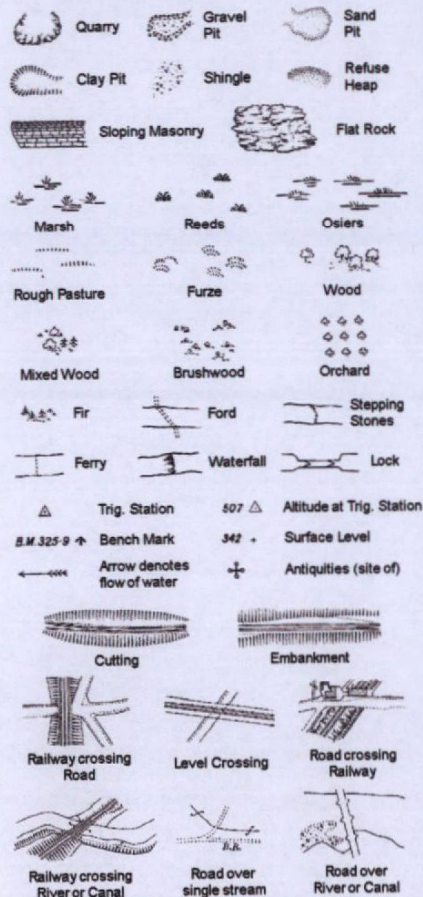
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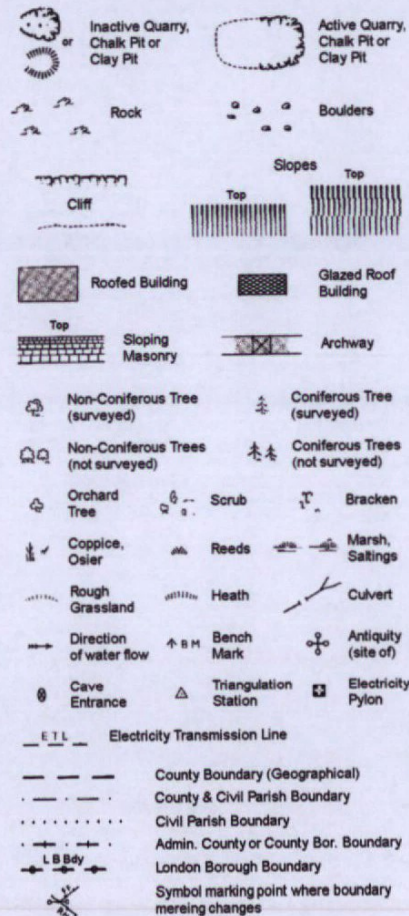
Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



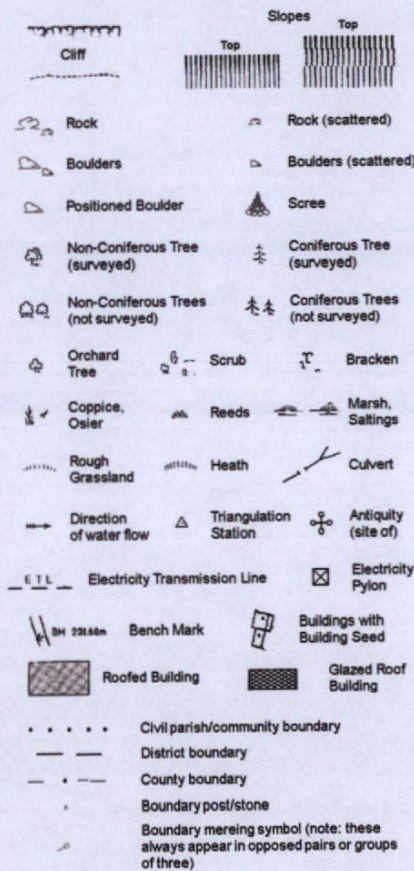
--- County Boundary (Geographical)	
--- County & Civil Parish Boundary	
--- Administrative County & Civil Parish Boundary	
--- County Borough Boundary (England)	
--- Co. Boro. Bdy.	
--- County Burgh Boundary (Scotland)	
--- Boundary Post or Stone	
B.R. Bridge Road	P.P. Police Call Box
E.P. Electricity Pylon	S.P. Signal Post
F.B. Foot Bridge	SL Sluice
F.P. Foot Path	Sp. Spring
G.P. Guide Post or Board	T.C.B. Telephone Call Box
M.S. Mile Stone	Tn. Trough
M.P.M.R. Mooring Post or Ring	W Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



BH Beer House	P Pillar, Pole or Post
BP, BS Boundary Post or Stone	PO Post Office
Cn, C Capstan, Crane	PC Public Convenience
Chy Chimney	PH Public House
D Fm Drinking Fountain	Pp Pump
El P Electricity Pylon or Post	SB, S Br Signal Box or Bridge
FAP Fire Alarm Pylon	SP, SL Signal Post or Light
FB Foot Bridge	Spr Spring
GP Guide Post	Tk Tank or Track
H Hydrant or Hydraulic	TCB Telephone Call Box
LC Level Crossing	TCP Telephone Call Post
MH Manhole	Tr Trough
MP Mile Post or Mooring Post	Wt Pt, Wt Water Point, Water Tap
MS Mile Stone	W Well
NLT Normal Tidal Limit	Wd Pp Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



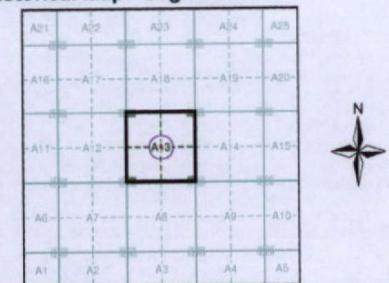
Bks Barracks	P Pillar, Pole or Post
Bty Battery	PO Post Office
Cemy Cemetery	PC Public Convenience
Chy Chimney	Pp Pump
Cls Cistern	Ppg Sta Pumping Station
Dismd Rly Dismantled Railway	PW Place of Worship
El Gen Sta Electricity Generating Station	Sewage Ppg Sta Sewage Pumping Station
El P Electricity Pole, Pylon	SB, S Br Signal Box or Bridge
El Sub Sta Electricity Sub Station	SP, SL Signal Post or Light
FB Filter Bed	Spr Spring
Fm / D Fm Fountain / Drinking Fm.	Tk Tank or Track
Gas Gov Gas Valve Compound	Tr Trough
GVC Gas Governor	Wd Pp Wind Pump
GP Guide Post	Wt Pt, Wt Water Point, Water Tap
MH Manhole	Wks Works (building or area)
MP, MS Mile Post or Mile Stone	W Well



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Glamorganshire	1:2,500	1875 - 1876	2
Glamorganshire	1:2,500	1900	3
Brecknockshire	1:2,500	1904	4
Glamorganshire	1:2,500	1919	5
Brecknockshire	1:2,500	1919	6
Ordnance Survey Plan	1:1,250	1967	7
Ordnance Survey Plan	1:2,500	1968	8
Ordnance Survey Plan	1:1,250	1969 - 1977	9
Supply of Unpublished Survey Information	1:1,250	1975	10
Additional SIMs	1:1,250	1984 - 1989	11
Additional SIMs	1:1,250	1989	12
Large-Scale National Grid Data	1:1,250	1993	13
Large-Scale National Grid Data	1:1,250	1994 - 1995	14
Large-Scale National Grid Data	1:1,250	1995	15
Large-Scale National Grid Data	1:1,250	1996	16
Large-Scale National Grid Data	1:1,250	1996	17

Historical Map - Segment A13



Order Details

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Customer Ref: 13319
National Grid Reference: 305580, 205980
Slice: A
Site Area (Ha): 0.06
Search Buffer (m): 100

Site Details

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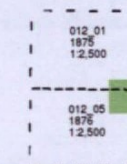
Glamorganshire

Published 1875 - 1876

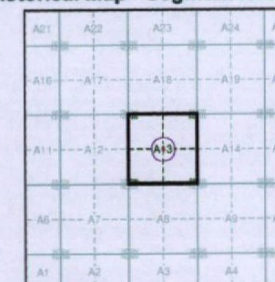
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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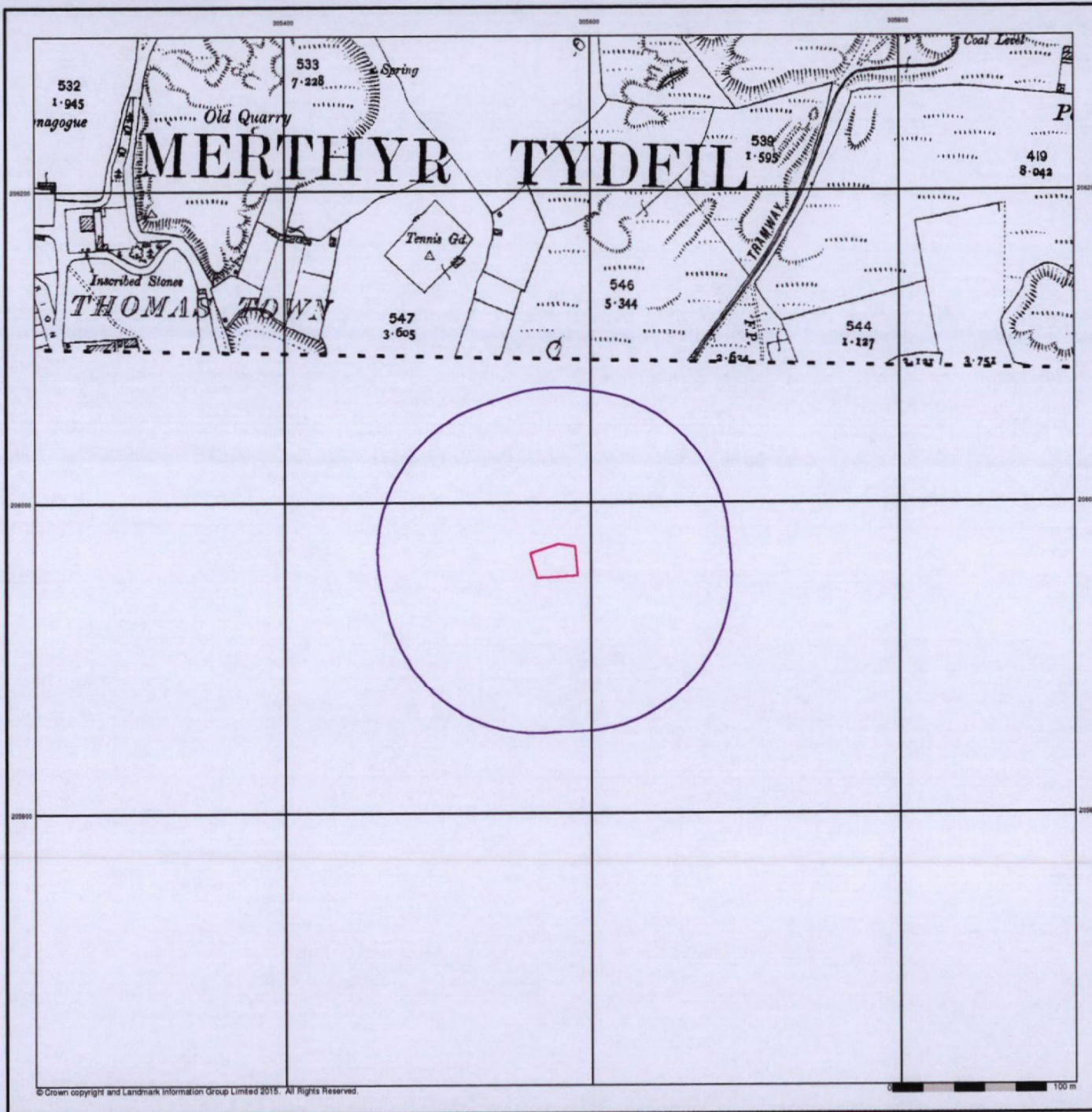
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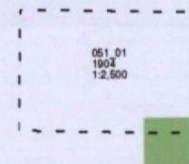
Brecknockshire

Published 1904

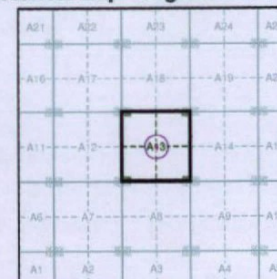
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Map Name(s) and Date(s)



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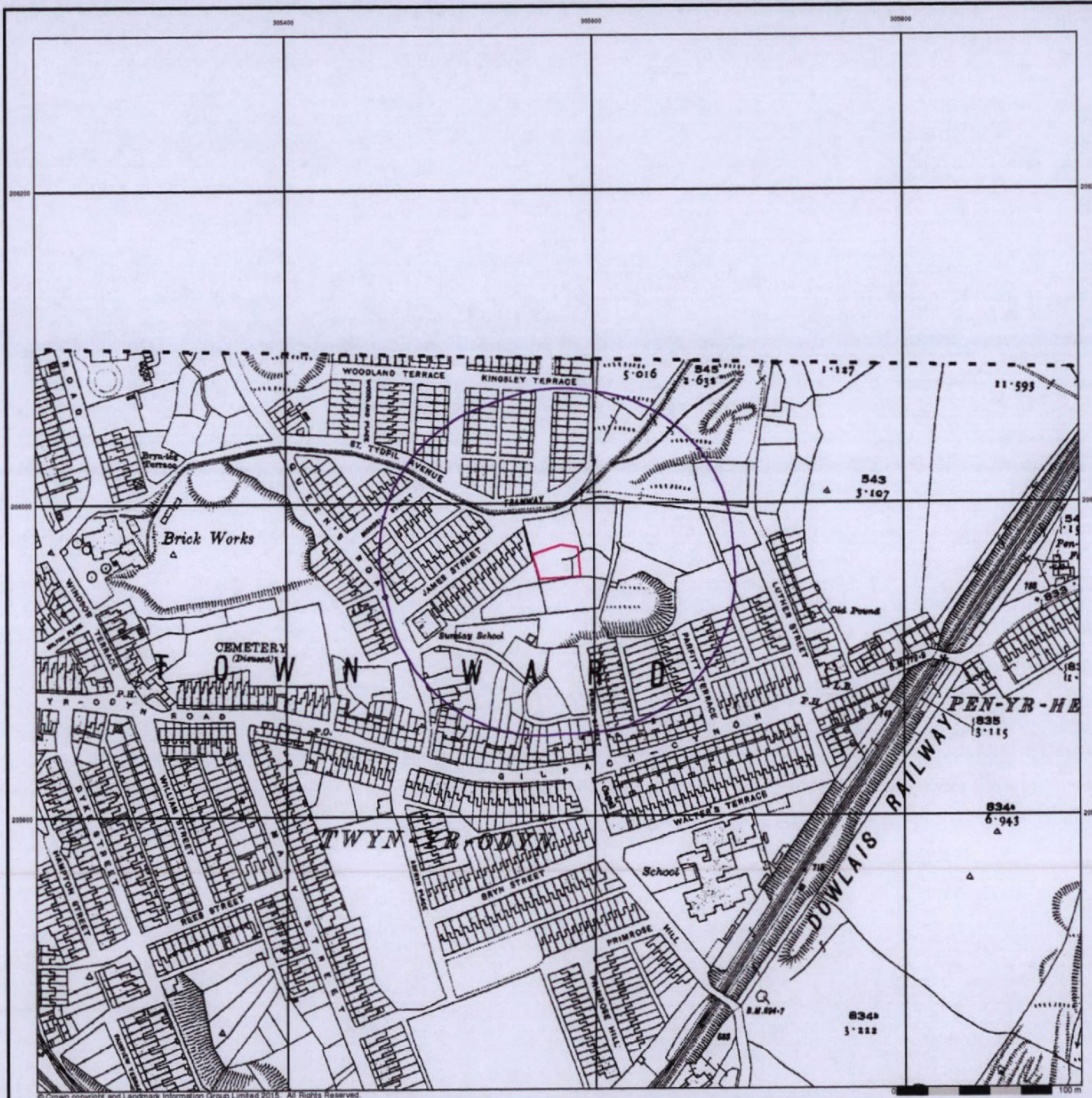
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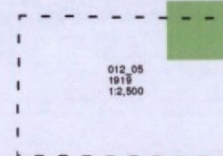


