

Paul Downing & Associates Ltd

H5 Site Condition Report for
Tomlinson's Dairy, Unit D, Five
Crosses Industrial Estate,
Wrexham, LL11 3RD

Version 1.0

In support of Application Reference: PPN-00061

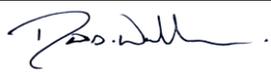
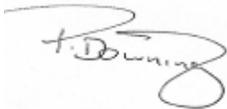
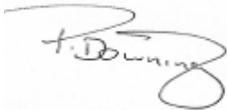
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1. Executive Summary

Paul Downing & Associates Ltd was commissioned to produce a site condition report (SCR) in support of a bespoke permit application PPN-00061 for Tomlinson's Dairy, Unit D, Five Crosses Industrial Estate, Wrexham, LL11 3RD under the Environmental Permitting Regulations 2014.

The aim of this report was to identify the baseline conditions with regards to soil and groundwater contamination by carrying out a site visit and review of literature and additional relevant data and reports.

The site is located in the Five Crosses Industrial Estate, 10km north west Wrexham in Wales. The surrounding land use is made up of a commercial and industrial properties and agricultural land the former great western railway line runs west of the site.

The site surface is made up of hard standing and there is a dedicated drainage system in place.

A review of the geology, hydrogeology, hydrology and environmental constraints such as SSSIs was carried out. The site has not had a long industrial past, remaining agricultural land up until the 1970s and, since then, the estate has undergone several phases of development. A ground investigation, reported in 2004, was also reviewed and its results incorporated in this report.

The site is located within 2km of two SSSIs and there are SACs and Ancient Woodlands in the surrounding area. The geology underlying the site is made up of Glacial Till overlying the Pennine Coal Formation, Unproductive Strata overlying a Secondary A Aquifer.

A source pathway receptor model was applied to understand the potential risks of processes on site to the environment based on the current land use and reported condition.

There is no evidence of widespread significant land contamination beneath this site based on the information collated for this report and the presence of hard standing, combined with low permeability geology, greatly reduces the potential for leaching. The report of 2004 did not indicate any soils contamination in excess of the Soil Guideline Values. The key potential risks identified in this report relate to fugitive liquid emissions escaping off site through the lagoon drainage system.

By implementing the correct environmental management systems on site the potential impacts associated with continued operation would not be considered significant.

This report has been produced solely for H5 SCR purposes of supporting a bespoke permit application PPN-00061 for Tomlinson's Dairy Ltd. Paul Downing & Associates Ltd is not liable for any other use of its contents other than those listed in this report nor for use by any other 3rd party other than Tomlinson's Dairy Ltd.

2. Introduction

1.1 Scope of Work

Paul Downing & Associates Ltd was commissioned to produce a site condition report (SCR) in support of bespoke permit application PPN-00061 for Tomlinson's Dairy, Unit D, Five Crosses Industrial Estate, Wrexham, LL11 3RD under the Environmental Permitting Regulations 2014.

The aim of this report was to identify the baseline conditions with regards to soil and groundwater contamination by carrying out a site visit and review of literature and additional relevant data and reports.

1.2 Background

The Client has requested that a bespoke permit application be submitted for the area of land identified in Figure 1, Annex A.

The report has been written in accordance with the Natural Resources Wales's H5 guidance for producing an SCR and comprises a site walkover, review of previous reports, Groundsure data (GS3343997) and involved discussions with the Natural Resources Wales. This report has also been completed in accordance to BS 10175:2011 – "Investigation of Potentially Contaminated Sites", code of practice and CLR 11 – "model procedures for the management of contaminated land".

The work undertaken for this SCR comprises:

- a site walkover assessment;
- a review of the historical land uses associated with the site to assess the potential for ground contamination;
- a review of the environmental setting to assess the sensitivity of the surrounding environment to contamination/pollution;
- consultation with the regulatory authorities to establish whether there are any significant environmental issues that may impact upon the site;
- a review of the "Groundsure" Site check report dated 03/10/2016 ref GS3343997; and
- A review of additional publically and commercially available reports and data sets.

The environmental risk assessment presented within this report has been prepared having regard to the source-pathway-receptor model introduced under Part IIA of the Environmental Protection Act 1990 and associated guidance on contaminated land published by the Department of Environment, Food and Rural Affairs. The methodology is essentially a qualitative assessment based on the identification and evaluation of potential 'source-pathway-receptor pollutant linkages'. On the basis of this risk assessment, consideration has been given to the potential for the site to be designated as 'contaminated land' (under the local authority contaminated land inspection strategy) as defined in Part IIA of the Environmental Protection Act 1990.

This report has been produced solely for H5 SCR purposes of supporting the bespoke permit application PPN-00061 for Tomlinson's Dairy. Paul Downing & Associates Ltd is not liable for any other use of its contents other than those listed in this report nor for use by any other 3rd party than Tomlinson's Dairy Ltd.

A statement of limitations is presented at the end of this report.

2 Site Setting

2.1 Site Location

The site is situated at Unit D of the Five Crosses Industrial Estate 10km north west of Wrexham on the outskirts of Coedpoeth east of Minera.

The site is located at National Grid Reference: (SJ) 327762 352256 Unit D, Five Crosses Industrial Estate, Wrexham, LL11 3RD. The site is on a slope with a fall from west to east at an elevation of approximately 240 metres Above Ordnance Datum (mAOD) and covers an area of 3.98 Hectares.

The site boundary under consideration in this report is presented in Figure 1 in Annex A.

2.2 Surrounding Land Use

The surrounding land use is made up of a mix of industrial units and agriculture. The B5430 road to Southsea runs along the western and southern boundary of the industrial estate and the Gwernygaseg Road bounds the east of the estate. The industries and industrial facilities located in close proximity include:

- An electrical substation;
- Engineering Services;
- Bus and Coach Stations, Depots and Companies; and
- Fuel distributors and suppliers.

North of the site is agricultural land where there are pylons that convey power cables over the site from north east to south west.

2.3 Site Layout - Operations and Infrastructure

The site is an operational dairy that receives, heats and bottles milk prior to shipping via road haulage tankers. There are several buildings on site and it has undergone phases of extension in previous years. There are electrical substations, transformers and oils securely stored on site.

All drains inside the main buildings connect to foul water drainage and externally, rainfall and surface water, is directed to a surface water lagoon prior to discharging into a stream. The layout and drainage details are presented in Figures 2a to 2d. There are two Class II Oil Separators on site and a combined sewer that runs north to south across the eastern area.

All milk silos on site are bunded in accordance with Best Available Techniques guidance with high level alarms to prevent overflowing and automatic cut offs. Milk delivery lines are blown dry after each tanker delivery and the delivery bay can accept 4 tankers at one time.

All Cleaning In Place (CIP) systems are directed to foul water under a trade effluent discharge consent with Welsh Water.

3 Site History

The site is located under the Wrexham County Borough Council Planning Authority¹ and a review of planning applications and historical maps of the site are described below and presented in Annex C.

3.1 Planning History

There are 21 records of planning applications associated with the postcode LL11 3RD and the most recent ten are shown below in table 3.1.

Table 3.1 Planning History based on LL11 3RD

Application Description	Location	Reference
Phase 3 - Extension Of Existing Blow Moulding Building And Associated Landscaping	Tomlinsons Dairies Five Crosses Industrial Estate Minera Wrexham	P/2016/0740
Phase 2 - Extension Of The Existing Main Dairy Building To Provide Additional Cold Storage, Trolley Return And Packaging Storage, Replacement Of Existing Raw Milk Silos, Extension To Existing Hardstanding To Facilitate Hgv Circulation, Manoeuvring An	Tomlinsons Dairies Five Crosses Industrial Estate Minera Wrexham	P/2016/0739
Erection Of Building For Tyre Fitting And Storage (Adjoining Sub Station)	Unit 26 Five Crosses Industrial Estate Minera Wrexham	P/2016/0705
Phase 1 - Extension To The Main Dairy Building To Provide Additional Cold Storage, Trolley Return And Office Accomodation And Extension To Existing Hardstanding To Facilitate Vehicle Circulation, Vehicle Manoeuvring And Temporary Parking Spaces For	Tomlinsons Dairies Five Crosses Industrial Estate Minera Wrexham	P/2016/0646
Application For Prior Approval For The Siting And Appearance Of Proposed Telecommunications Installation Upgrade And Associated Works	Telecommunications Mast Ruthin Road Minera Wrexham	P/2016/0543
Relaxation Of Condition No 1 Imposed Under Planning Permission P/2011/0339 To Allow A Further Five Years For Development To Be Commenced (Erection Of 3 No Buildings Containing 11 No Two Storey Class B1, B2 And B8 Office / Workshop Units With Associated Ac	Land At Minera Building Supplies Five Crosses Industrial Estate Minera Wrexham	P/2016/0391
Erection Of Building To Allow Under Cover Parking Of Coaches	Units 7 To 8 Five Crosses Industrial Estate Minera Wrexham	P/2016/0028
Application For Approval Of Details Reserved By Conditions Imposed Under Planning Permission P2015/0377:Condition 8 - Submission Of A Management Plan To Consider Proposed Outdoor Working Practices In Relation To Controlling Potential Sources Of Noise An	Tomlinsons Dairies Five Crosses Industrial Estate Minera Wrexham	P/2015/0911
Erection Of Canopy To Provide New Spray Booth And Associated Plant Booth	Auto Kraft Unit 35A Five Crosses Industrial Estate Mkinera Wrexham	P/2015/0553
Erection Of Single Storey Section Building (12.235 M Long X 6.055 M Wide) To Be Used As Ancillary Offices In Connection With 34 Five Crosses Industrial Estate	Armon Limited Unit 34 Five Crosses Industrial Estate Minera Wrexham	P/2015/0539

Four of the most recent planning applications associated with this postcode are in relation to the Dairy itself.

¹<http://planning.wrexham.gov.uk/Planning>

3.2 Historical Mapping

Historical maps have been collated dating back to 1872 and these are presented in Annex C.

Based on the historical maps a summary of the site's key development over time is given in Table 3.2:

Table 3.2: Summary of key developments shown in historical maps

Date	Key Features
1872	The site is made up of agricultural fields with the Wrexham and Minera branch of the Great Western Railway passing west of the site. There is a small pond on site and drainage is managed by ditches at field boundaries.
1900	This map shows an old shaft south of the site and remnants of former works.
1962	The fields in the north are shown on the mapping as marshland.
1976	There is no development or changes on site until the 1976 map that shows the existing power cables and pylons crossing the site.
1989	The old shaft and remnants of workings are no longer shown on and have been covered by the trading estate.
2010/2014	The site remains unchanged and undeveloped until the 2014 map that shows two buildings in the south west corner of the site on the northern boundary of the Five Crosses Industrial Estate.

Other than the development of the trading and industrial estate in the 1970s there has been very little development on or near the site throughout its history.

4 Environmental Setting

4.1 Geology

The geology has been determined from the British Geological Survey Map App² and the Groundsure Report (Annex D) which is derived from the BGS 1:50,000 Digital Geological Map of Great Britain.

The geology on site is made up of superficial deposits overlying bedrock. The superficial deposits are described as Till formed up to 2 million years ago in the Quaternary Period. These rocks were formed in cold periods with Ice Age glaciers scouring the landscape and depositing moraines of till with outwash sand and gravel deposits from seasonal and post glacial meltwaters.

The bedrock is the Pennine Lower Coal Measures Formation and Pennine Middle Coal Measures Formation (undifferentiated). These are sedimentary beds formed approximately 309 to 313 million years ago in the Carboniferous Period. Deposition occurred in swamps, estuaries and deltas and these rocks were formed in marginal coastal plains with lakes and swamps periodically inundated by the sea; or estuaries and deltas and shallow seas.