Glamorganshire
Published 1919

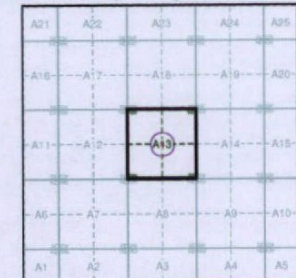
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Map Name(s) and Date(s)



Historical Map - Segment A13



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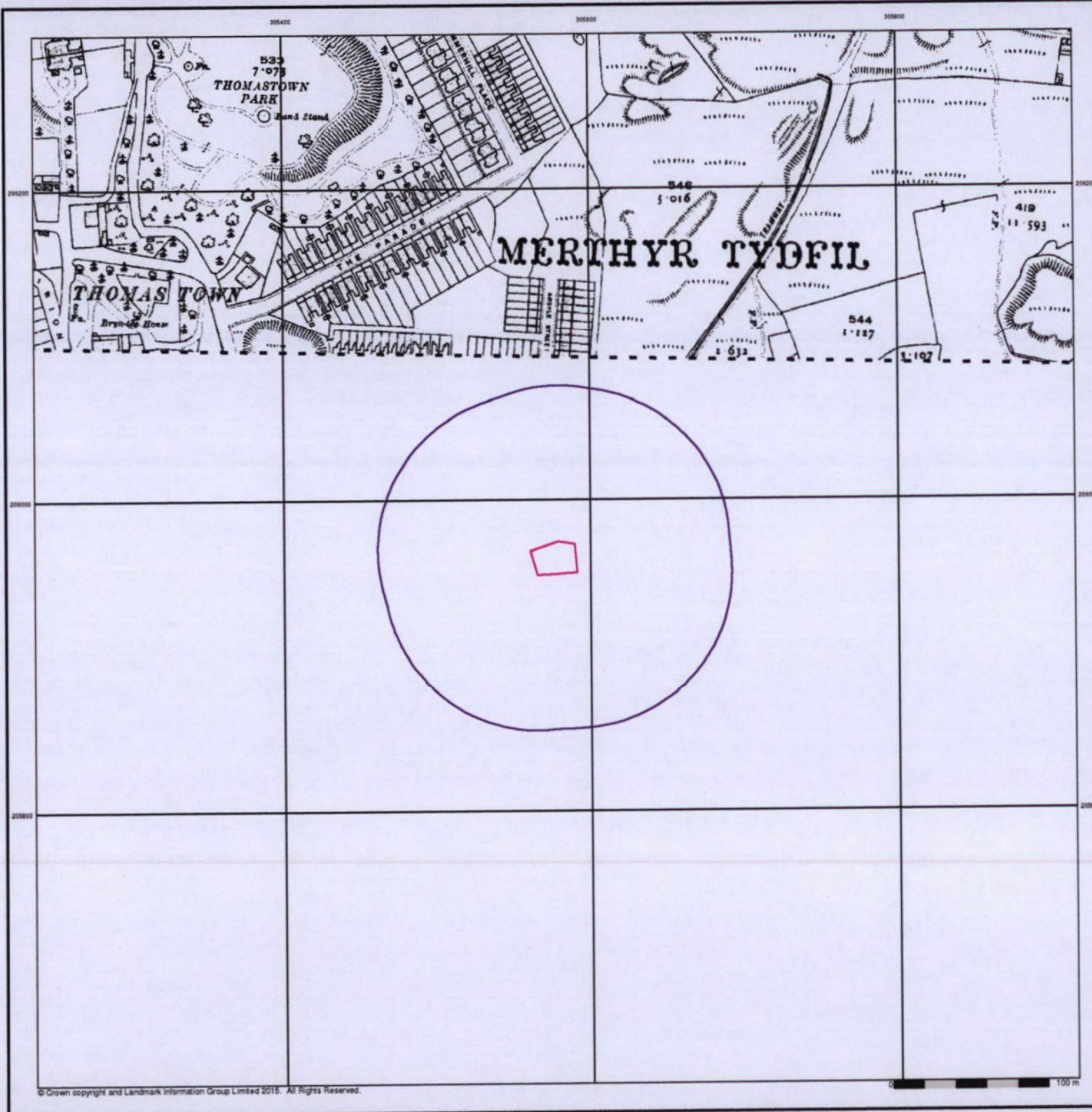
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Ordnance Survey Plan **Published 1957**

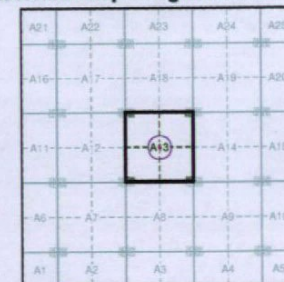
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SO0506SW 1957 1:1,250	SO0506SE 1957 1:1,250
SO0505SW 1957 1:1,250	SO0505NE 1957 1:1,250

Historical Map - Segment A13



Order Details

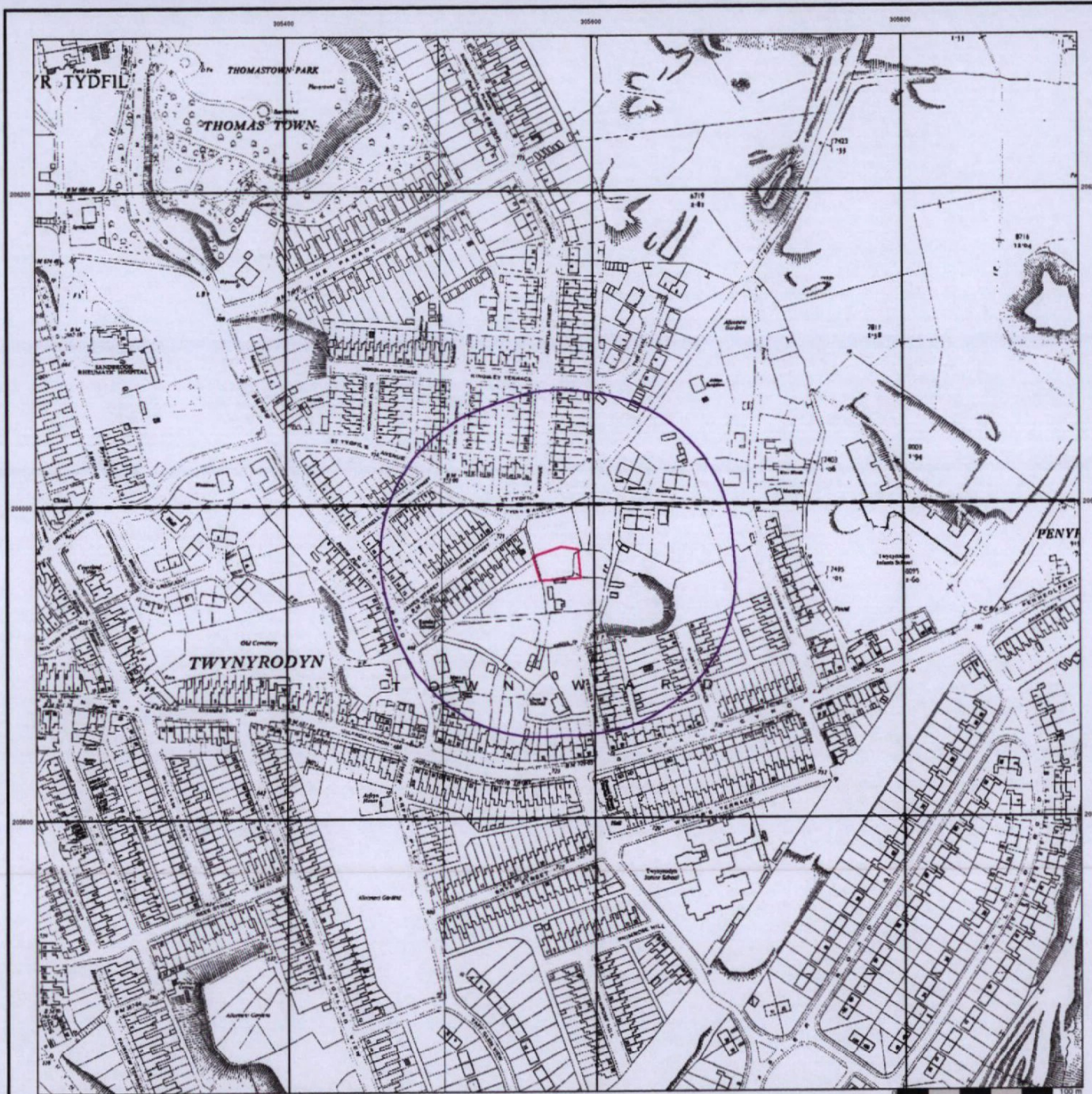
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Customer Ref: 13319
National Grid Reference: 305580, 205960
Slice: A
Site Area (Ha): 0.06
Search Buffer (m): 100

Site Details

Builders Yard, Elwyn Drive, Merthyr Tydfil, CF47 0NJ



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Ordnance Survey Plan Published 1958

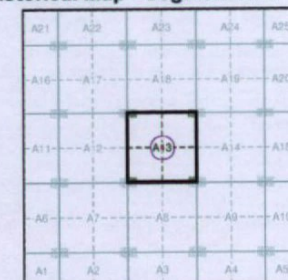
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SO0506	1958	1:2,500
SO0505	1958	1:2,500

Historical Map - Segment A13



Order Details

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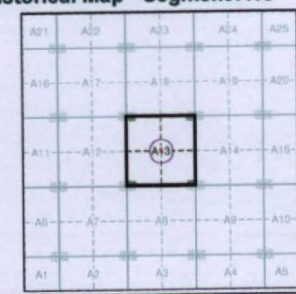
Ordnance Survey Plan
Published 1969 - 1977
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SO05046SW 1977 1:1,250	SO05046SE 1969 1:1,250
SO05046NW 1969 1:1,250	SO05046NE 1973 1:1,250

Historical Map - Segment A13



Order Details

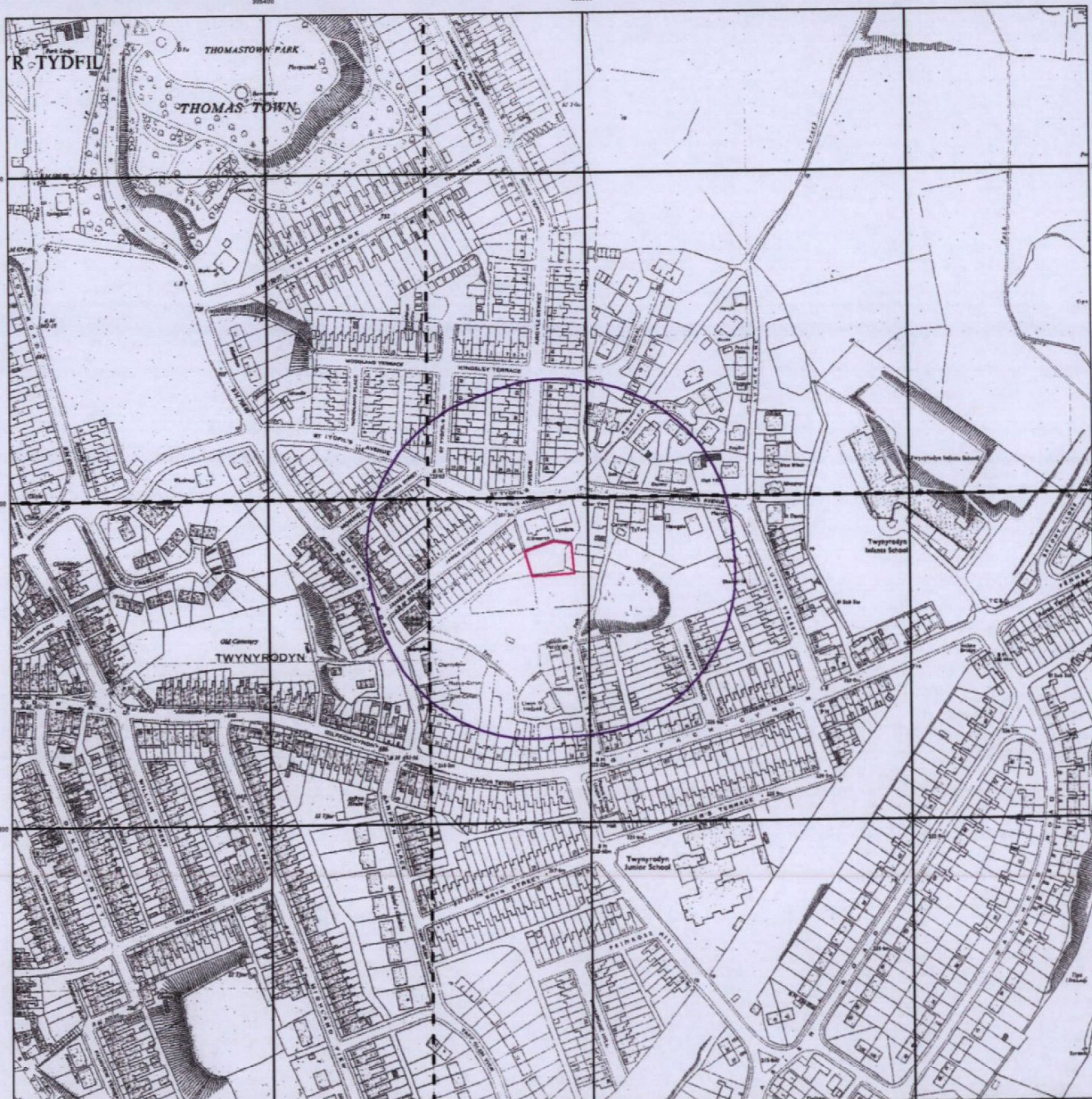
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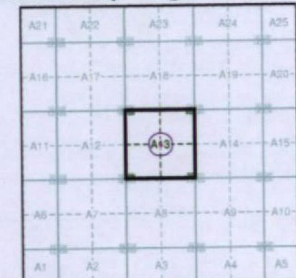
Supply of Unpublished Survey Information
Published 1975
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SO0506SW 1975 1:1,250	SO0506SE 1975 1:1,250
SO0505NW 1975 1:1,250	SO0505NE 1975 1:1,250

Historical Map - Segment A13



Order Details

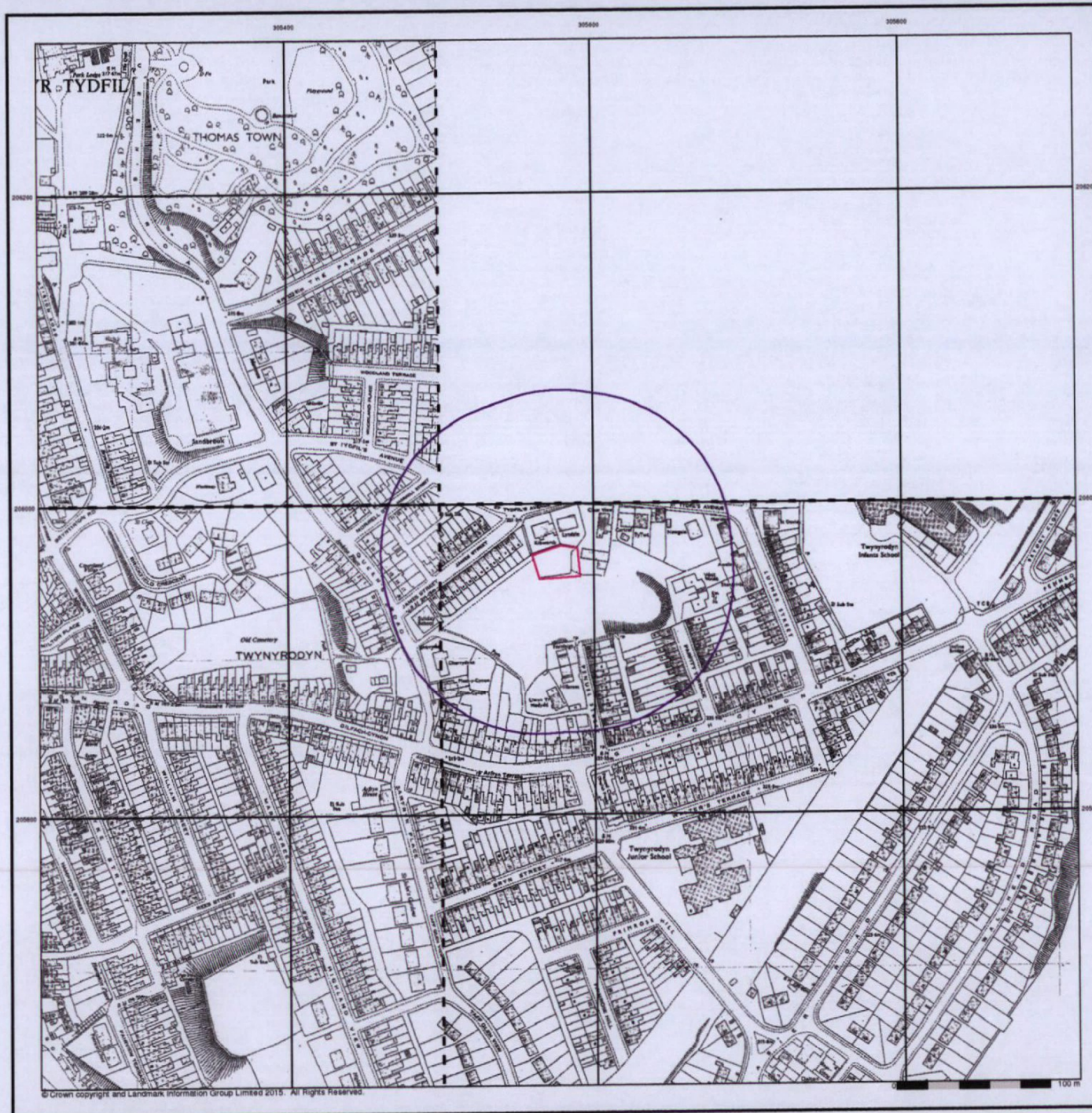
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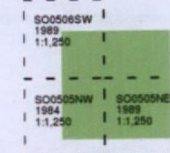


Additional SIMs
Published 1984 - 1989

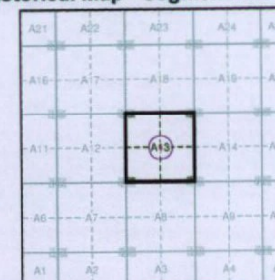
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

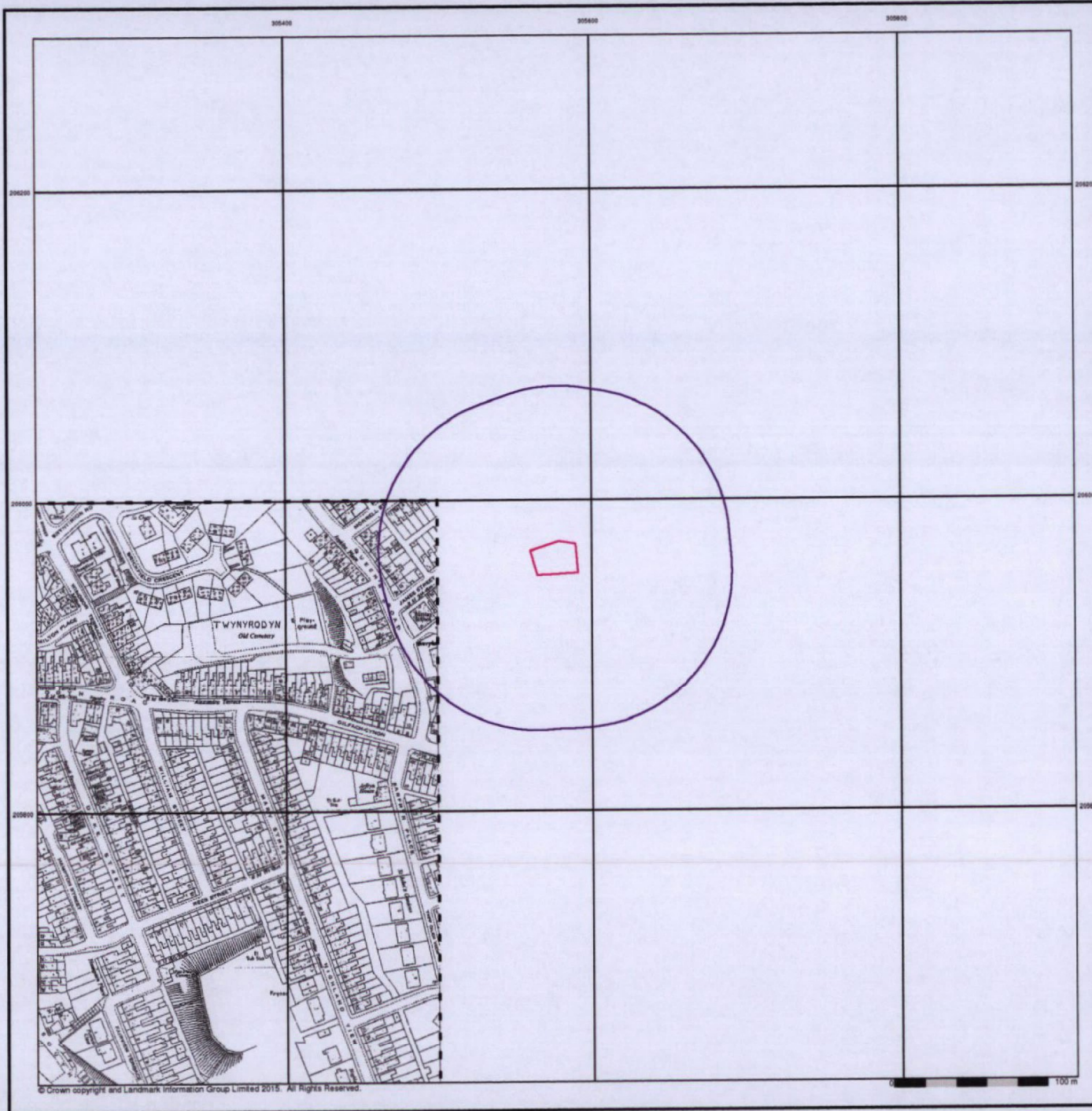
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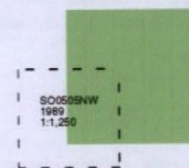


**Additional SIMs
Published 1989**

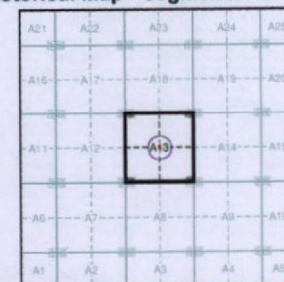
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

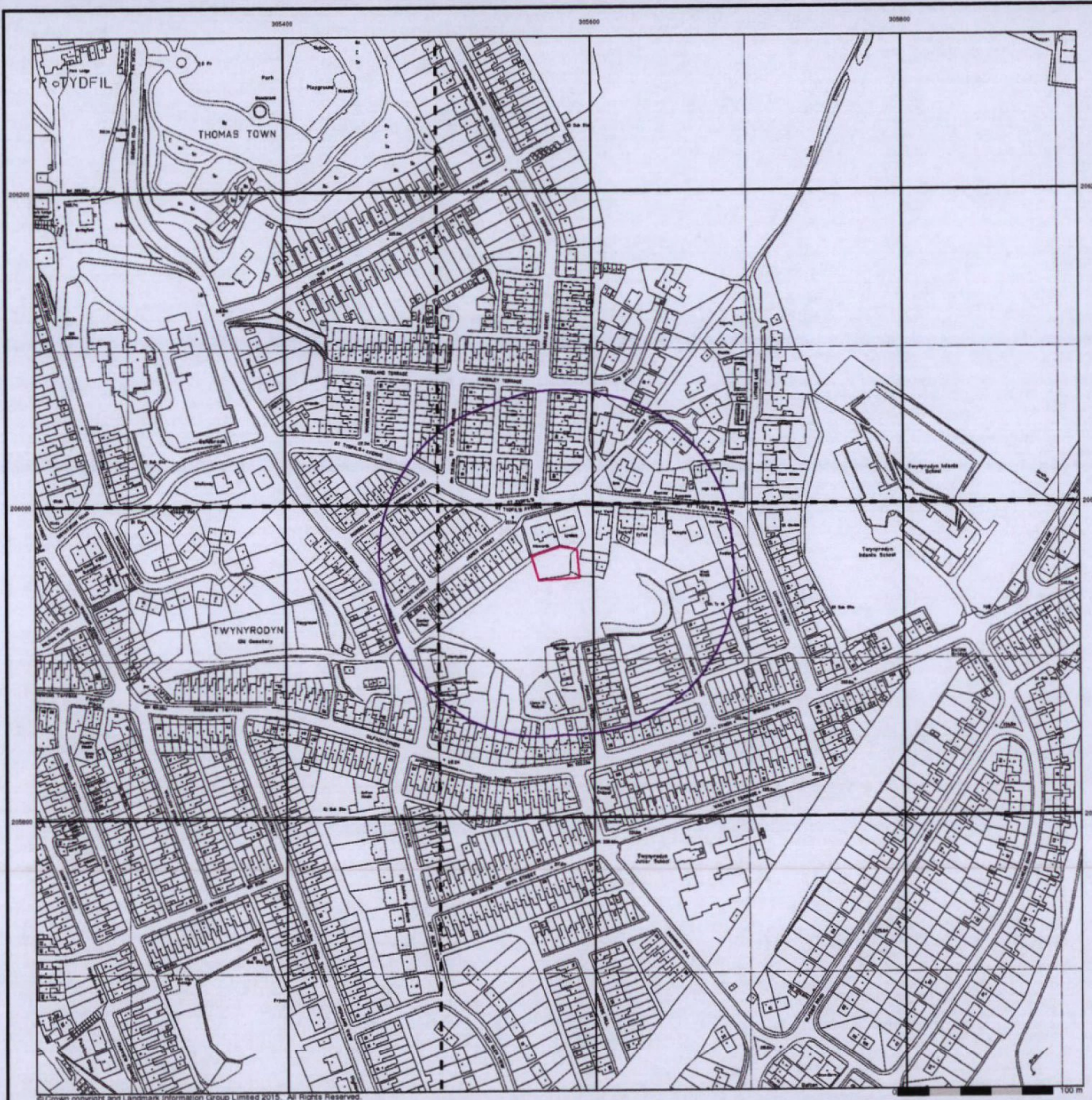
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Large-Scale National Grid Data Published 1993

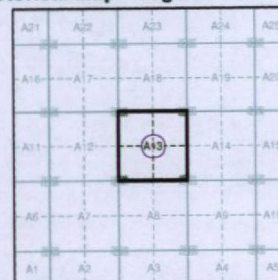
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SO0506SW 1993 1:1,250	SO0506SE 1993 1:1,250
SO0505NW 1993 1:1,250	SO0505NE 1993 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 70905697_1_1
Customer Ref: 13319
National Grid Reference: 305580, 205960
Slice: A
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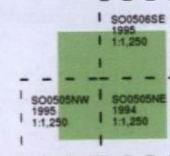


**Large-Scale National Grid Data
Published 1994 - 1995**

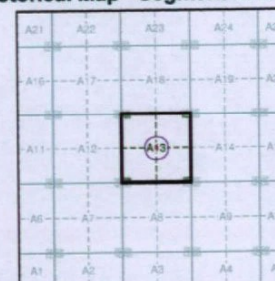
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SLM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the forerunners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