A nearby borehole located at NGR (SJ) 327590 352010 drilled in 1977 encountered 16.5m of Glacial Till and was abandoned due to slow progress. No groundwater was encountered during drilling this borehole.

4.2 Hydrology & Surface Water Features

There are 18 Detailed River Networks located within 500m of the site and these are mainly associated with the on site and nearby network of drains, classified as Tertiary Rivers. The closest Primary River is River Gwenfro 192m north east of the site.

² <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

There are no surface water abstractions licensed within 2000m of the site and no biological or chemical monitoring data sets. The surface water features identified in Annex D are shown in Figure 3.

4.3 Hydrogeology

Based on the Groundsure data the site is underlain by Unproductive Strata overlying a Secondary A Aquifer. The aquifers are designated based on their perceived vulnerability and Unproductive Strata, relating to the Glacial Till, consists of deposits with low permeability that have negligible significance for water supply or river base flow.

Secondary A aquifers, represented by the Pennine Coal Measures, are made up from Permeable layers capable of supporting water supplies at a local rather than strategic scale, in some cases, forming an important source of base flow to rivers.

The soils on site are considered to have a low leaching potential meaning pollutants are unlikely to penetrate the soil layer because water movement is impeded by the low permeability of the geology and/or has the ability to attenuate diffuse pollutants.

There are two historical groundwater abstraction licences located between 848 and 1173m south west of the site. They were both used for potable water supply and were licensed to Dee Valley Water Plc.

The site does not lie in any Source Protection Zones at surface or at depth beneath the confining layer of Glacial Till. Groundwater flow direction in the Pennine Formation is not known however it is likely to be driven by the geometry of the bedding planes.

4.4 Flood Risk

Surface Water Flooding

The site is not located within Natural Resources Wales' designated Flood Zones. The Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

The RoFRaS flood rating for the site is *Very Low*.

Groundwater Flooding

The BGS has identified groundwater flooding susceptibility areas within 50m from the boundary of the site and these relate to clear water. Further information is presented in Section 7.7 of Annex D and there is limited potential for groundwater flooding with a high confidence rating. Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, there is no need to take action in relation to the groundwater flooding hazard.

4.5 Environmental Sensitivity

Based on the information provided in the Groundsure report there are two Sites of Special Scientific Interest (SSSIs) within 2000m of the site. These both relate to the Ruabon/Llantysilio mountains and Minera 1225 and 1657m west of the site. There are also three Special Areas of Conservation (SACs)

all beyond 1300m from the site and located in the Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains south west and west.

There are 48 records of Ancient Woodlands within 2000m and an Area of Outstanding Natural Beauty (AONB) Bryniau Clwyd a Dyffryn Dyfrdwy/Clwydian Range and Dee Valley is 878m south west of the site.

The site is not located within 2000m of any of the following designations:

- National Nature Reserves (NNRs);
- Local Nature Reserves;
- World Heritage Sites;
- National Parks (NPs);
- Nitrate Sensitive Areas (NSAs) and Nitrate Vulnerable Zones (NVZs); or
- Green Belt.

The environmental designations are shown in Figure 4 and Section 8 of Annex D.

5 Previous Reporting

A ground investigation was carried out on the site as part of the new dairy development. It was undertaken by Mark Dady Associates and was reported in February 2004 (Report No' 457).

The purpose of the investigation was to ascertain the nature and structure of the near surface soils to understand the environmental and geotechnical properties. Four 150mm cable percussive boreholes were progressed to a maximum depth of 10m below ground level and samples collected for laboratory analysis. A series of geotechnical testing was also carried out and the report is presented in Annex C.

The boreholes did not reach bedrock and remained in the superficial Till deposits. Groundwater was only encountered in one borehole (BH02) at a depth of 1.0m below ground level, this is not anticipated to reflect natural groundwater levels beneath the site.

Soil samples were collected from a depth of 0.5mbgl and analysis of a basic contamination suite was undertaken by ALcontrol Geochem Analytical Services. The results are presented in Annex C and are reported as below Soil Guideline Values (SGVs) for Commercial/Industrial land use.

6 Regulatory Setting

6.1 Environmental Permits

There are no Integrated Pollution Control (IPC) Authorisations issued within 500m of the site or IPPC Activities.

Three records of Part A(2) and Part B Activities and Enforcements within 500m exist and these relate to one Mineral Process and two Waste Oil Burning Processes, 88m, 123m and 174m south west and south of the site respectively.

In addition to above there is a Discharge Consent associated with treated sewage effluent from Barn A & B, Gwern y Gaseg Farm 358m north of the site. There are no further records of environmental permits of regulatory controls in the vicinity of the site.

6.2 Landfill and Waste Licences

Four historic landfills have been identified within 1500m of the site and one Local Authority Landfill site, these are all beyond 500m of the site.

The closest, Pentre Saeson Foundry 735m north, last received industrial waste in December 1985.

There are records of five waste treatment, transfer, disposal or metal recycling sites within 1500m of the site, the closest being the Household, Commercial and Industrial Waste Transfer Station at Station House, Old Road, 181m south west of the site.

The waste sites within 500m are show on Figure 5 in Annex A.

6.3 Records of Pollution Incidents

Pollution incidents are recorded by the Natural Resources Wales on the National Incident Recording System (NIRS) and given a category rating based on their severity of impact caused to water, land and air. There has been one record of a List 2 incident within 500m of the site and no records of the more severe List 1.

The incident, recorded 489m south east of the site, was on the 13 March 2003 and related to sewage materials that had a minor impact on water and no impact on land or air.

6.4 Petroleum Licences

There are no records of petrol, fuel sites or underground high pressure oil and gas pipelines within 500m of the site.

6.5 Coal Mining and Other Resources

The site is within 75m of an identified mining area, the area is known for coal and, based on the local geology, the British Geological Survey (BGS) have identified that the area may have been used to recover Iron Ore (Bedded).

Further details relating to the nature of potential extraction are beyond the scope of this document however, for further information, there are details in Section 10.0 of Annex D.

7 Environmental Risk Assessment

7.1 Risk Assessment Framework

The following environmental risk assessment has been prepared having regard to the source-pathway-receptor model introduced under Part IIA of the Environmental Protection Act 1990 and associated guidance on contaminated land published by the Department of Environment, Food and Rural Affairs.

The methodology is essentially a qualitative assessment based on the identification and evaluation of potential 'source-pathway-receptor pollutant linkages'.

An Environmental Risk Assessment involves assessing the likely probability and consequence of a Pollutant Linkage existing and determining a consequent level of risk. A pollutant linkage will only be present where the sources pathways and receptors are all present. For a risk to exist all three of the following components must be present:

- **Source** of contamination;
- **Pathway** for the contaminant to move from source to receptor; and

- **Receptor** that could be affected by the contaminant.

The following sections identify the sources, pathways and receptors present on site and assess the potential linkages.

7.2 Potential Sources

The following table identifies the potential sources of contaminants on the site and qualitatively assesses their significance on a scale of 1 (Low) to 5 (High) versus the likelihood on a scale of 1 (Unlikely) to 3 (Very likely). The risk score is the product of the significance and likelihood has been categorised as follows:

- 1-4 = **Low Potential Risk**
- 5-10 = **Medium Potential Risk**
- 11-15 = **High Potential Risk**

Table 7.1: Potential Sources On Site

ID	Potential Source	Potential Significance (1 Low 5 High)	Likelihood (1 Unlikely 3 Very Likely)	Risk Score
1	Unidentified Historic/Legacy contamination in the sub surface	2	1	2
2	Hydrocarbons – Transformers, fuels, lubricants	3	2	6
3	Contaminated surface water – hydrocarbon, dairy products	4	2	8
4	Milk	4	2	8

7.3 Potential Pathways

The following table identifies the potential pathways that have been assessed on site.

Table 7.2: Potential Pathways On Site

ID	Potential Pathways
1	Subsurface drainage channels
2	Vertical leaching through the soils
3	Overland flow
4	Inhalation during excavation/wind blown

7.4 Potential Receptors

The following table identifies the potential receptors that have been identified on site and in the surrounding area.

Table 7.3: Potential Receptors

ID	Potential Receptors
1	Site employees at surface
2	Construction workers (excavation crews)
3	Surface water features including ecosystems

7.5 Potentially Complete SPR Linkages

By combining the information in the source pathway receptor tables the potentially complete linkages have been assessed and are shown in Table 7.4. There are a total of 12 potentially complete

linkages however this is considered extremely conservative as no significant impacts have been identified on site and there are very few likely receptors. Current processes are not considered to have led to significant impacts.

A summary of the key potentially significant linkages based on a medium risk score is given in Table 7.5:

Table 7.4: Review of all SPR Linkages identified on site

		<i>Potential Receptor</i>		
		<i>Site employees at surface</i>	<i>Construction workers (excavation crews)</i>	<i>Surface water features including ecosystems</i>
<i>Potential Sources</i>	<i>Unidentified Historic/Legacy contamination in the sub surface</i>	Derma Contact ingestion/inhalation	Derma Contact ingestion/inhalation	Leaching from Glacial Till into surface water drainage channels
	<i>Hydrocarbons – Transformers, fuels, lubricants</i>	Inhalation of vapours	Derma Contact and ingestion Inhalation	Overland runoff
	<i>Contaminated surface water – hydrocarbon, dairy products</i>	Inhalation Derma Contact and ingestion	Derma Contact and ingestion Inhalation	Overland runoff, connection with lagoon direct to discharge stream
	<i>Milk</i>	NA	NA	Overland runoff, connection with lagoon direct to discharge stream

Table 7.5: Summary of Medium Risk SPR Potential Linkages identified on site

Source	Pathway	Receptor	Risk	Rationale
Contaminated surface water – hydrocarbon, dairy products	Overland runoff, connection with lagoon direct to discharge stream	Surface Water Features Including Ecosystems	Medium	Contaminated water has the potential to enter the environment by passing through the lagoon and discharging into the surface water stream. In the event of a catastrophic loss on site the stream could be at risk.
Milk	Overland runoff, connection with lagoon direct to discharge stream	Surface Water Features Including Ecosystems	Medium	Milk has a high Biological Oxygen Demand (BOD) and can be very harmful to the environment. Contaminated water has the potential to enter the environment by passing through the lagoon and discharging into the surface water stream. In the event of a catastrophic loss on site the stream could be at risk.

8 Conclusion & Recommendations

8.1 Conclusions

Overall the site would be given a classification of low risk with the exception of two medium potentially complete source, pathway and receptor linkages. The site has not had a long industrial past and the soil investigation reported in 2004 (Annex C) does not indicate the presence of contaminant concentrations in excess of SGVs. Soils conditions beneath the site are anticipated to be similar to those observed in the 2004 report.

The two key potentially complete the SPR linkages classified as medium risk are:

- Potential impacts on surface water through contaminated surface water drainage entering the discharge stream having passed through the lagoon; and
- Milk entering the stream as a result of a catastrophic spill.

The nature of the geology underlying the site means that any contamination, as a result of spills or historic legacies, would not migrate easily and therefore there is a low risk of any impacts being observed in groundwater at depth.

By implementing the correct environmental management systems on site the potential impacts associated with continued operation would not be considered significant.

8.2 Recommendations

The following recommendations have been made to enable the potential impacts of a completed SPR linkage to be reduced.

1. *Inspection and maintenance of hard standing*

Hard standing should be inspected on a regular basis to identify cracks and wear and tear. Where identified these should undergo maintenance and repair to maintain a low permeability surface reducing the potential of vertical migration into the sub surface. The hard standing minimises infiltration of precipitation and therefore reduce the risk of mobilising any unforeseen unidentified contamination in the sub surface; and

2. *Pollution Prevention Management Systems*

A pollution management system should be put in place (if not already existing) to ensure staff on site are able to manage a potentially environmentally damaging incident. A stop valve, if not already in place, should be installed on the discharge of the lagoon to prevent discharge in the event of a catastrophic loss of product. The pollution prevention management systems should include spill kits, bunding of all tanks where liquids are stored and training on control of the surface water drainage system.