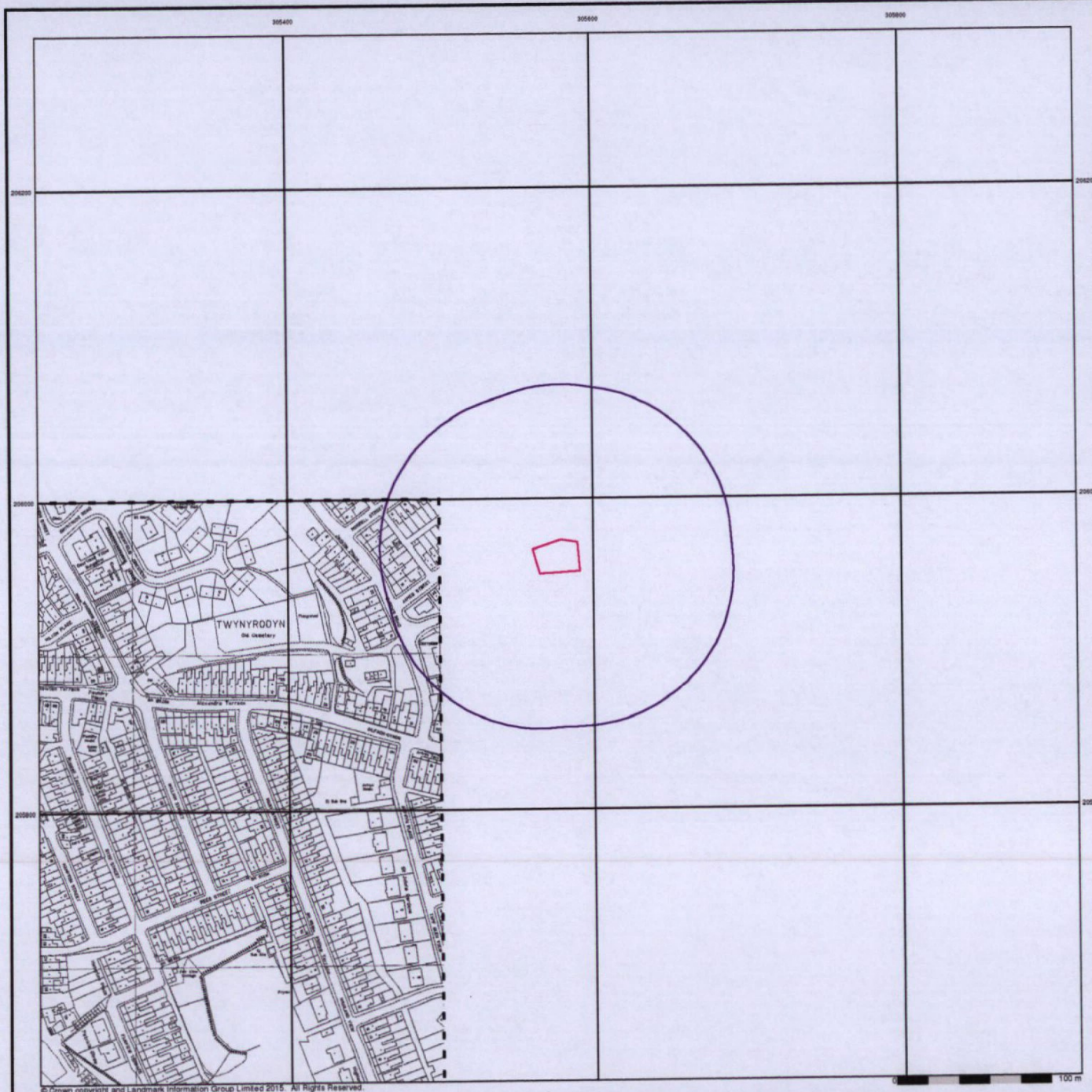
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Slice: A
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Search Buffer (m): 100

Site Details

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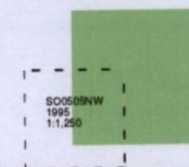


Large-Scale National Grid Data Published 1995

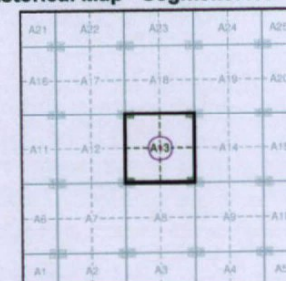
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

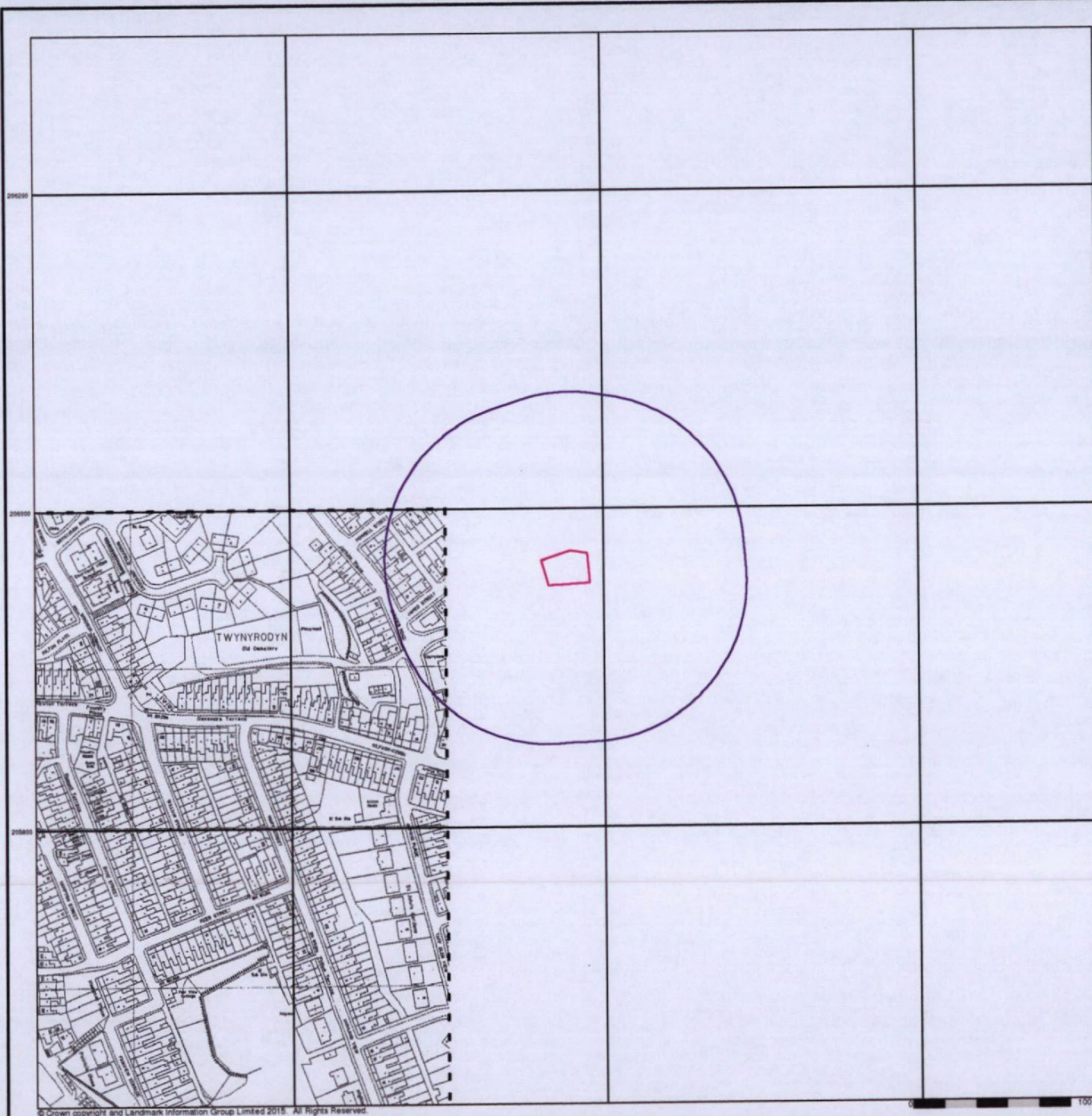
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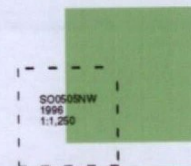


Large-Scale National Grid Data Published 1996

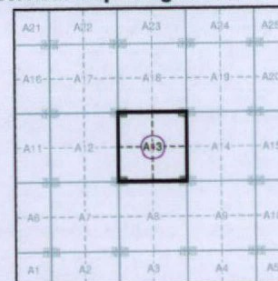
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the forerunners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 70905697_1_1
Customer Ref: 13319
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Site Details

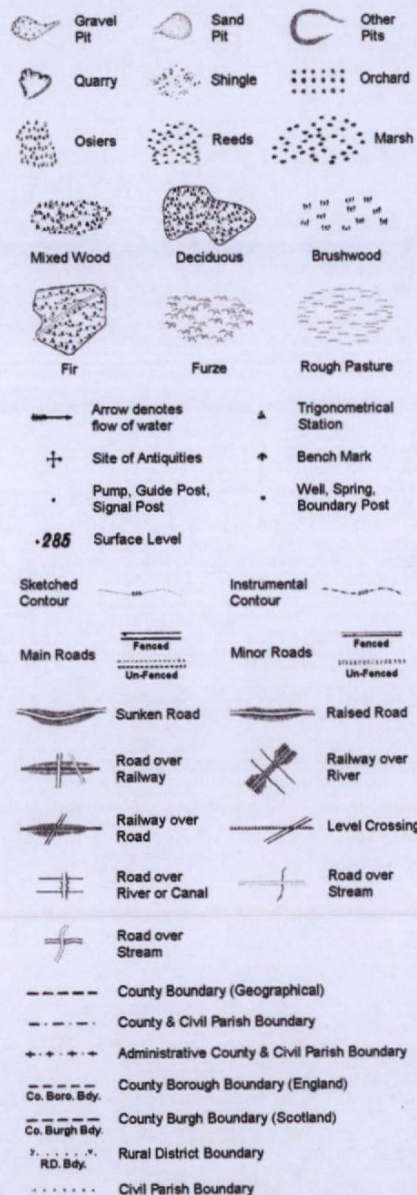
Builders Yard, Elwyn Drive, Merthyr Tydfil, CF47 0NJ



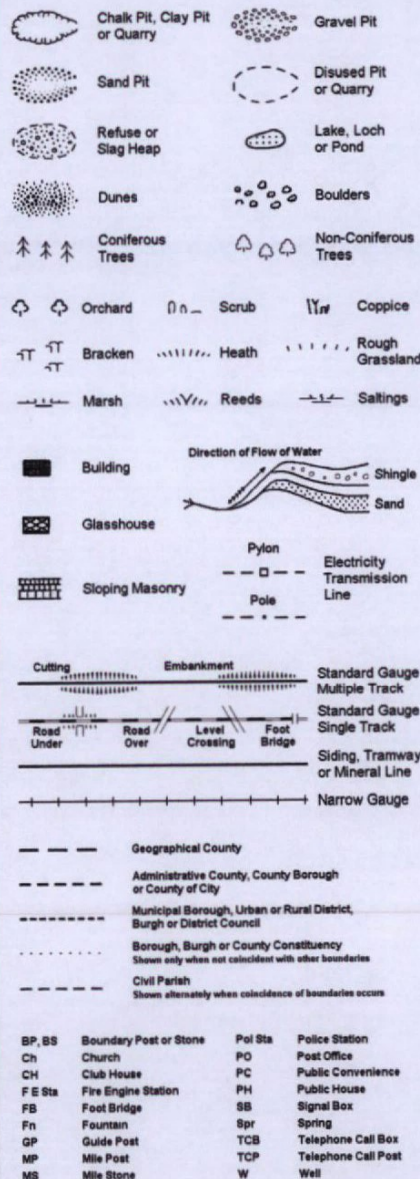
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.smi/rocheck.co.uk

Historical Mapping Legends

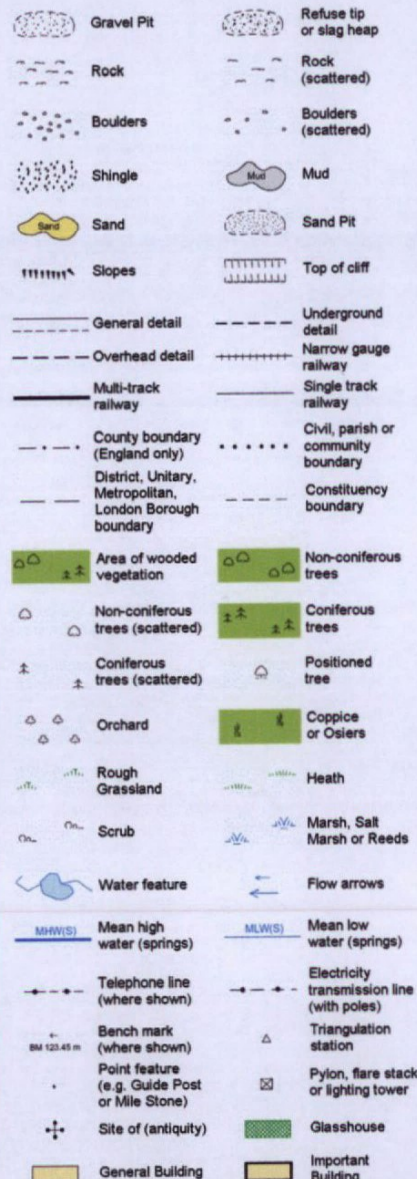
Ordnance Survey County Series 1:10,560



Ordnance Survey Plan 1:10,000



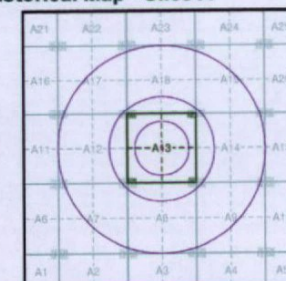
1:10,000 Raster Mapping



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Brecknockshire	1:10,560	1884	2
Glamorganshire	1:10,560	1885	3
Glamorganshire	1:10,560	1901	4
Brecknockshire	1:10,560	1905	5
Brecknockshire	1:10,560	1922	6
Brecknockshire	1:10,560	1938	7
Historical Aerial Photography	1:10,560	1945	8
Brecknockshire	1:10,560	1951	9
Ordnance Survey Plan	1:10,000	1964 - 1965	10
Ordnance Survey Plan	1:10,000	1969	11
Ordnance Survey Plan	1:10,000	1970 - 1979	12
Ordnance Survey Plan	1:10,000	1982 - 1989	13
Ordnance Survey Plan	1:10,000	1990 - 1992	14
10K Raster Mapping	1:10,000	2006	15
VectorMap Local	1:10,000	2015	16