9 Statement of Limitations

This report was prepared in accordance with the scope of work outlined within this report and is subject to the applicable cost, time and other constraints. Paul Downing & Associates Ltd performed the services on behalf of the Client in a manner consistent with the normal level of care and expertise exercised by members of the environmental profession. No warranties, expressed or implied, are made.

Except as otherwise stated, Paul Downing & Associates Ltd's assessment is limited strictly to identifying the specified environmental conditions associated with the subject Site and does not evaluate structural or geotechnical conditions of any part of the Site (including any buildings, equipment or infrastructure).

All conclusions and recommendations made in the report are the professional opinions of the Paul Downing & Associates Ltd personnel involved with the project and, while normal checking of the accuracy of data has been conducted, Paul Downing & Associates Ltd assumes no responsibility or liability for errors in data obtained from such sources, regulatory agencies or any other external sources, nor from occurrences outside the scope of this project.

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This report does not constitute legal advice.

10 Annexes

10.1 ANNEX A Figures

- Figure 1 Site Boundary and Location
- Figure 2a to 2d Site Layout & Drainage
- Figure 3 Hydrology
- Figure 4 Environmental Designations
- Figure 5 Licensed Waste Sites

10.2 ANNEX B Photo Log

10.3 ANNEX C Historical Mapping & Previous Report

10.4 ANNEX D Groundsure Report

ANNEX A Figures

Figure 1 Site Boundary and Location

Figure 2a to 2d Site Layout & Drainage

Figure 3 Hydrology

Figure 4 Environmental Designations

Figure 5 Licensed Waste Sites

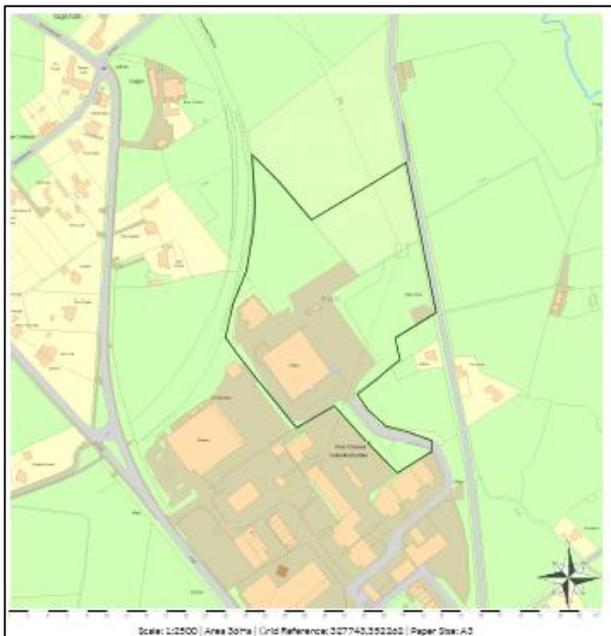
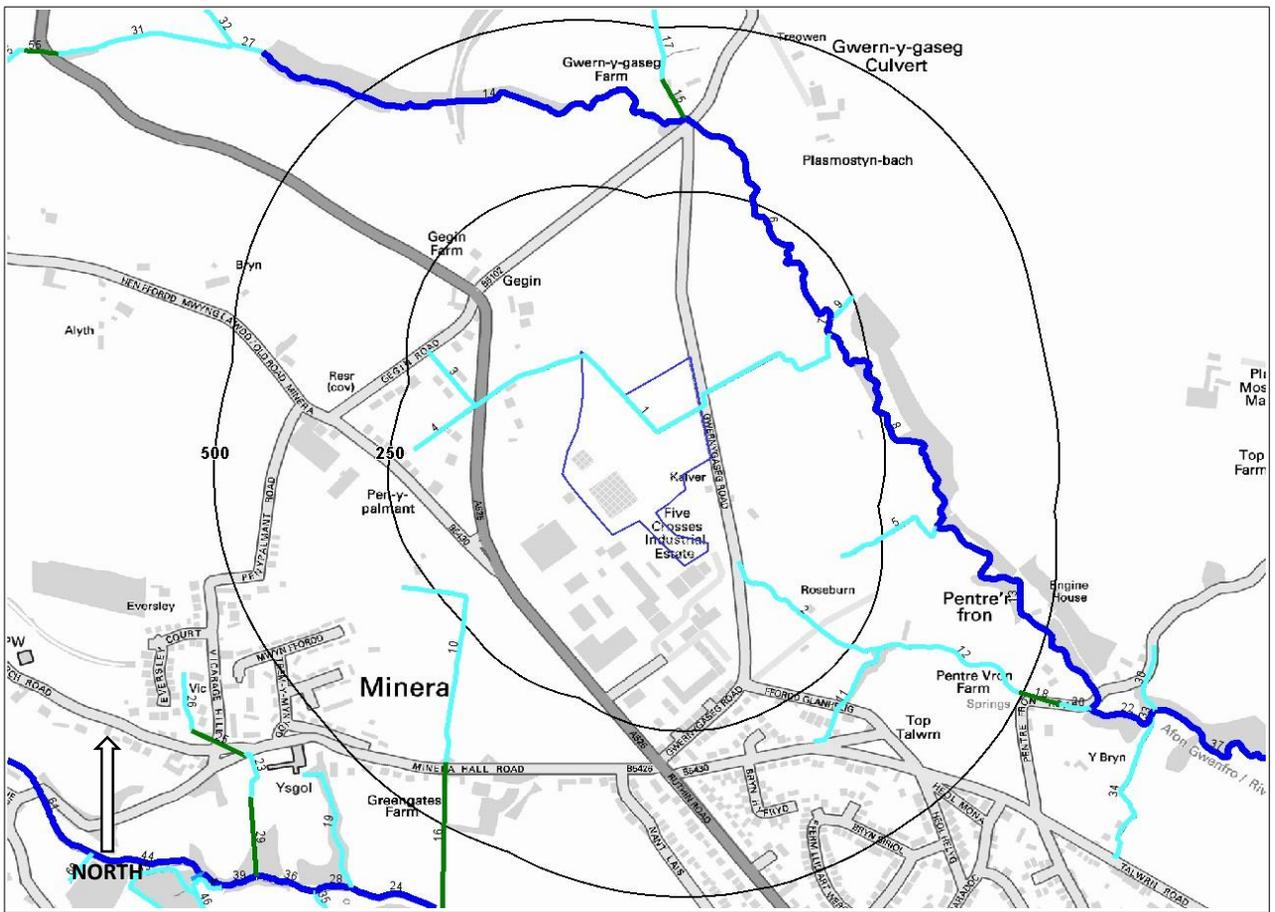



Figure 1 Site Location
Tomlinson's Dairy, UNIT D, FIVE CROSSES INDUSTRIAL ESTATE, WREXHAM, LL11 3RD
Reference: GS3343997



Mapping sourced from



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Ordnance Survey license 100035207.

- Site Outline
- 250 Search Buffers (m)
- 500 Search Buffers (m)
- Primary River
- Secondary River
- Tertiary River
- Lake/Reservoir
- Underground River (inferred)
- General Quality Assessment: Biology
- General Quality Assessment: Chemistry
- Canal
- Canal Tunnel
- Culvert
- Multiple Channel Culvert
- Underground River (Potential Sewer)
- Underground River (local knowledge)

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Figure 3 Hydrology

Tomlinson's Dairy, UNIT D, FIVE CROSSES INDUSTRIAL ESTATE, WREXHAM, LL11 3RD

Reference: GS3343997



Mapping sourced from



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- | | | | | | |
|--|--------------------------|--|---------------------------------|--|-------------------------|
| | AONB | | Green Belt | | Ancient Woodland |
| | National Park | | Environmentally Sensitive Areas | | National Nature Reserve |
| | SSSI | | Special Areas of Conservation | | Local Nature Reserves |
| | Special Protection Areas | | World Heritage Sites | | Ramsar Sites |
| | Nitrate Vulnerable Zones | | Nitrate Sensitive Areas | | |
- Site Outline
 100 Search Buffers (m)
 250 Search Buffers (m)



Figure 4 Environmental Designations

Tomlinson's Dairy, UNIT D, FIVE
CROSSES INDUSTRIAL ESTATE,
WREXHAM, LL11 3RD

Reference: GS3343997



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-  Site Outline
 -  E.A. Active Landfill
 -  E.A. Historic Landfill
 -  BGS / DoE Survey Landfill
 -  Historic and Planned Waste Sites
 -  E.A. Licensed Waste Site
 -  Local Authority/Historical Mapping Landfill Records
- 250 — Search Buffers (m)
— 500 —

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Figure 5 Landfills

Tomlinson's Dairy, UNIT D, FIVE CROSSES INDUSTRIAL ESTATE, WREXHAM, LL11 3RD

Reference: GS3343997

ANNEX B Photo Log



Photograph 1: Hard standing, carp parking and main building



Photograph 2: Lorries on site, reinforced concrete hard standing

ANNEX C Historical Mapping & Previous Report

Site Details:

UNIT D, FIVE CROSSES
INDUSTRIAL ESTATE,
WREXHAM, LL11 3RD

Client Ref: Tomlinsons_Dairy
Report Ref: GS-3343998
Grid Ref: 327769, 352259

Map Name: County Series

Map date: 1873-1874

Scale: 1:2,500

Printed at: 1:2,500



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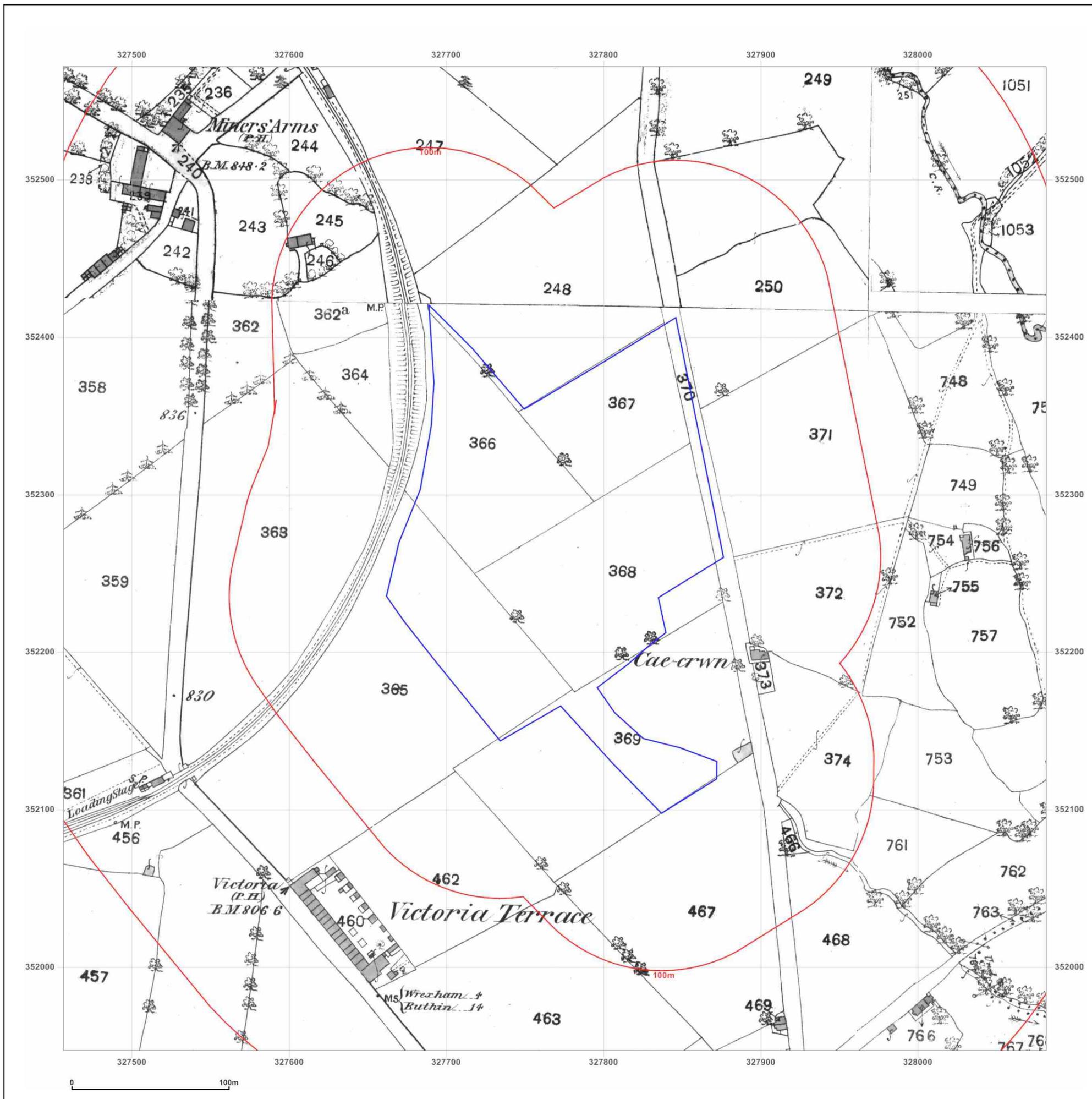


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Client Ref: Tomlinsons_Dairy
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Grid Ref: 327769, 352259

Map Name: County Series

Map date: 1899

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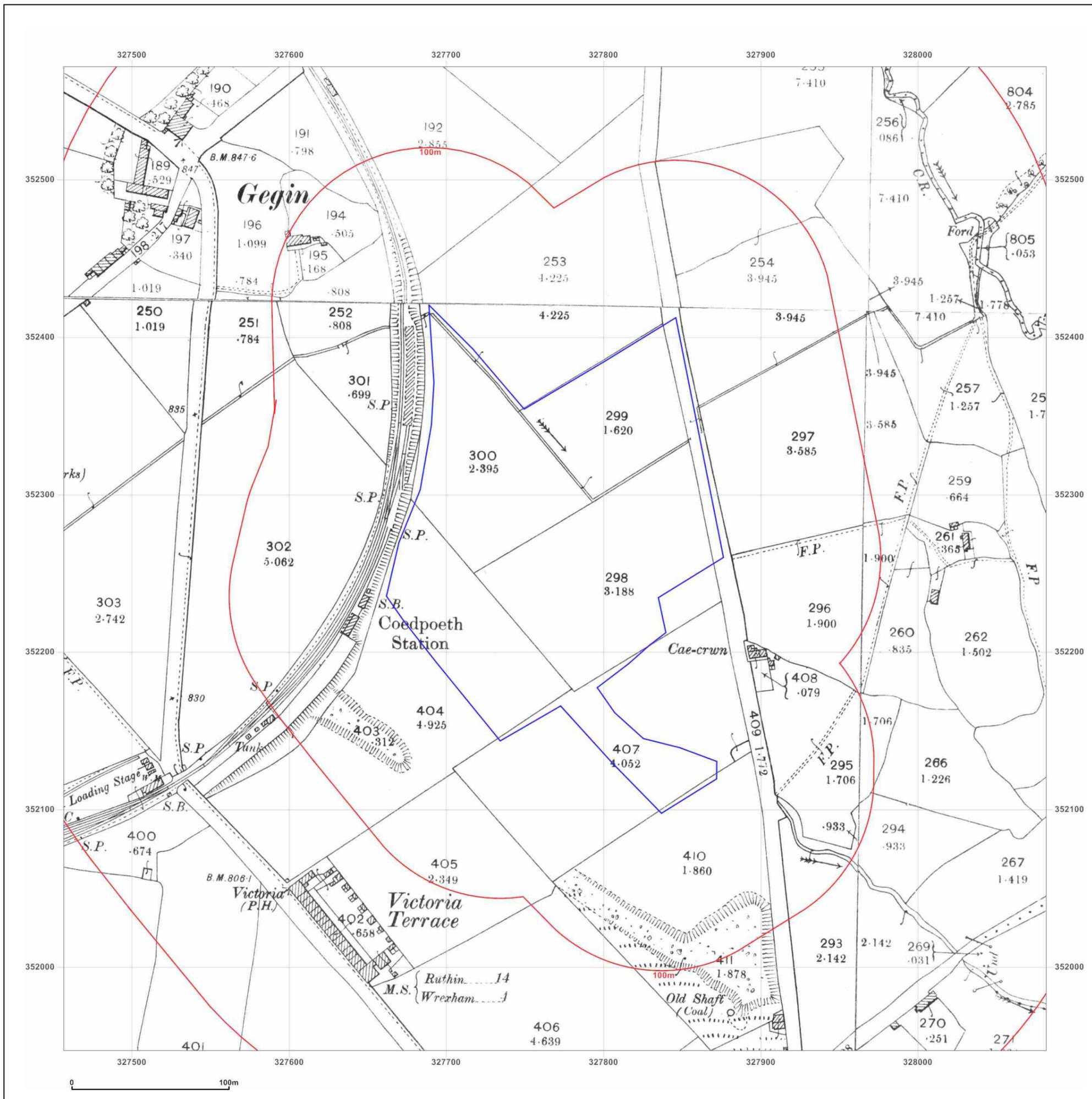


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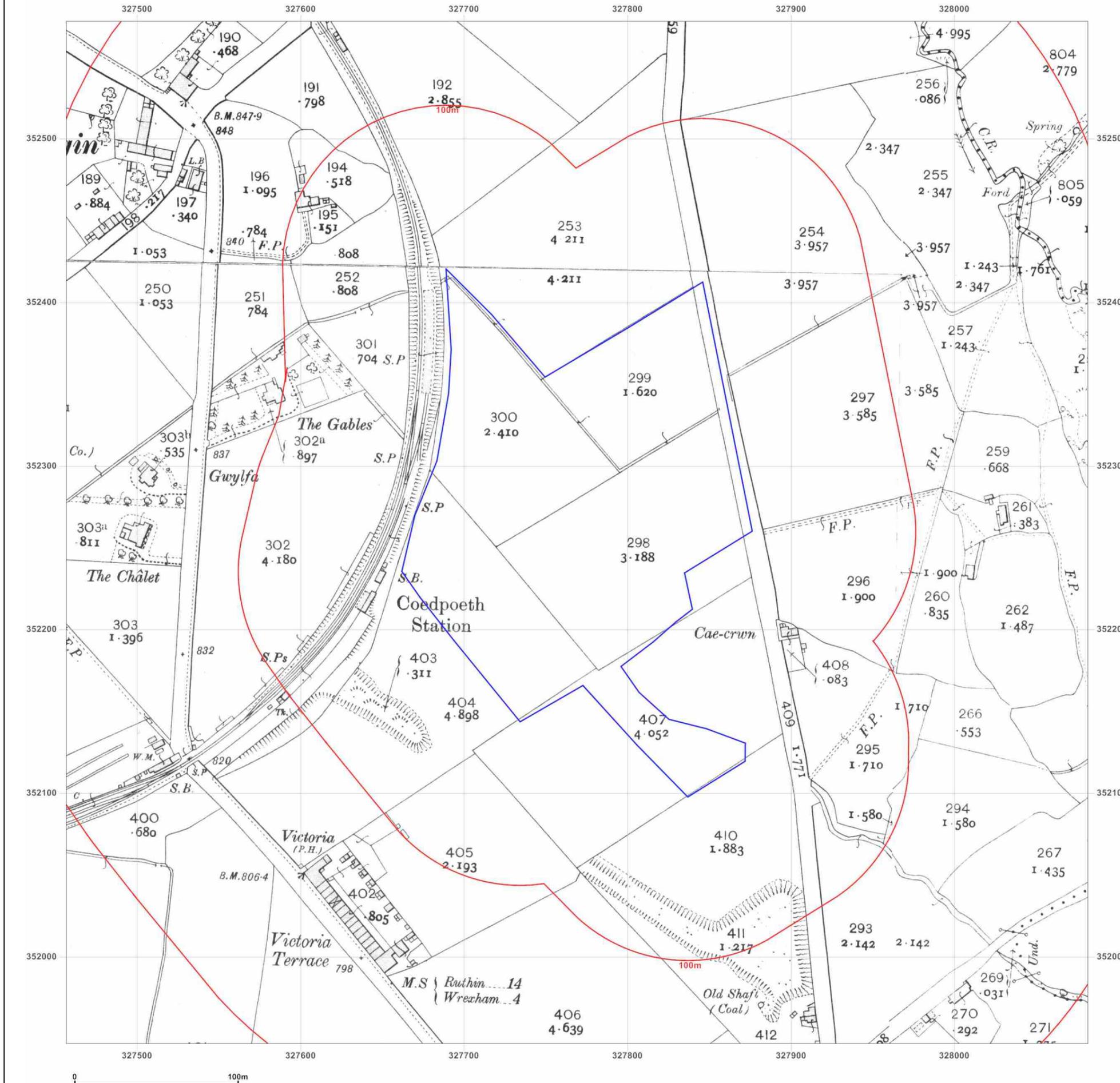


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Grid Ref: 327769, 352259

Map Name: National Grid

Map date: 1961-1962

Scale: 1:2,500

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Revised 1962
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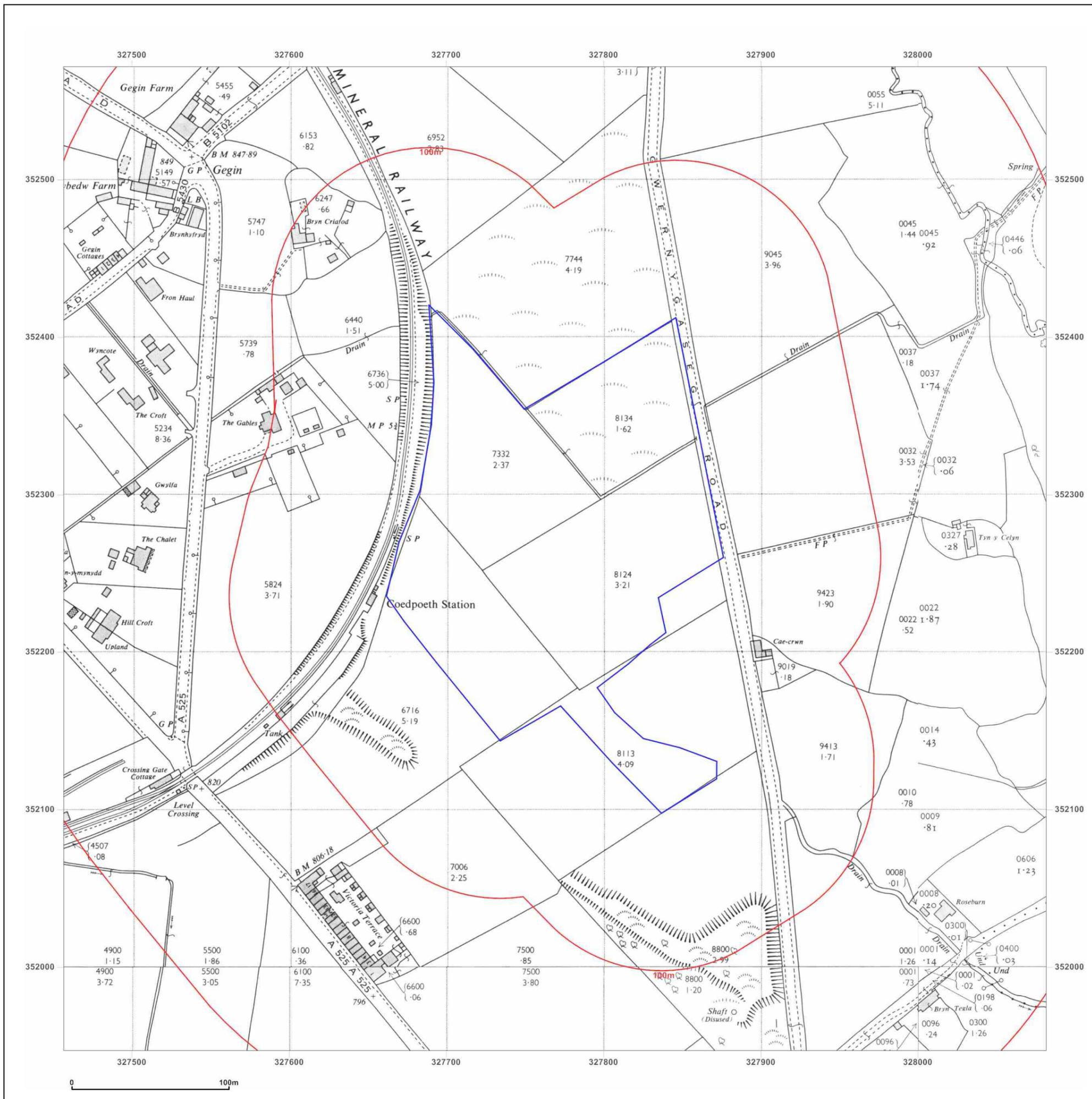