Historical Map - Slice A



Order Details

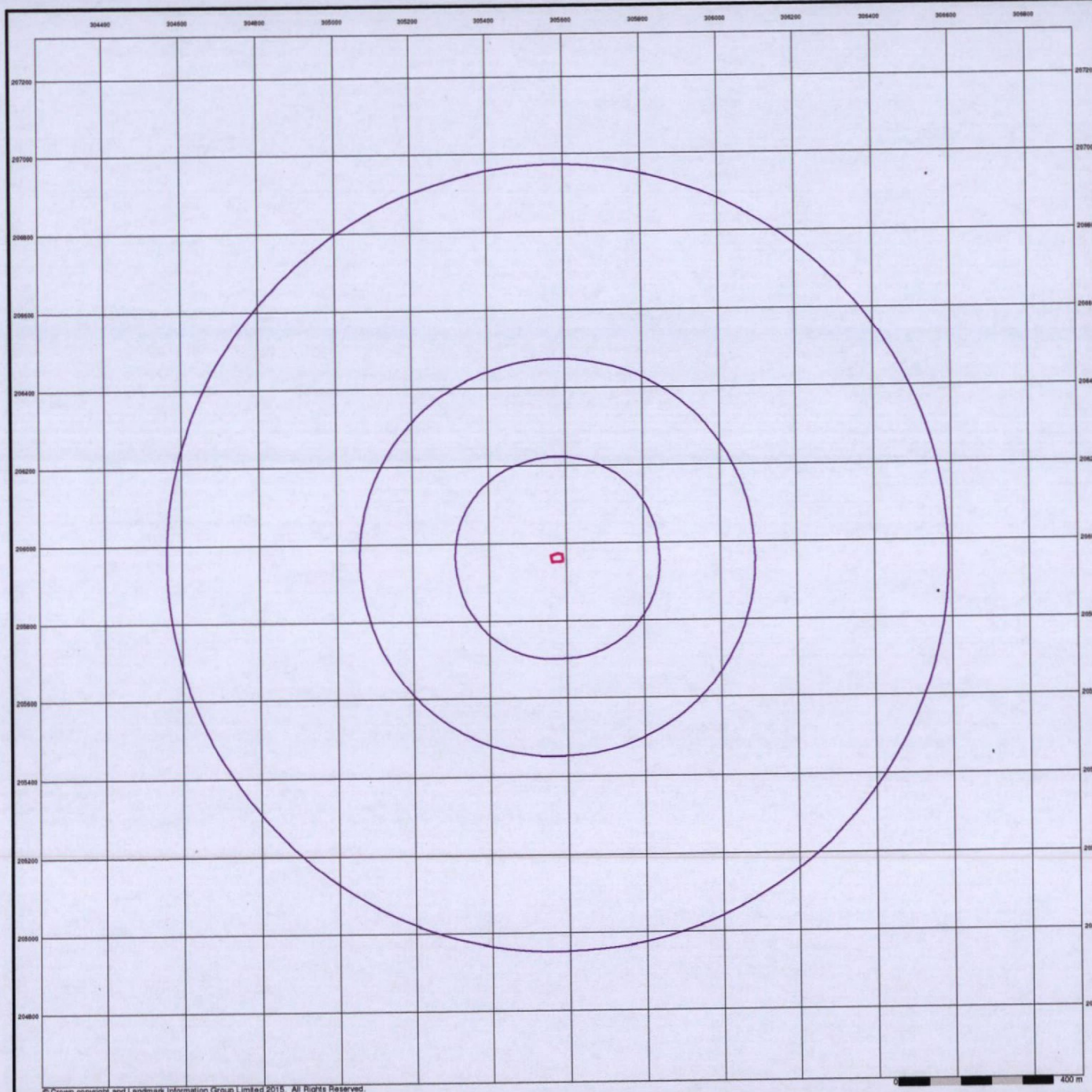
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 Slice: A
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Site Details

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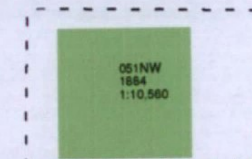
Brecknockshire

Published 1884

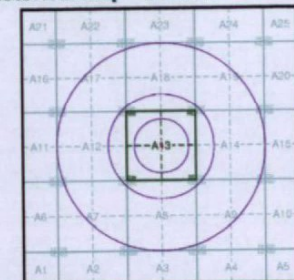
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 70905697_1_1
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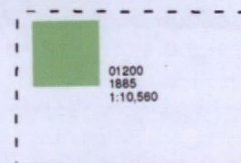
Glamorganshire

Published 1885

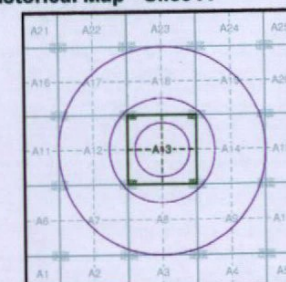
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

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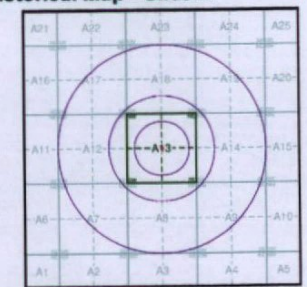
Glamorganshire
Published 1901
Source map scale - 1:10,560

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Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

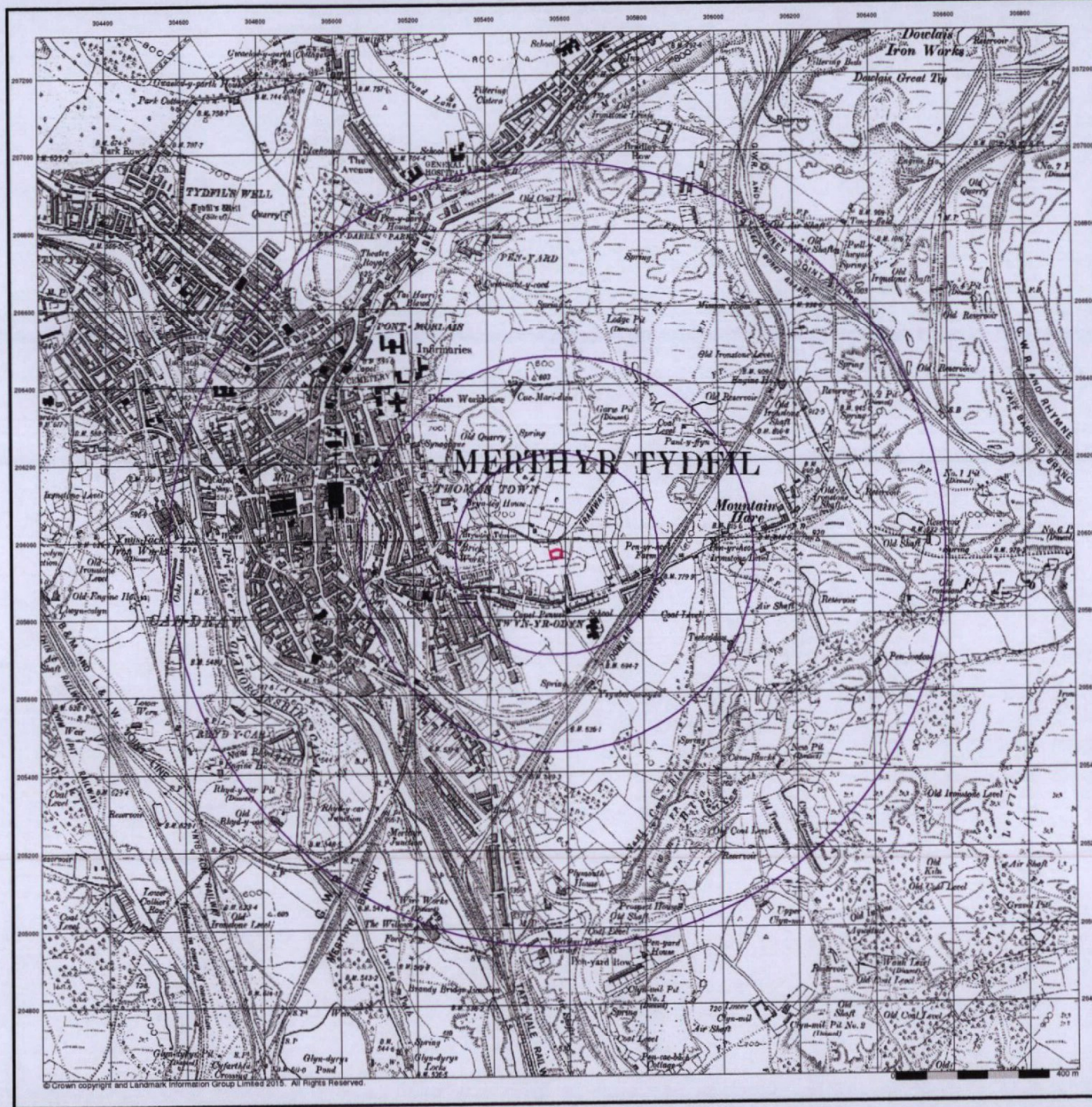
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 Customer Ref: 13319
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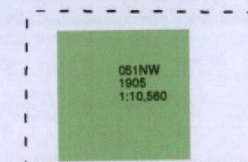
Brecknockshire

Published 1905

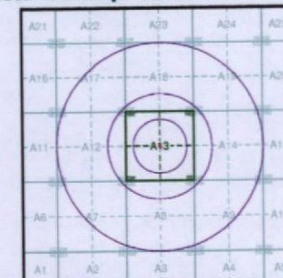
Source map scale - 1:10,560

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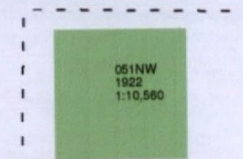


Brecknockshire
Published 1922

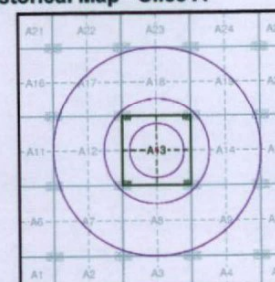
Source map scale - 1:10,560

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Search Buffer (m): 1000

Site Details

Builders Yard, Elwyn Drive, Merthyr Tydfil, CF47 0NJ



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Fax: 0844 844 9951
Web: www.amescheck.co.uk



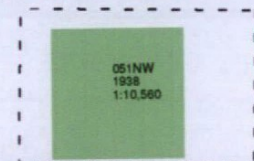
Brecknockshire

Published 1938

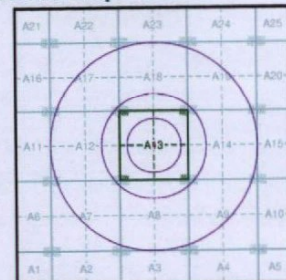
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overlaid with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

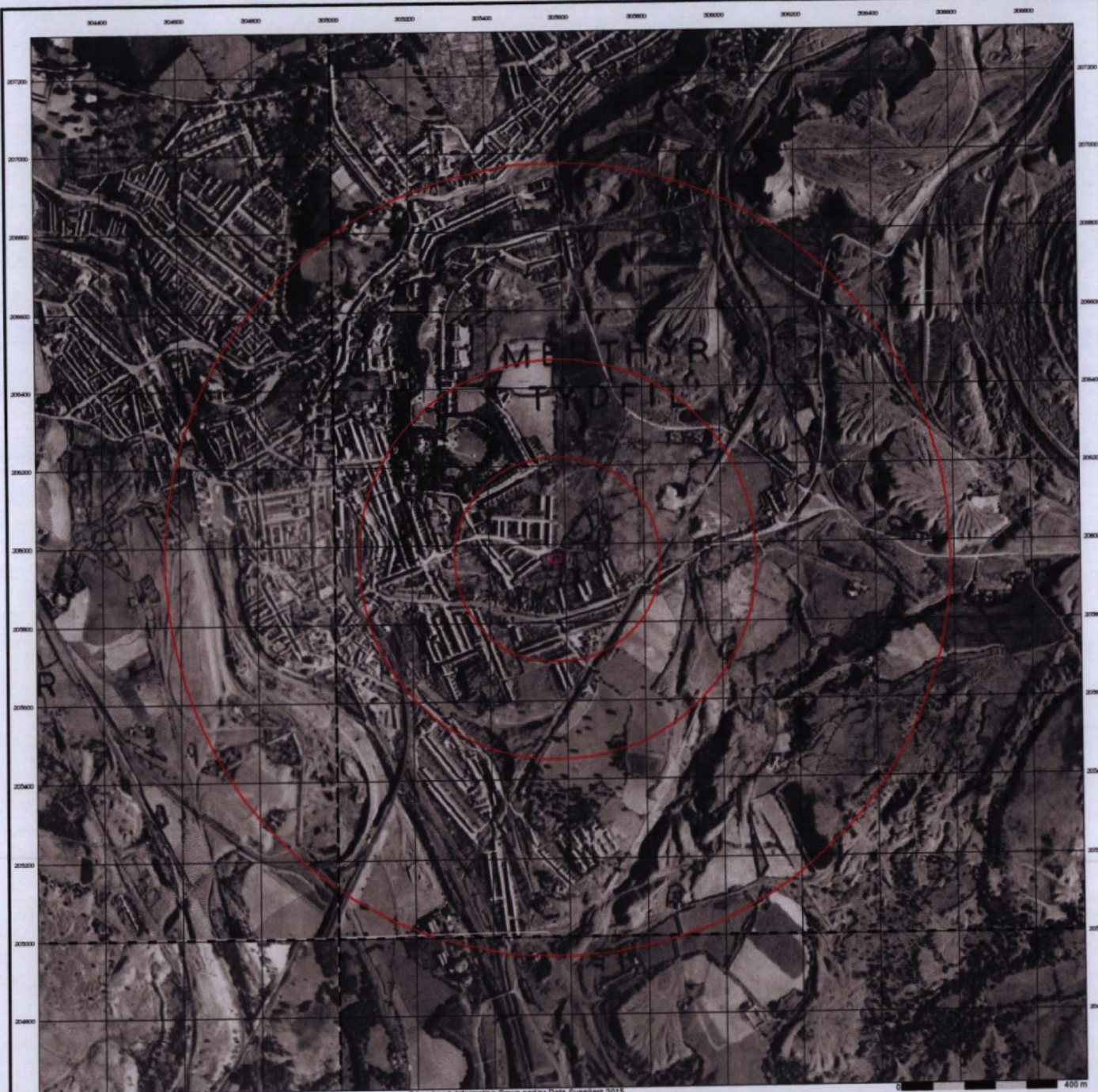
Order Number: 70905697_1_1
 Customer Ref: 13319
 National Grid Reference: 305580, 205960
 Slice: A
 Site Area (Ha): 0.06
 Search Buffer (m): 1000

Site Details

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Historical Aerial Photography Published 1945

Source map scale - 1:10,560

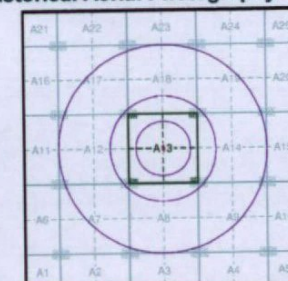
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

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Map Name(s) and Date(s)

SO00NW 1945 1:10,560	SO00NE 1945 1:10,560
SO00SW 1945 1:10,560	SO00SE 1945 1:10,560

Historical Aerial Photography - Slice A



LIBRARY
HS1111B

Order Details

Order Number: 70905697_1_1
Customer Ref: 13319
National Grid Reference: 305580, 205960
Slice: A
Site Area (Ha): 0.06
Search Buffer (m): 1000

Site Details

Builders Yard, Elwyn Drive, Merthyr Tydfil, CF47 0NJ



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Fax: 0844 844 9951
Web: www.envirocheck.co.uk