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Client Ref: Tomlinsons_Dairy
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Grid Ref: 327769, 352259

Map Name: National Grid

Map date: 1979-1984

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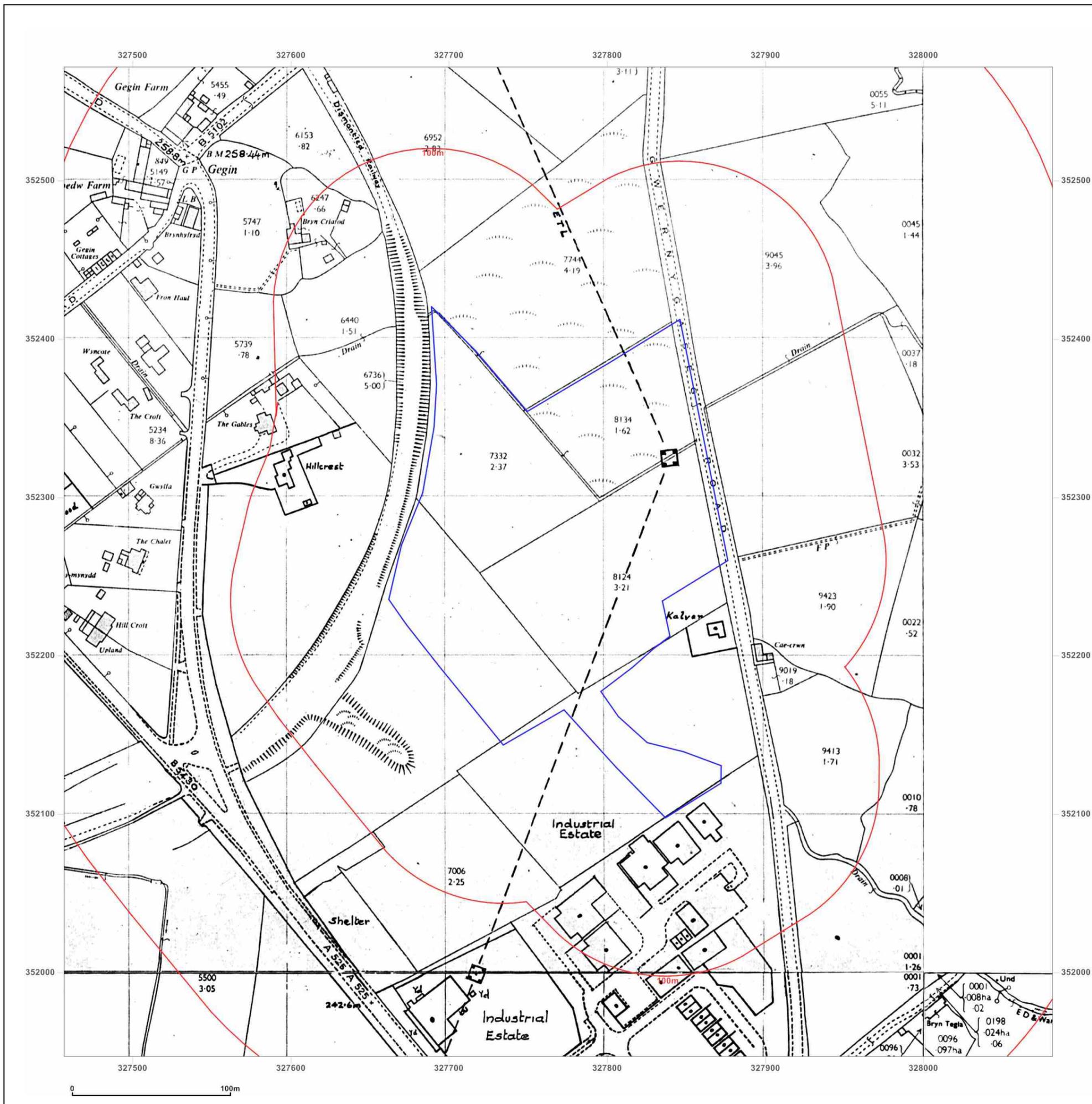


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Report Ref: GS-3343998
Grid Ref: 327769, 352259

Map Name: National Grid

Map date: 1993

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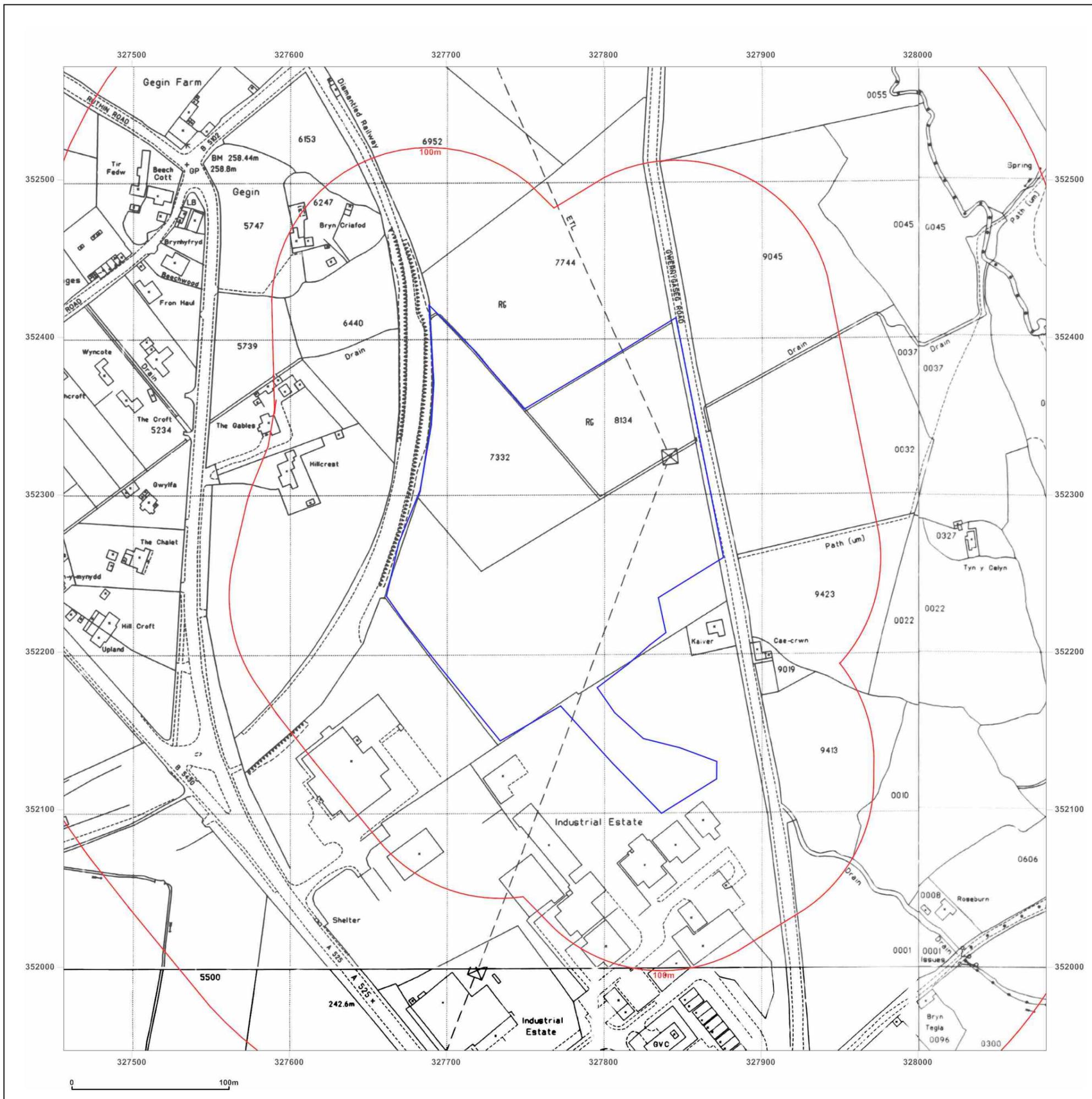


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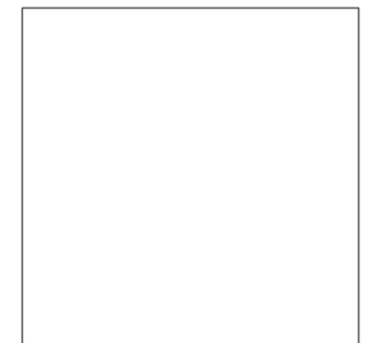
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Report Ref: GS-3343998
Grid Ref: 327769, 352259

Map Name: County Series

Map date: 1872

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1872
Revised 1872
Edition N/A
Copyright N/A
Levelled N/A