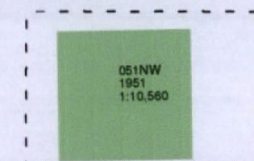
Brecknockshire

Published 1951

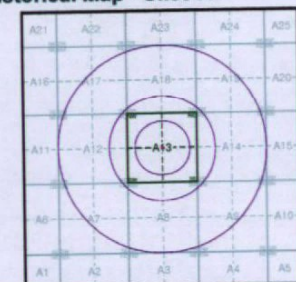
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1934, the OS maps were based on the Cassini projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlining areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid in 1970. The first 1:10,000 scale maps were produced in 1984, using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 70905697_1_1
Customer Ref: 13319
National Grid Reference: 305580, 205960
Slice: A
Site Area (Ha): 0.06
Search Buffer (m): 1000

Site Details

Site Details
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Ordnance Survey Plan

Published 1964 - 1965

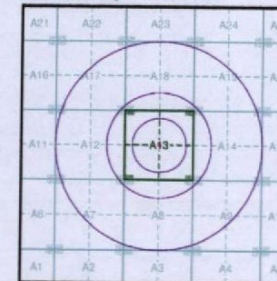
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SO00NW	SO00NE
1965	1965
1:10,560	1:10,560
SO00SW	SO00SE
1964	1964
1:10,560	1:10,560

Historical Map - Slice A



Order Details

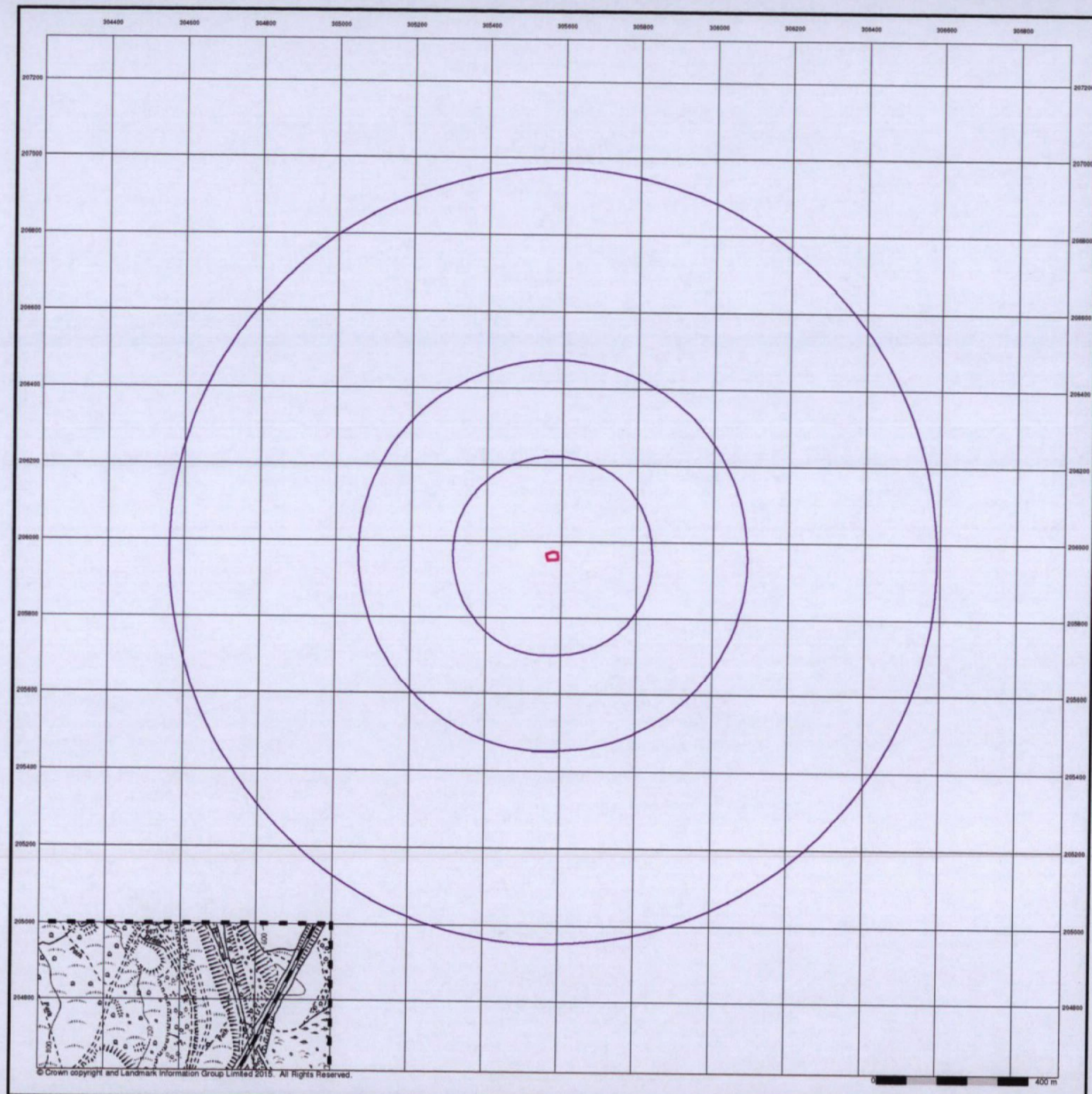
Order Number: 70905697_1_1
 Customer Ref: 13319
 National Grid Reference: 305580, 205960
 Slice: A
 Site Area (Ha): 0.06
 Search Buffer (m): 1000

Site Details

Builders Yard, Elwyn Drive, Merthyr Tydfil, CF47 0NJ



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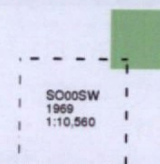
Ordnance Survey Plan

Published 1969

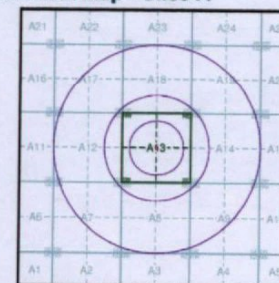
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

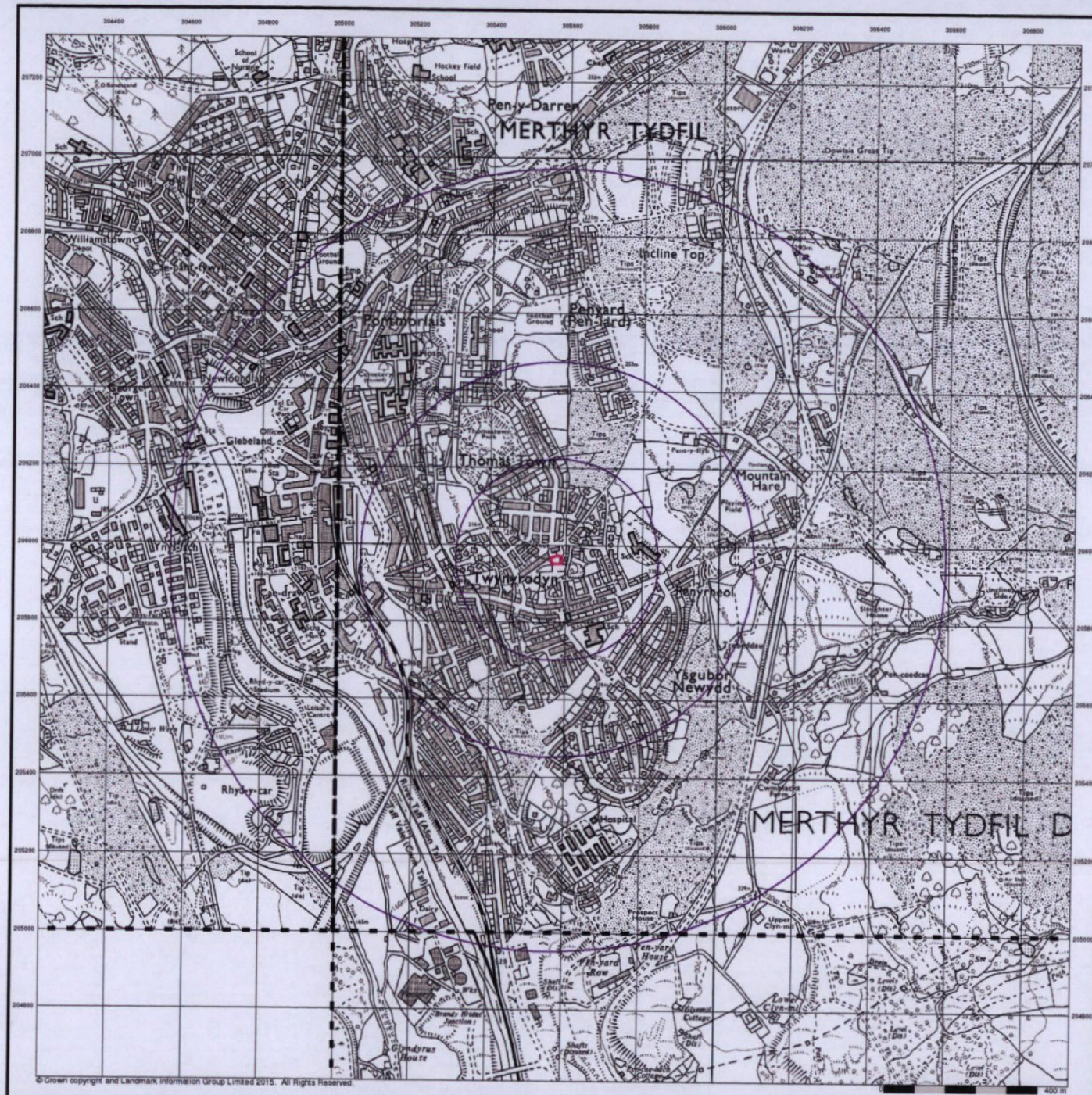
Order Number: 70905697_1_1
 Customer Ref: 13319
 National Grid Reference: 305580, 205960
 Slice: A
 Site Area (Ha): 0.06
 Search Buffer (m): 1000

Site Details

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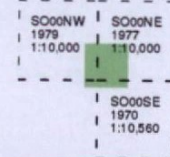
Ordnance Survey Plan

Published 1970 - 1979

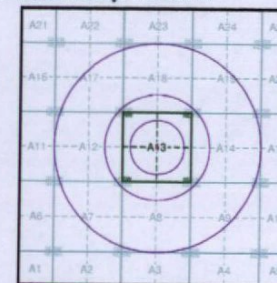
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single country or group of countries being carried out independently in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,560 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

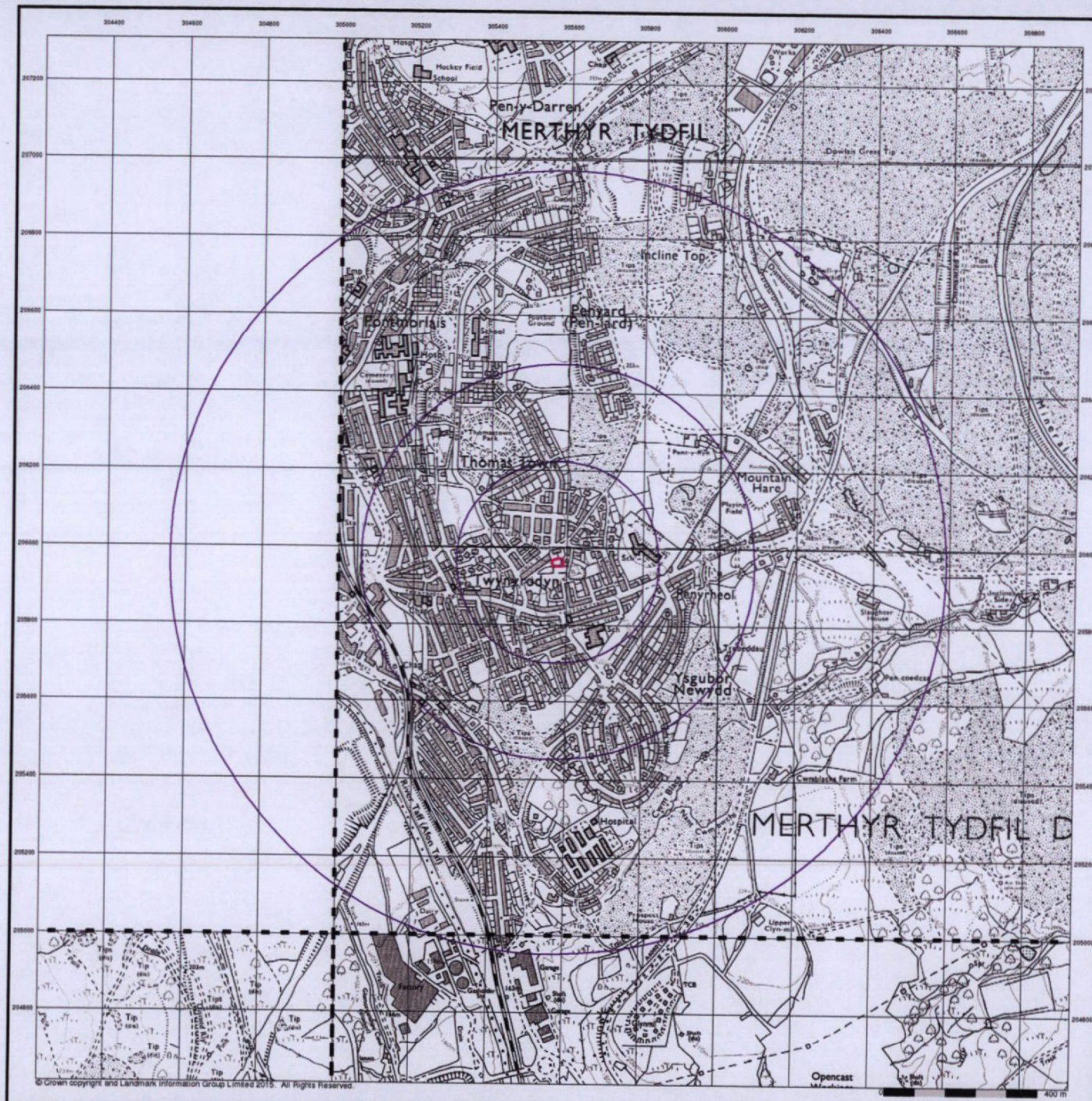
Order Number: 70905697_1_1
Customer Ref: 13319
National Grid Reference: 305580, 205960
Slice: A
Site Area (Ha): 0.06
Search Buffer (m): 1000

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Ordnance Survey Plan Published 1982 - 1989

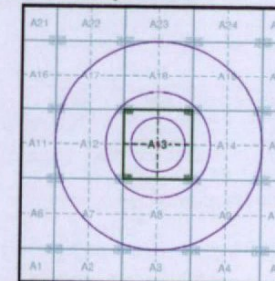
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1954 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SO00NE	1963	1:10,000
SO00SW	1962	1:10,000
SO00SE	1969	1:10,000

Historical Map - Slice A



Order Details

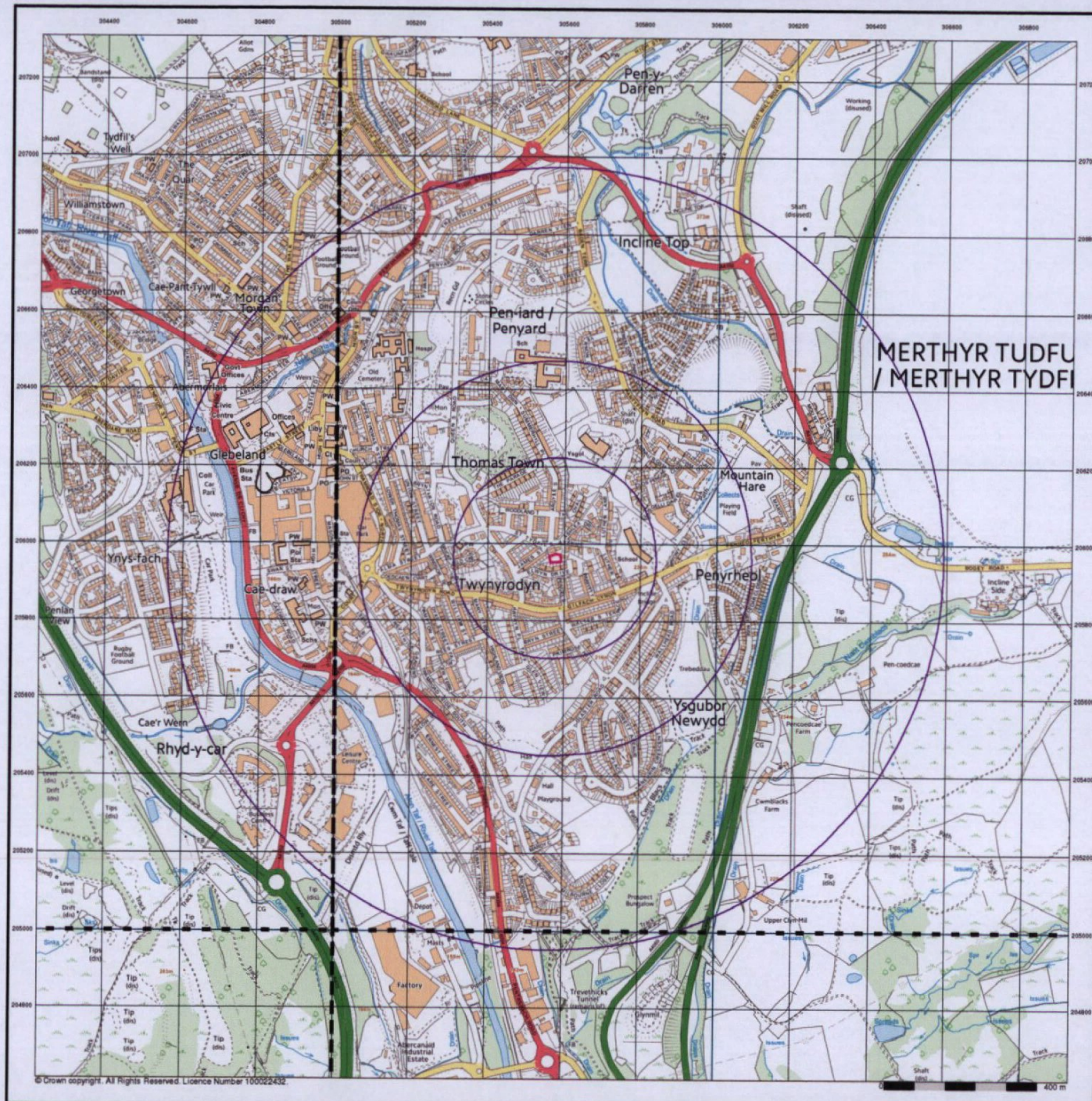
Order Number: 70905897_1_1
Customer Ref: 13319
National Grid Reference: 305580, 205960
Slice: A
Site Area (Ha): 0.06
Search Buffer (m): 1000

Site Details

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VectorMap Local

Published 2015

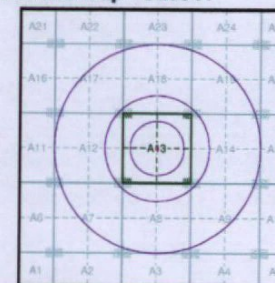
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

SO00NW	SO00NE
2015	2015
Variable	Variable
SO00SW	SO00SE
2015	2015
Variable	Variable

Historical Map - Slice A



Order Details

Order Number: 70905697_1_1
 Customer Ref: 13319
 National Grid Reference: 305580, 205960
 Slice: A
 Site Area (Ha): 0.06
 Search Buffer (m): 1000

Site Details

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Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

70905697_1_1

Customer Reference:

13319

National Grid Reference:

305580, 205960

Slice:

A

Site Area (Ha):

0.06

Search Buffer (m):

1000

Site Details:

Builders Yard

Elwyn Drive

Merthyr Tydfil

CF47 0NJ

Client Details:

Ms L Dow

Terra Firma (Wales) Ltd

5 Deryn Court

Wharfdale Road

Pentwyn

Cardiff

CF23 7HB

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	20
Hazardous Substances	-
Geological	23
Industrial Land Use	37
Sensitive Land Use	-
Data Currency	44
Data Suppliers	49
Useful Contacts	50

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Radon Potential dataset Copyright Notice

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Report Version v49.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1				16
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 4				2
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 5			Yes	
Pollution Incidents to Controlled Waters	pg 5				33
Prosecutions Relating to Authorised Processes					
Prosecutions Relating to Controlled Waters					
Registered Radioactive Substances					
River Quality	pg 10				4
River Quality Biology Sampling Points	pg 11				2
River Quality Chemistry Sampling Points	pg 13				3
Substantiated Pollution Incident Register	pg 15			1	1
Water Abstractions	pg 16				1 (*3)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 16	Yes	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 17	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 17	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Detailed River Network Lines	pg 17			Yes	n/a
Detailed River Network Offline Drainage					n/a

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 20				3
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)	pg 20				2
Licensed Waste Management Facilities (Locations)	pg 21				2
Local Authority Recorded Landfill Sites	pg 21				2
Registered Landfill Sites	pg 22				2
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 23	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 23	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 29			5	31
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
Brine Compensation Area			n/a	n/a	n/a
Coal Mining Affected Areas	pg 35	Yes	n/a	n/a	n/a
Mining Instability	pg 35	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 35	Yes		n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 35	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 35		Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 35	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 35	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 35	Yes		n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries	pg 37		6	9	56
Fuel Station Entries	pg 43				1
Sensitive Land Use					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	Discharge Consents Operator: Dwr Cymru Cyfyngedig Property Type: Sewerage Network - Sewers - Water Company Location: Merthyr Tydfil - Willows Gas W Authority: Natural Resources Wales Catchment Area: River Taff Reference: AN0091001 Permit Version: 1 Effective Date: 20th October 1989 Issued Date: 20th October 1989 Revocation Date: 20th December 2001 Discharge Type: Unspecified Discharge: Freshwater Stream/River Environment: Receiving Water: Taff Status: New Consent, by Application (Water Resources Act 1991, Section 88) Positional Accuracy: Located by supplier to within 100m	A8NW (S)	636	2	305360 205350
2	Discharge Consents Operator: Merthyr Tydfil County Borough Council Property Type: Recreational & Cultural Location: Rhydyar Sports Complex Merthyr T, Merthyr Tydfil Authority: Natural Resources Wales Catchment Area: Not Supplied Reference: Af3031901 Permit Version: 1 Effective Date: 2nd October 1972 Issued Date: 2nd October 1972 Revocation Date: 6th May 2004 Discharge Type: Trade Discharges - Site Drainage Discharge: Freshwater Stream/River Environment: Receiving Water: Taff Status: Revoked (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	674	2	305014 205565
3	Discharge Consents Operator: Atlantic Properties Ltd Property Type: Sewerage Network - Pumping Station - Others Location: Rhyd-Y-Car Leisure Centre Mt, Rhyd-Y-Car, Merthyr Tydfil, Cf48 1ut Authority: Natural Resources Wales Catchment Area: Not Supplied Reference: An0413101 Permit Version: 1 Effective Date: 28th September 2007 Issued Date: 28th September 2007 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Pumping Station - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: River Taff Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	678	2	305112 205448
4	Discharge Consents Operator: Nmc (Uk) Ltd Property Type: Undefined Or Other Location: Afan Taff Htl Rhydyar Merthyr Tyd, Rhydyar Merthyr Tydfil Authority: Natural Resources Wales Catchment Area: River Taff Reference: An0115702 Permit Version: 1 Effective Date: 28th November 1988 Issued Date: 28th November 1988 Revocation Date: 16th January 1995 Discharge Type: Unspecified Discharge: Freshwater Stream/River Environment: Receiving Water: Taff Status: Consent expired Positional Accuracy: Located by supplier to within 10m	A12SW (W)	696	2	304900 205750

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	Discharge Consents Operator: Nmc (Uk) Ltd Property Type: Undefined Or Other Location: Afan Taff Htl Rhydyar Merthyr Tyd, Rhydyar Merthyr Tydfil Authority: Natural Resources Wales Catchment Area: River Taff Reference: An0115701 Permit Version: 1 Effective Date: 28th November 1988 Issued Date: 28th November 1988 Revocation Date: 3rd April 1995 Discharge Type: Unspecified Discharge: Freshwater Stream/River Environment: Receiving Water: Taff Status: Consent expired Positional Accuracy: Located by supplier to within 100m	A12SW (W)	780	2	304800 205800
6	Discharge Consents Operator: Celtic Energy Ltd Property Type: Coal Extraction, Surface Location: Great White Tip Site Authority: Natural Resources Wales Catchment Area: River Taff Reference: An0238701 Permit Version: 1 Effective Date: 10th November 1992 Issued Date: 10th November 1992 Revocation Date: 1st November 1996 Discharge Type: Trade Effluent Discharge: Into And/Or Watercourse Environment: Receiving Water: Culvert To River Taff Status: Consent expired Positional Accuracy: Located by supplier to within 100m	A19SW (NE)	794	2	306191 206489
7	Discharge Consents Operator: Dwr Cymru Cyfyngedig Property Type: Sewerage Network - Sewers - Water Company Location: Cso Avenue De Clichy Merthyr, Merthyr Tydfil Authority: Natural Resources Wales Catchment Area: Not Supplied Reference: An0315501 Permit Version: 1 Effective Date: 10th December 2001 Issued Date: 10th December 2001 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge: Freshwater Stream/River Environment: Receiving Water: River Taff Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A12SW (W)	812	2	304750 205930
8	Discharge Consents Operator: Dwr Cymru Cyfyngedig Property Type: Sewerage Network - Sewers - Water Company Location: Cso Trevithick Monument Merthyr, Merthyr Tydfil Authority: Natural Resources Wales Catchment Area: River Taff Reference: Ae2025307 Permit Version: 2 Effective Date: 8th December 2001 Issued Date: 7th December 2001 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge: Freshwater Stream/River Environment: Receiving Water: Morlais Brook Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A17NE (NW)	821	2	305120 206660

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	Discharge Consents Operator: Dwr Cymru Cyfyngedig Property Type: Sewerage Network - Sewers - Water Company Location: Merthyr Tydfil-Trevethick Monu Peny, Penyard Road Authority: Natural Resources Wales Catchment Area: River Taff Reference: AE2025307 Permit Version: 1 Effective Date: 15th April 1964 Issued Date: 15th April 1964 Revocation Date: 7th December 2001 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge: Freshwater Stream/River Environment: Receiving Water: Morlais Brook Status: New Consent, by Application (Water Resources Act 1991, Section 88) Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	850	2	305130 206700
9	Discharge Consents Operator: Celtic Energy Ltd Property Type: Undefined Or Other Location: Water Tmnt Area Wa (Final) Rec Scme, E Merthyr Rec Scme Tmnt Area Wa, Phase 111a, Merthyr Tydfil Authority: Natural Resources Wales Catchment Area: River Taff Reference: AN0264401 Permit Version: 1 Effective Date: 23rd July 1996 Issued Date: 23rd July 1996 Revocation Date: 2nd October 1997 Discharge Type: Trade Effluent Discharge: Freshwater Stream/River Environment: Receiving Water: Nant Cwm Blacs Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 100m	A14NE (E)	834	2	306420 206045
10	Discharge Consents Operator: Celtic Energy Ltd Property Type: Coal Extraction, Surface Location: Great White Tip Site Authority: Natural Resources Wales Catchment Area: River Taff Reference: An0238702 Permit Version: 1 Effective Date: 10th November 1992 Issued Date: 10th November 1992 Revocation Date: 1st November 1996 Discharge Type: Trade Effluent Discharge: Into And/Or Watercourse Environment: Receiving Water: Culvert And Hence To River Taf Status: Consent expired Positional Accuracy: Located by supplier to within 100m	A19SE (NE)	853	2	306256 206503
11	Discharge Consents Operator: Dwr Cymru Cyfyngedig Property Type: Sewerage Network - Sewers - Water Company Location: Cso College Car Pk Merthyr Tydfil, Cso College Car Park Authority: Natural Resources Wales Catchment Area: River Taff Reference: An0091401 Permit Version: 2 Effective Date: 31st March 2002 Issued Date: 17th July 2001 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge: Freshwater Stream/River Environment: Receiving Water: Taff Status: Varied by Application - (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A12NW (W)	854	2	304710 206040

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	Discharge Consents Operator: Dwr Cymru Cyfyngedig Property Type: Sewerage Network - Sewers - Water Company Location: Merthyr - Rear Of Eastfield Te Authority: Natural Resources Wales Catchment Area: River Taff Reference: AE2025309 Permit Version: 1 Effective Date: 15th April 1964 Issued Date: 15th April 1964 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge: Freshwater Stream/River Environment: Receiving Water: Taff Status: New Consent, by Application (Water Resources Act 1991, Section 88) Positional Accuracy: Located by supplier to within 100m	A12SW (W)	854	2	304750 205700
13	Discharge Consents Operator: Dwr Cymru Cyfyngedig Property Type: Sewerage Network - Sewers - Water Company Location: Merthyr Tydfil - Ave De Clichy Authority: Natural Resources Wales Catchment Area: River Taff Reference: AN0091501 Permit Version: 1 Effective Date: 20th October 1989 Issued Date: 20th October 1989 Revocation Date: 28th March 2002 Discharge Type: Unspecified Discharge: Freshwater Stream/River Environment: Receiving Water: Taff Status: Revoked (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 100m	A12NW (W)	868	2	304720 206180
14	Discharge Consents Operator: Dwr Cymru Cyfyngedig Property Type: Education Location: Merthyr Tydfil - Further Educa Carp, Carpk Authority: Natural Resources Wales Catchment Area: River Taff Reference: AN0091401 Permit Version: 1 Effective Date: 20th October 1989 Issued Date: 20th October 1989 Revocation Date: 30th March 2002 Discharge Type: Unspecified Discharge: Freshwater Stream/River Environment: Receiving Water: Taff Status: New Consent, by Application (Water Resources Act 1991, Section 88) Positional Accuracy: Located by supplier to within 100m	A12NW (W)	896	2	304680 206130
15	Discharge Consents Operator: Celtic Energy Ltd Property Type: Undefined Or Other Location: Water Tmnt Area Wa (Storm) Rec Scme, E Merthyr Rec Scme Tmnt Area Wa, Phase 111a, Merthyr Tydfil Authority: Natural Resources Wales Catchment Area: River Taff Reference: AN0264402 Permit Version: 1 Effective Date: 23rd July 1996 Issued Date: 23rd July 1996 Revocation Date: 2nd October 1997 Discharge Type: Trade Effluent Discharge: Freshwater Stream/River Environment: Receiving Water: Nant Cwm Blacs Status: Authorisation revokedRevoked Positional Accuracy: Unknown	A14NE (E)	928	2	306515 206038
16	Local Authority Pollution Prevention and Controls Name: Star Texaco Location: 3-3a Lower High Street, Methyr Tydfil Authority: Merthyr Tydfil County Borough Council, Environmental Health Department Permit Reference: PPC/PG1.14/04/10 Dated: 1st March 1999 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station Status: Permitted Positional Accuracy: Manually positioned to the address or location	A12SE (SW)	545	3	305081 205703