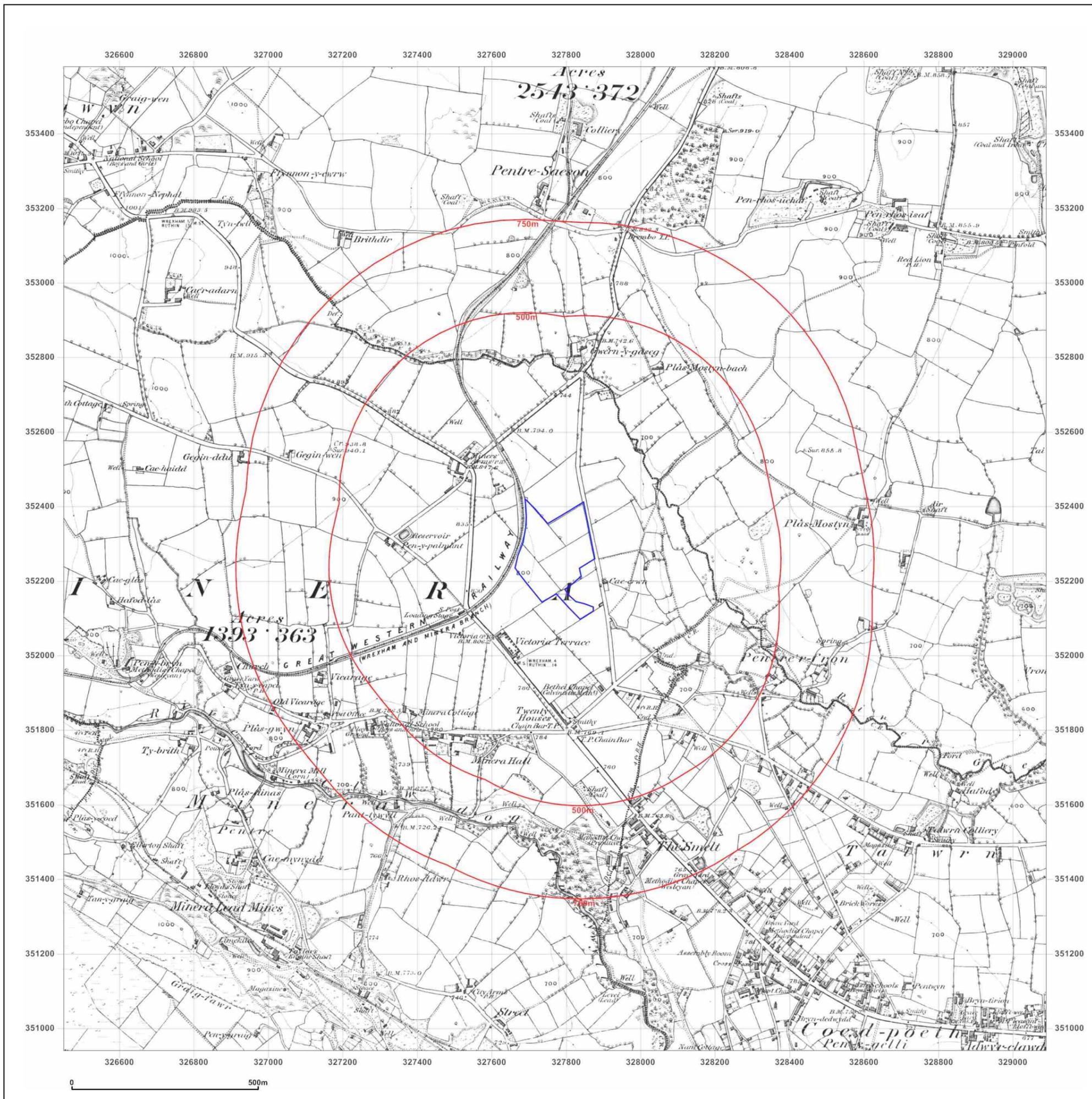


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Report Ref: GS-3343998
Grid Ref: 327769, 352259

Map Name: County Series

Map date: 1900

Scale: 1:10,560

Printed at: 1:10,560



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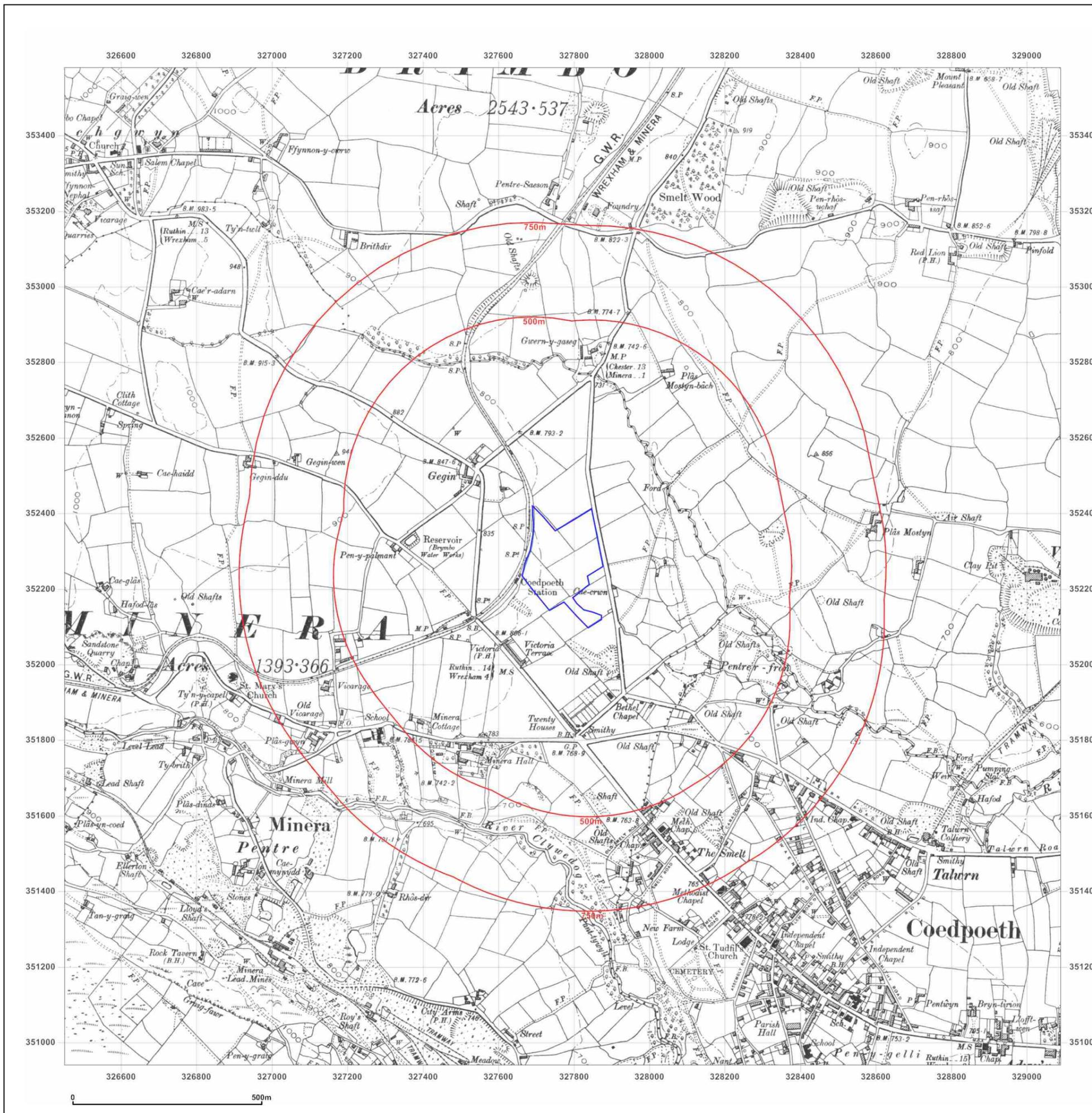


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Report Ref: GS-3343998
Grid Ref: 327769, 352259

Map Name: County Series

Map date: 1910

Scale: 1:10,560

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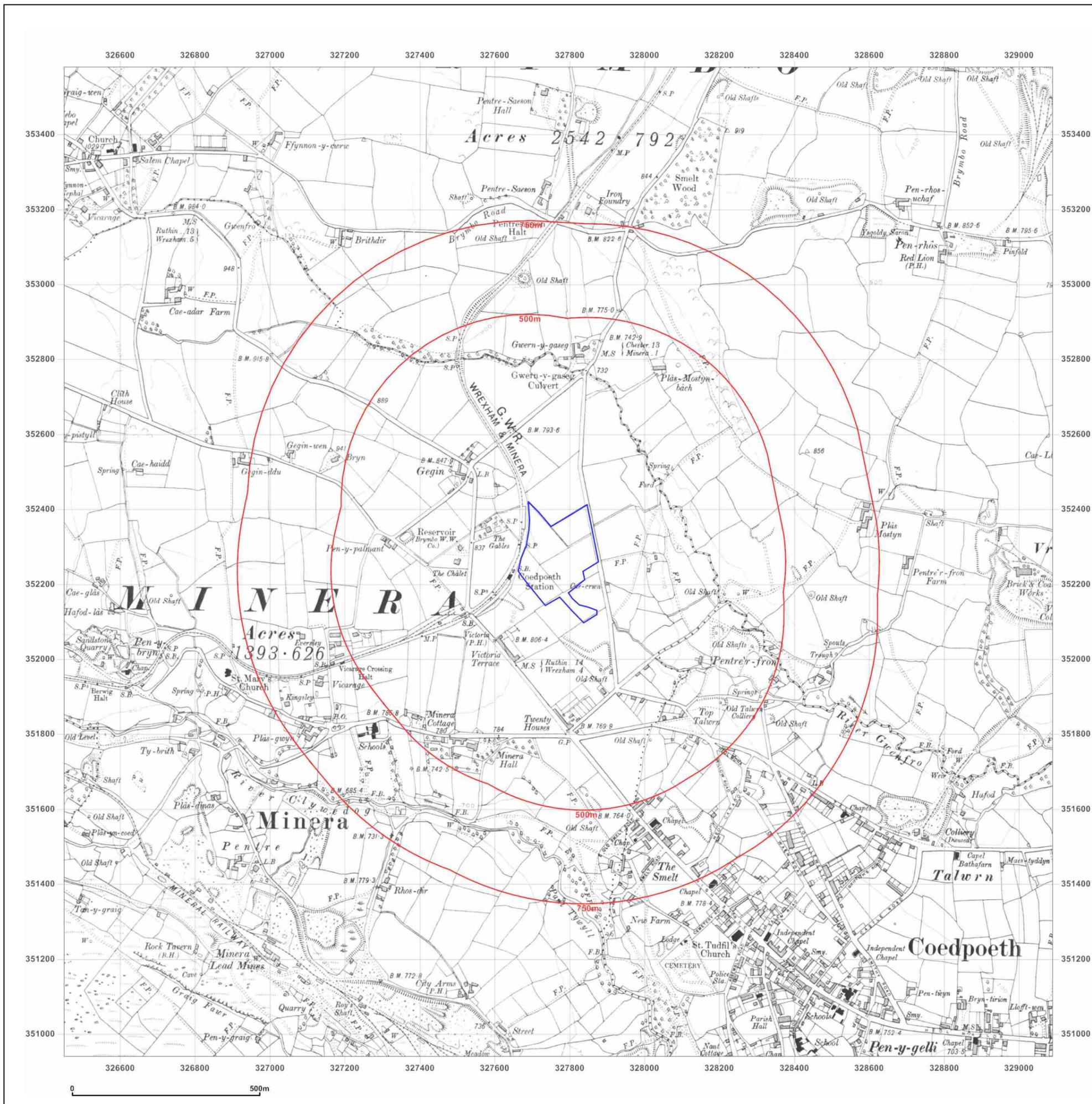


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Grid Ref: 327769, 352259

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



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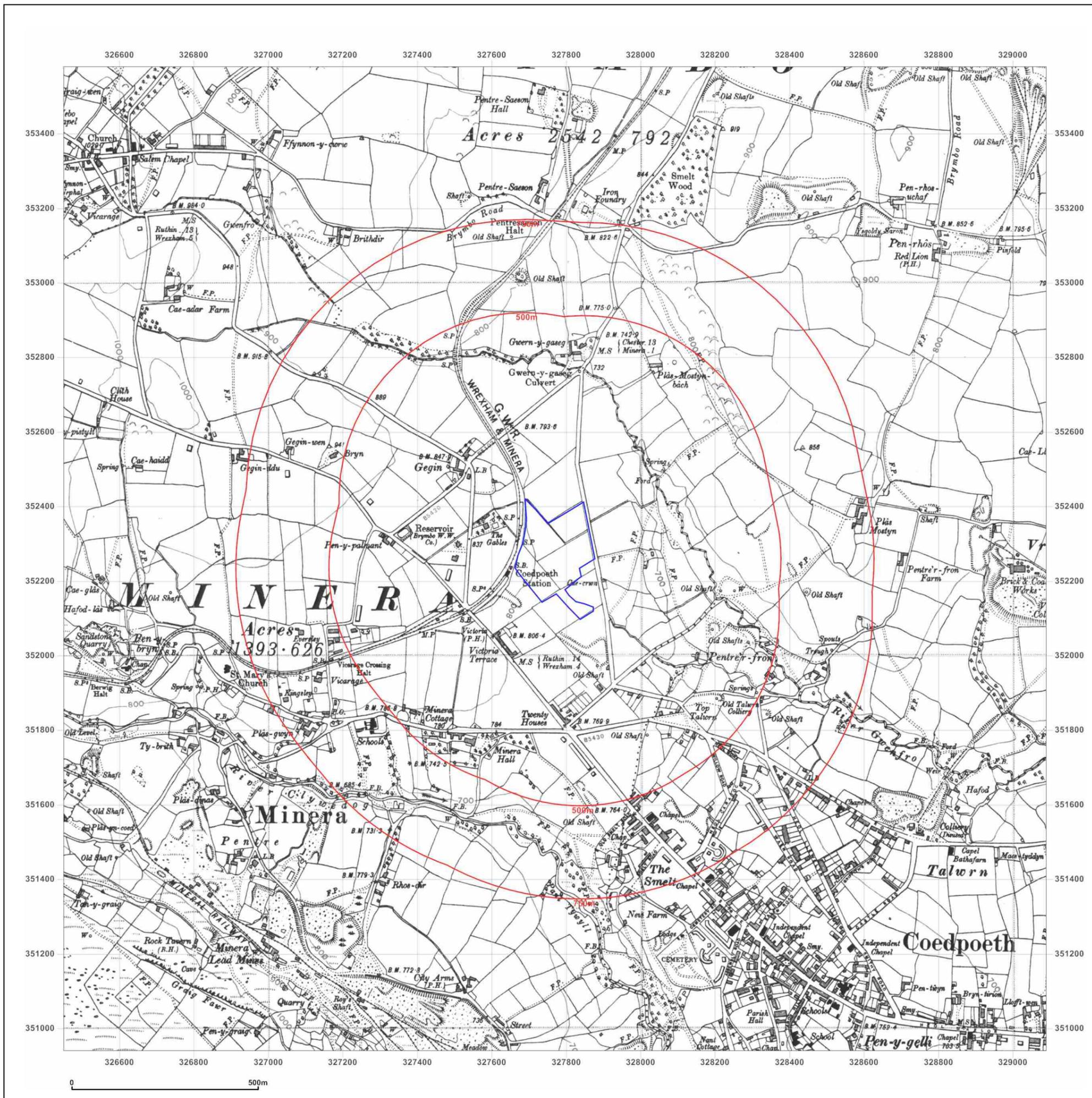


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Grid Ref: 327769, 352259

Map Name: County Series

Map date: 1949

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1871
Revised 1949
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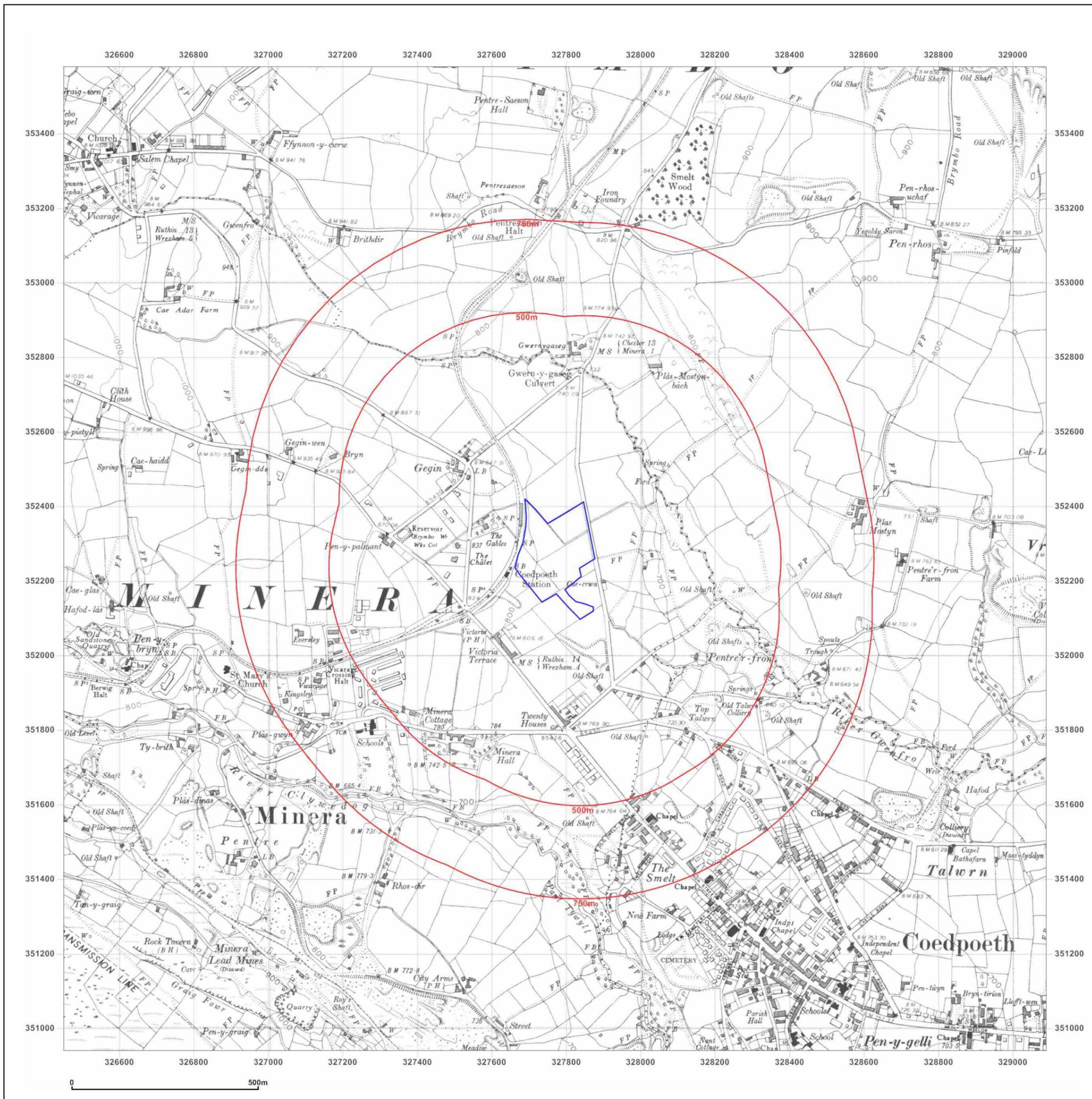


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Map Name: Provisional

Map date: 1960

Scale: 1:10,560

Printed at: 1:10,560



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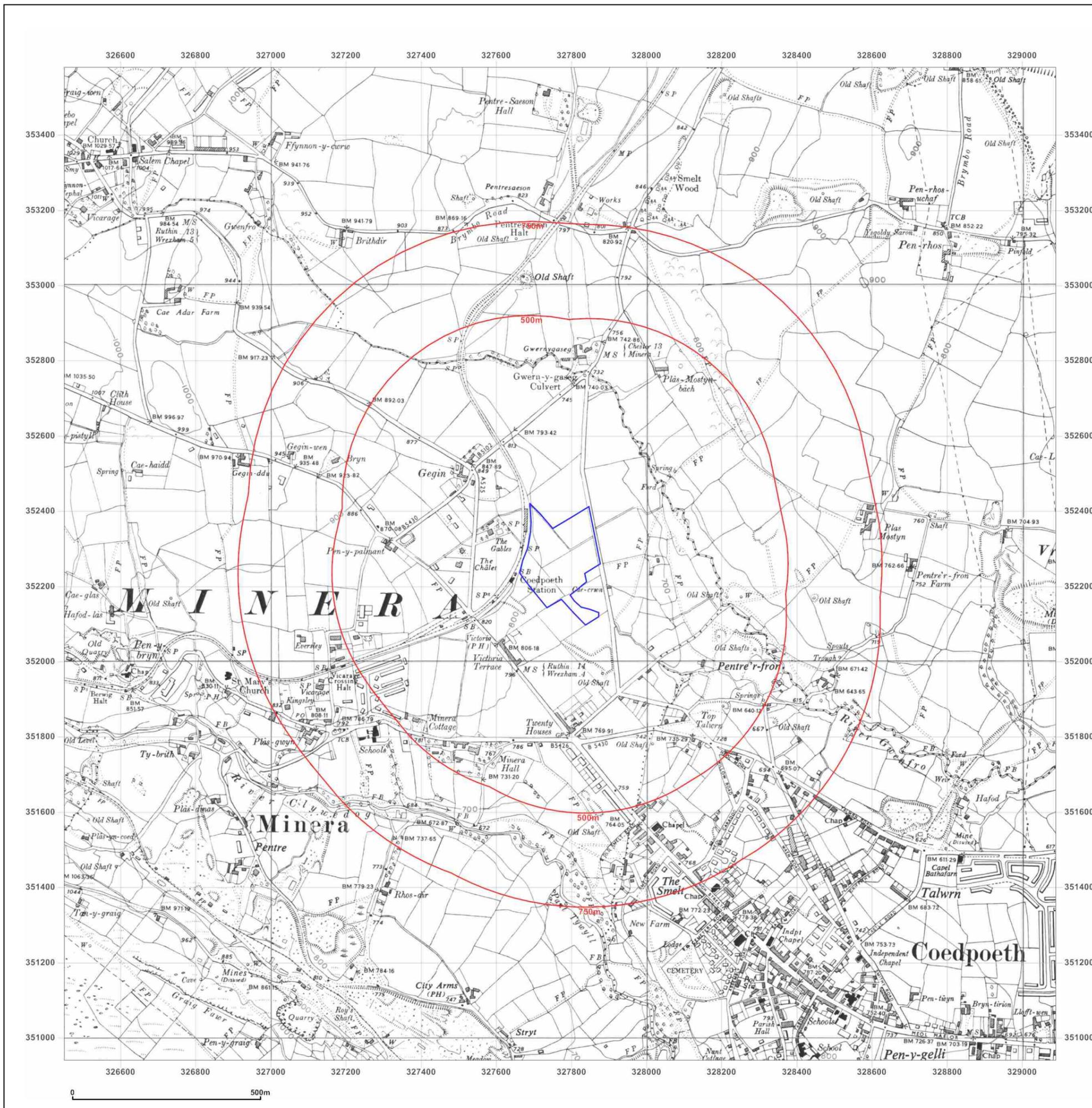


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Client Ref: Tomlinsons_Dairy
Report Ref: GS-3343998
Grid Ref: 327769, 352259

Map Name: National Grid

Map date: 1976

Scale: 1:10,000

Printed at: 1:10,000



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Edition N/A
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Levelled 1973