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
17	Local Authority Pollution Prevention and Controls Name: British Coal Opencast Location: Incline Top Opencast Site, Goatmill Road, MERTHYR TYDFIL, Mid Glamorgan, CF48 3TD Authority: Merthyr Tydfil County Borough Council, Environmental Health Department Permit Reference: PG (3)/5(91)-1 Dated: 26th February 1993 Process Type: Local Authority Pollution Prevention and Control Description: PG3/5 Coal, coke and coal product processes Status: Authorisation revokedRevoked Positional Accuracy: Located by supplier to within 10m	A19SW (NE)	711	3	305920 206601
	Nearest Surface Water Feature	A13NE (E)	300	-	305886 206017
18	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Goat Mill Road Authority: Environment Agency, Welsh Region Pollutant: Unknown Note: Not Supplied Incident Date: 13th March 1997 Incident Reference: 31912 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14NW (E)	652	4	306200 206200
19	Pollution Incidents to Controlled Waters Property Type: Not Given Location: At Footbridge, Near The Weir Authority: Environment Agency, Welsh Region Pollutant: Unknown Note: Not Supplied Incident Date: 28th May 1997 Incident Reference: 32500 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	662	4	305200 205400
20	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Stream, Underneath, PENTREBACH Authority: Environment Agency, Welsh Region Pollutant: Light Oil Note: Not Supplied Incident Date: 20th January 1992 Incident Reference: 1901 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	665	4	305001 205601
21	Pollution Incidents to Controlled Waters Property Type: Not Given Location: St Tydfil Court Authority: Environment Agency, Welsh Region Pollutant: Rubble/Litter Or Solids Note: River Taff Incident Date: 5th February 1998 Incident Reference: 34791 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Neglect Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12SW (W)	696	4	304900 205750

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
21	Pollution Incidents to Controlled Waters Property Type: Road Location: A470 Roadscheme, ABERCANAIID Authority: Environment Agency, Welsh Region Pollutant: Rubble/Litter Or Solids Note: Accidental Spillage/Leakage Incident Date: 2nd October 1995 Incident Reference: 26254 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Runoff Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12SW (W)	712	4	304900 205700
22	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Up Stream Of Rhydyar, Road Bridge Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Not Supplied Incident Date: 23rd March 1995 Incident Reference: 24240 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	704	4	305001 205531
22	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Rhydyar Leisure Centre Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Not Supplied Incident Date: 11th June 1997 Incident Reference: 32967 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	719	4	304970 205550
22	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Rhydyar Leisure Centre Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: River Taff Incident Date: 11th June 1997 Incident Reference: 32967 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	721	4	304970 205545
23	Pollution Incidents to Controlled Waters Property Type: Road (Lost Load) Location: Bogey Road, Roundabout, MERTHYR TYDFIL Authority: Environment Agency, Welsh Region Pollutant: Crude Sewage Note: Accidental Spillage/Leakage Incident Date: 15th May 1995 Incident Reference: 24189 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Burst Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A14NE (E)	722	4	306300 206100
24	Pollution Incidents to Controlled Waters Property Type: Road Location: Merthyr Weir Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Deliberate Act Incident Date: 25th March 1995 Incident Reference: 23038 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Direct Discharge Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	762	4	304800 206000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
25	Pollution Incidents to Controlled Waters Property Type: Industrial Premises Location: Bridge At, Technical Authority: Environment Agency, Welsh Region Pollutant: Miscellaneous - Fire water / Foam Note: Not Supplied Incident Date: 11th March 1995 Incident Reference: 23452 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Direct Discharge Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	812	4	304750 206000
25	Pollution Incidents to Controlled Waters Property Type: Building Sites Location: Down Stream Of Glass Road, Bridge Opposite, Town Hall Authority: Environment Agency, Welsh Region Pollutant: Sewage - Septic Tank Effluent Note: Poor Operational Practise Incident Date: 4th April 1992 Incident Reference: 3478 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Effluent Discharge Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	862	4	304700 206000
25	Pollution Incidents to Controlled Waters Property Type: Building Sites Location: Weir Pool By, Glass Bridge Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Poor Operational Practise Incident Date: 4th April 1992 Incident Reference: 3478 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Effluent Discharge Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	862	4	304700 205995
26	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Theatre Royal Authority: Environment Agency, Welsh Region Pollutant: Unknown Note: Not Supplied Incident Date: 1st December 1994 Incident Reference: 22063 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	817	4	305200 206700
27	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Weir At Merthyr College Authority: Environment Agency, Welsh Region Pollutant: Light Oil Note: Not Supplied Incident Date: 26th March 1997 Incident Reference: 31800 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	821	4	304750 206095
28	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Merthyr Below, Fire Station Authority: Environment Agency, Welsh Region Pollutant: Unknown Note: Not Supplied Incident Date: 18th April 1992 Incident Reference: 3837 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	822	4	304750 206100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
28	Pollution Incidents to Controlled Waters Property Type: Road Location: Opposite College, By Footbridge Authority: Environment Agency, Welsh Region Pollutant: Light Oil Note: Inadequate Design/Capacity Incident Date: 20th March 1995 Incident Reference: 22990 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Direct Discharge Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	866	4	304705 206095
28	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Weir In, MERTHYR Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Not Supplied Incident Date: 1st May 1996 Incident Reference: 28200 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	867	4	304705 206100
28	Pollution Incidents to Controlled Waters Property Type: Road Location: Opposite Fire Station Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Inadequate Design/Capacity Incident Date: 20th March 1995 Incident Reference: 22990 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Direct Discharge Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	867	4	304705 206105
28	Pollution Incidents to Controlled Waters Property Type: Road Location: Merthyr Town Centre, Down Stream Of Weir Authority: Environment Agency, Welsh Region Pollutant: Cement/Mortar Note: Inadequate Design/Capacity Incident Date: 15th March 1995 Incident Reference: 23528 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Leakage Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	871	4	304700 206095
28	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Webley Hotel, MERTHYR Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Not Supplied Incident Date: 1st May 1996 Incident Reference: 28200 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	872	4	304700 206105
28	Pollution Incidents to Controlled Waters Property Type: Road Location: Merthyr College, Car Park Authority: Environment Agency, Welsh Region Pollutant: Farm Effluent/Slurry Note: Accidental Spillage/Leakage Incident Date: 27th March 1995 Incident Reference: 23459 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Direct Discharge Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	872	4	304700 206100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
29	Pollution Incidents to Controlled Waters Property Type: Not Given Location: At Rear Of Caslte Cinema Car Park Authority: Environment Agency, Welsh Region Pollutant: Crude Sewage Note: Blockage Incident Date: 11th April 1997 Incident Reference: 32011 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Overflow Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	876	4	304800 206400
30	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Near Rhydycar Leisure Centre Authority: Environment Agency, Welsh Region Pollutant: Crude Sewage Note: Poor Management Control Incident Date: 4th July 1996 Incident Reference: 29076 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Leakage Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12SW (W)	902	4	304700 205700
31	Pollution Incidents to Controlled Waters Property Type: Not Given Location: MERTHYR TYDFIL Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Inadequate Design/Capacity Incident Date: 7th April 1992 Incident Reference: 3973 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Overflow Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	915	4	304650 206050
32	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Confluence With Taff Authority: Environment Agency, Welsh Region Pollutant: Unknown Note: Not Supplied Incident Date: 1st January 1996 Incident Reference: 26989 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	922	4	304700 206295
32	Pollution Incidents to Controlled Waters Property Type: Water Company Sewage: Storm Overflow Location: Below Fire Station, MERTHYR Authority: Environment Agency, Welsh Region Pollutant: Crude Sewage Note: Blocked Sewer Incident Date: 18th September 1995 Incident Reference: 26097 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Overflow Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	923	4	304700 206300
33	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Weir, MERTHYR Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Emergency Overflow Incident Date: 14th March 1995 Incident Reference: 23539 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Runoff Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	957	4	304605 205995

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Merthyr-College, Car Park Authority: Environment Agency, Welsh Region Pollutant: Light Oil Note: Not Supplied Incident Date: 14th March 1995 Incident Reference: 23537 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	962	4	304600 206000
33	Pollution Incidents to Controlled Waters Property Type: Not Given Location: MERTHYR Authority: Environment Agency, Welsh Region Pollutant: Sewage - Treated Effluent Note: Emergency Overflow Incident Date: 14th March 1995 Incident Reference: 23539 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Runoff Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	962	4	304600 205995
34	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Opposite Fire Station Authority: Environment Agency, Welsh Region Pollutant: Mud/Clay/Soil Note: Natural Occurrence Incident Date: 13th May 1997 Incident Reference: 32501 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Direct Discharge Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	964	4	304700 206400
35	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Down Stream Fire Station, MERTHYR Authority: Environment Agency, Welsh Region Pollutant: Light Oil Note: Weather Incident Date: 26th March 1997 Incident Reference: 31900 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Runoff Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	970	4	304600 206100
36	Pollution Incidents to Controlled Waters Property Type: Land Location: Town Car Park Authority: Environment Agency, Welsh Region Pollutant: Contaminated Groundwater Note: Poor Operational Practise Incident Date: 15th April 1991 Incident Reference: 255 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Runoff Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SW (W)	975	4	304660 206340
	River Quality Name: Taff GQA Grade: River Quality A Reach: Conf.Nant Rhyd'R-Conf.Morlais Estimated Distance 1.1 (km): Flow Rate: Flow less than 5 cumecs Flow Type: River Year: 2000	A7NE (SW)	607	4	305071 205600

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	River Quality Name: Taff GQA Grade: River Quality A Reach: Conf.Nant Cannaid-Nant Rhyd Y Car Estimated Distance 1.5 (km): Flow Rate: Flow less than 5 cumecs Flow Type: River Year: 2000	A7NE (SW)	607	4	305071 205600
	River Quality Name: Nant Morlais GQA Grade: River Quality C Reach: Conf.Taff - Conf.Goitre Bk Estimated Distance 1 (km): Flow Rate: Flow less than 0.62 cumecs Flow Type: River Year: 2000	A17NE (NW)	838	4	305193 206720
	River Quality Name: Nant Morlais GQA Grade: River Quality C Reach: Conf.Goitre Bk.-Headwaters Estimated Distance 2.4 (km): Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A18NW (N)	875	4	305365 206821
37	River Quality Biology Sampling Points Name: Taff Reach: Confluence Nant Cannaid To Nant Rhyd Y Car Estimated Distance: 1.50 Positional Accuracy: Located by supplier to within 100m Year: 1990 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 1995 GQA Grade: River Quality Biology GQA Grade B - Good Year: 2000 GQA Grade: River Quality Biology GQA Grade B - Good Year: 2002 GQA Grade: River Quality Biology GQA Grade Not Supplied Year: 2003 GQA Grade: River Quality Biology GQA Grade Not Supplied Year: 2004 GQA Grade: River Quality Biology GQA Grade B - Good Year: 2005 GQA Grade: River Quality Biology GQA Grade B - Good Year: 2006 GQA Grade: River Quality Biology GQA Grade B - Good Year: 2007 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2008 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2009 GQA Grade: River Quality Biology GQA Grade C - Fairly Good	A7NE (SW)	649	4	305100 205500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
38	River Quality Biology Sampling Points Name: Morlais Reach: Confluence River Taff To Confluence Goitre Brook Estimated Distance: 1.00 Positional Accuracy: Located by supplier to within 100m Year: 1990 GQA Grade: River Quality Biology GQA Grade E - Poor Year: 1995 GQA Grade: River Quality Biology GQA Grade E - Poor Year: 2000 GQA Grade: River Quality Biology GQA Grade D - Fair Year: 2002 GQA Grade: River Quality Biology GQA Grade Not Supplied Year: 2003 GQA Grade: River Quality Biology GQA Grade Not Supplied Year: 2004 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2005 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2006 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2007 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2008 GQA Grade: River Quality Biology GQA Grade C - Fairly Good Year: 2009 GQA Grade: River Quality Biology GQA Grade C - Fairly Good	A18NW (N)	873	4	305300 206800

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
39	River Quality Chemistry Sampling Points Name: Taff Reach: Confluence Nant Rhyd'R To Confluence Morlais Estimated Distance: 1.10 Objective: Not Supplied Positional Accuracy: Located by supplier to within 10m Year: 1990 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 1993 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1994 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1995 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1996 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 1997 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 1998 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 1999 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2000 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2001 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2002 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2003 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2004 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2005 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2006 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2007 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2008 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2009 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied	A7NE (SW)	666	4	304988 205621

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
40	River Quality Chemistry Sampling Points Name: Nant Morlais Reach: Confluence River Taff To Confluence Goitre Brook Estimated Distance: 1.00 Objective: Not Supplied Positional Accuracy: Located by supplier to within 10m Year: 1990 GQA Grade: River Quality Chemistry GQA Grade D - Fair Compliance: Not Supplied Year: 1993 GQA Grade: River Quality Chemistry GQA Grade D - Fair Compliance: Not Supplied Year: 1994 GQA Grade: River Quality Chemistry GQA Grade E - Poor Compliance: Not Supplied Year: 1995 GQA Grade: River Quality Chemistry GQA Grade E - Poor Compliance: Not Supplied Year: 1996 GQA Grade: River Quality Chemistry GQA Grade E - Poor Compliance: Not Supplied Year: 1997 GQA Grade: River Quality Chemistry GQA Grade D - Fair Compliance: Not Supplied Year: 1998 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1999 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 2000 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 2001 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 2002 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 2003 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2004 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 2005 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 2006 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 2007 GQA Grade: River Quality Chemistry GQA Grade D - Fair Compliance: Not Supplied Year: 2008 GQA Grade: River Quality Chemistry GQA Grade E - Poor Compliance: Not Supplied Year: 2009 GQA Grade: River Quality Chemistry GQA Grade E - Poor Compliance: Not Supplied	A17SE (NW)	817	4	304909 206459