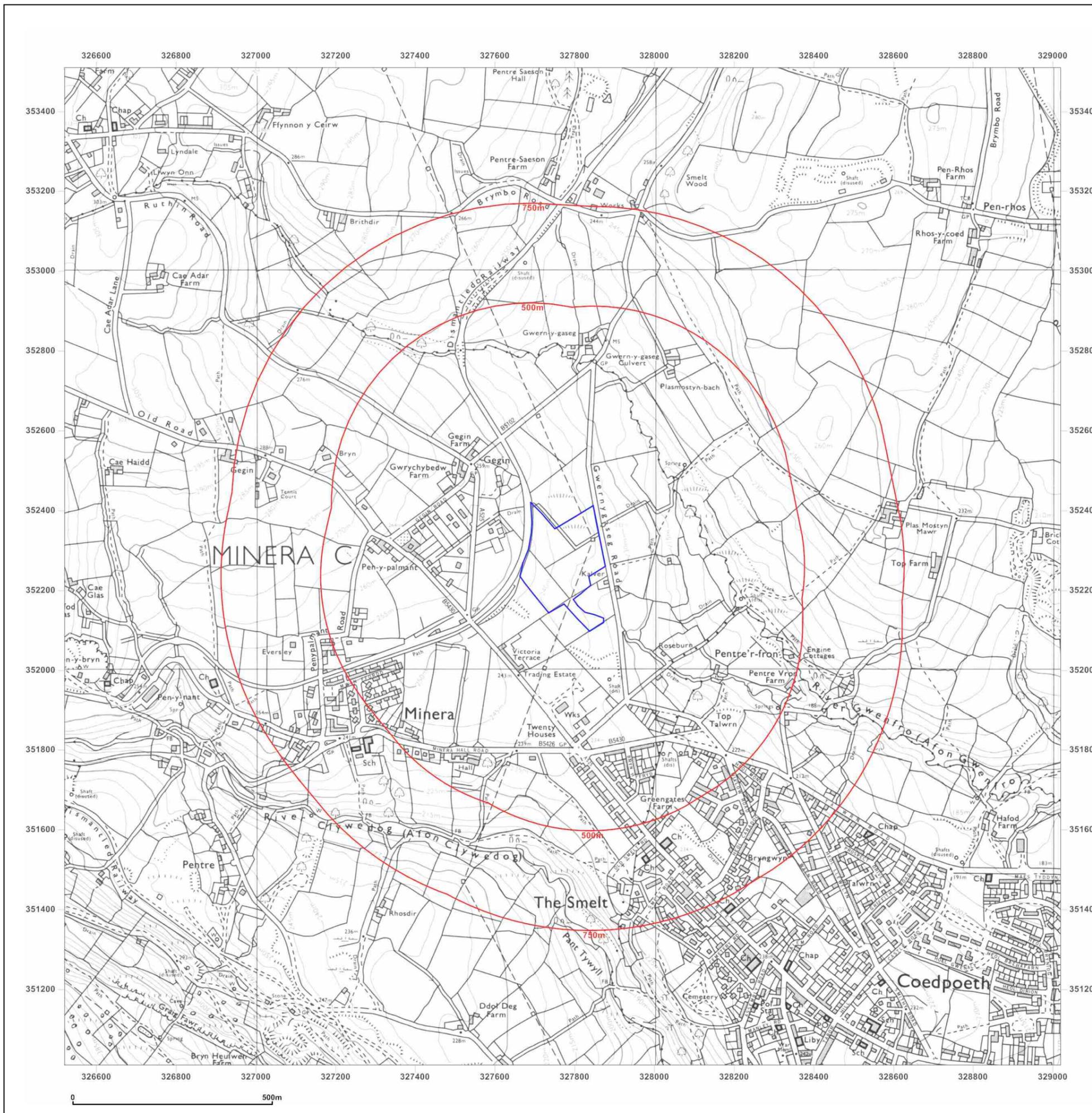


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Client Ref: Tomlinsons_Dairy
Report Ref: GS-3343998
Grid Ref: 327769, 352259

Map Name: National Grid

Map date: 1985

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1970
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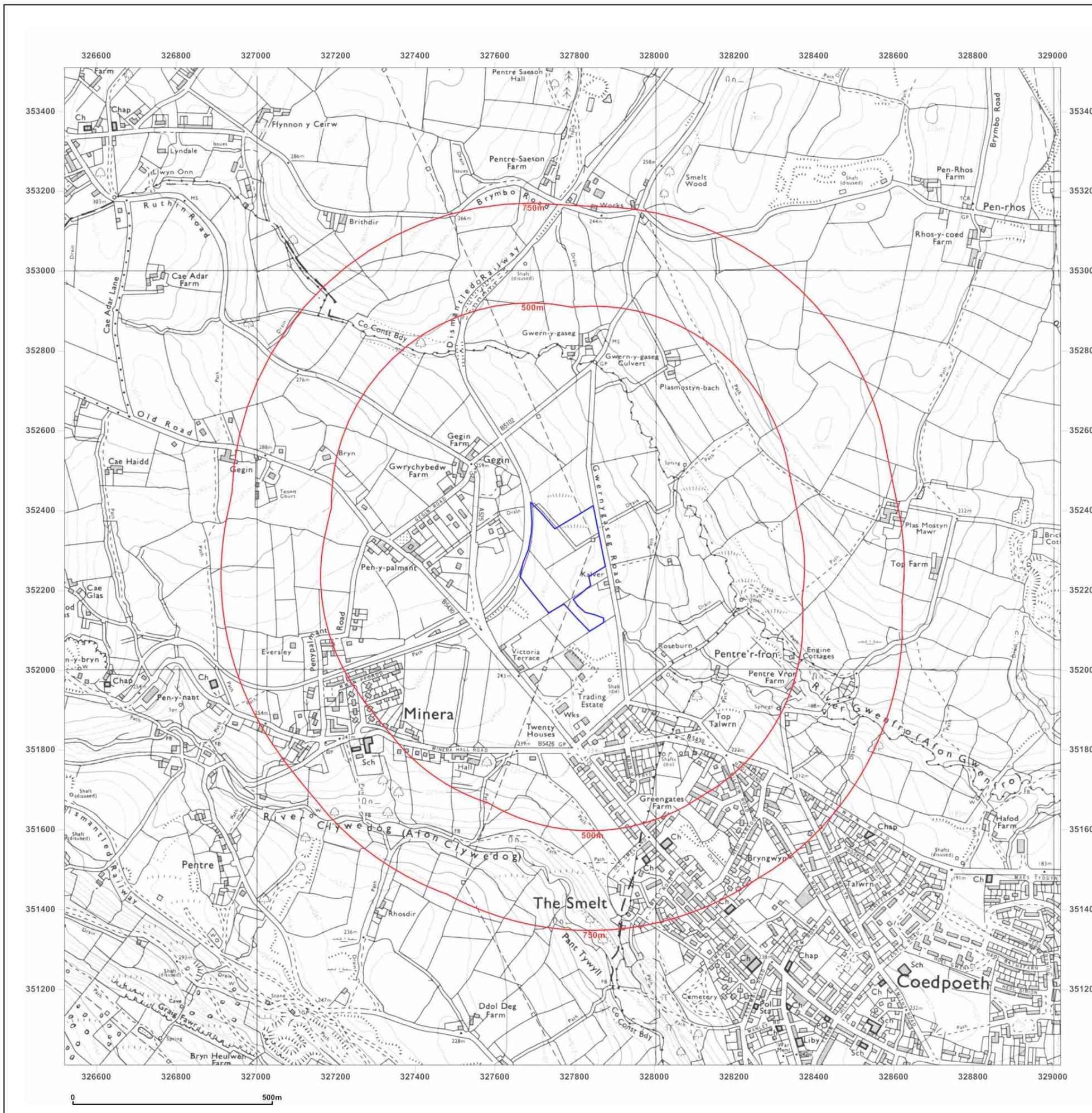


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Client Ref: Tomlinsons_Dairy
Report Ref: GS-3343998
Grid Ref: 327769, 352259

Map Name: National Grid

Map date: 1989

Scale: 1:10,000

Printed at: 1:10,000



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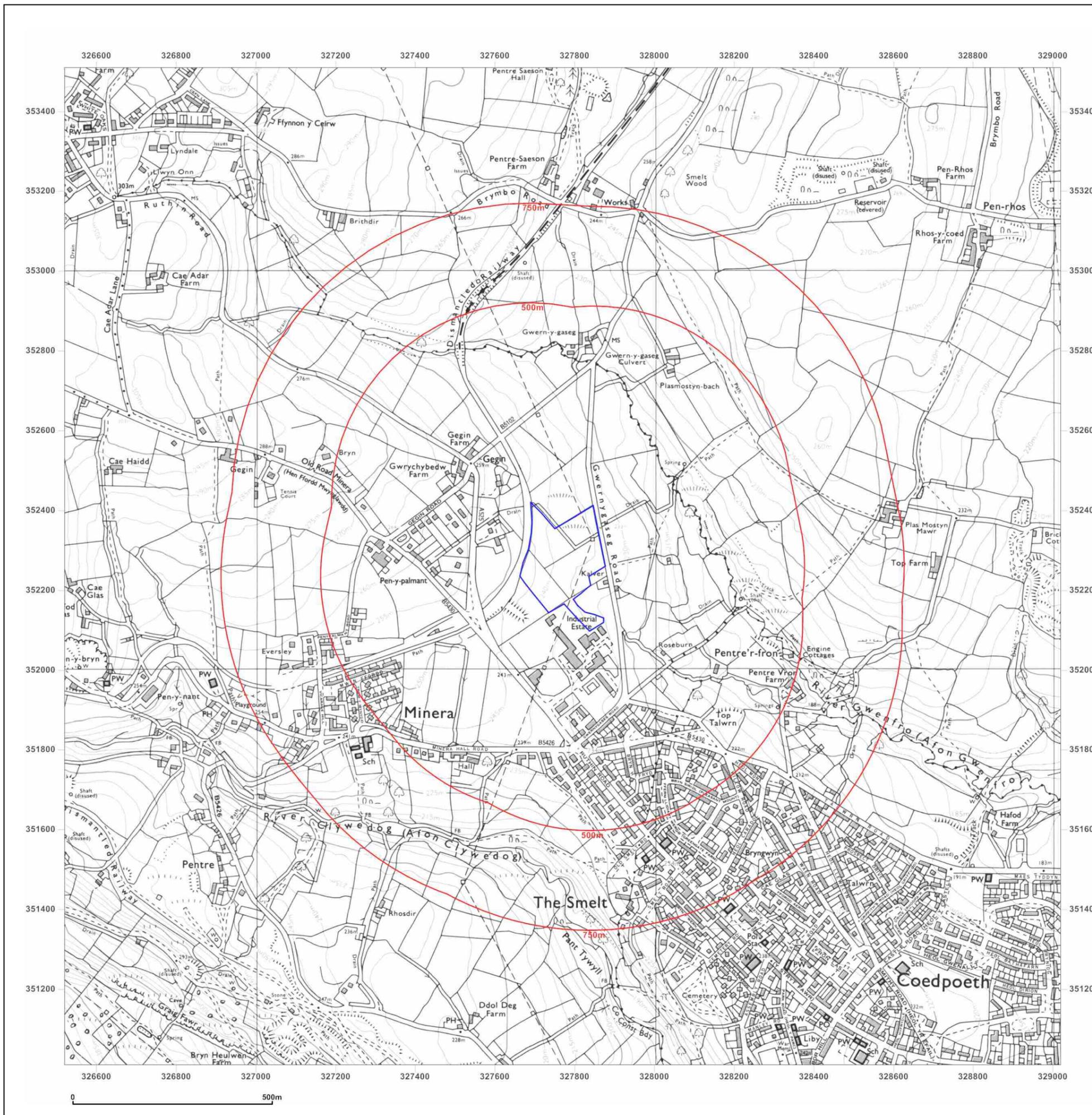


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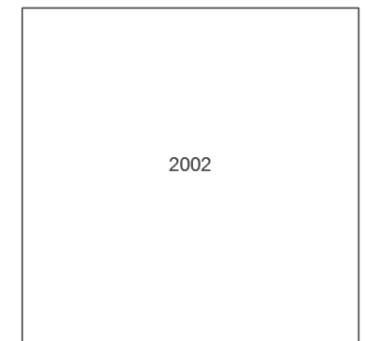
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Report Ref: GS-3343998
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Map Name: 1:10,000 Raster

Map date: 2002

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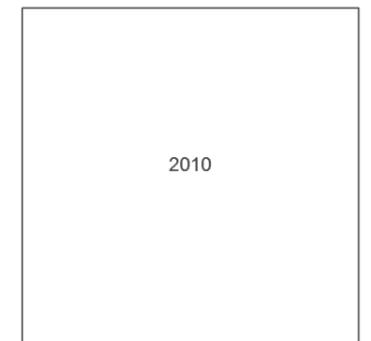
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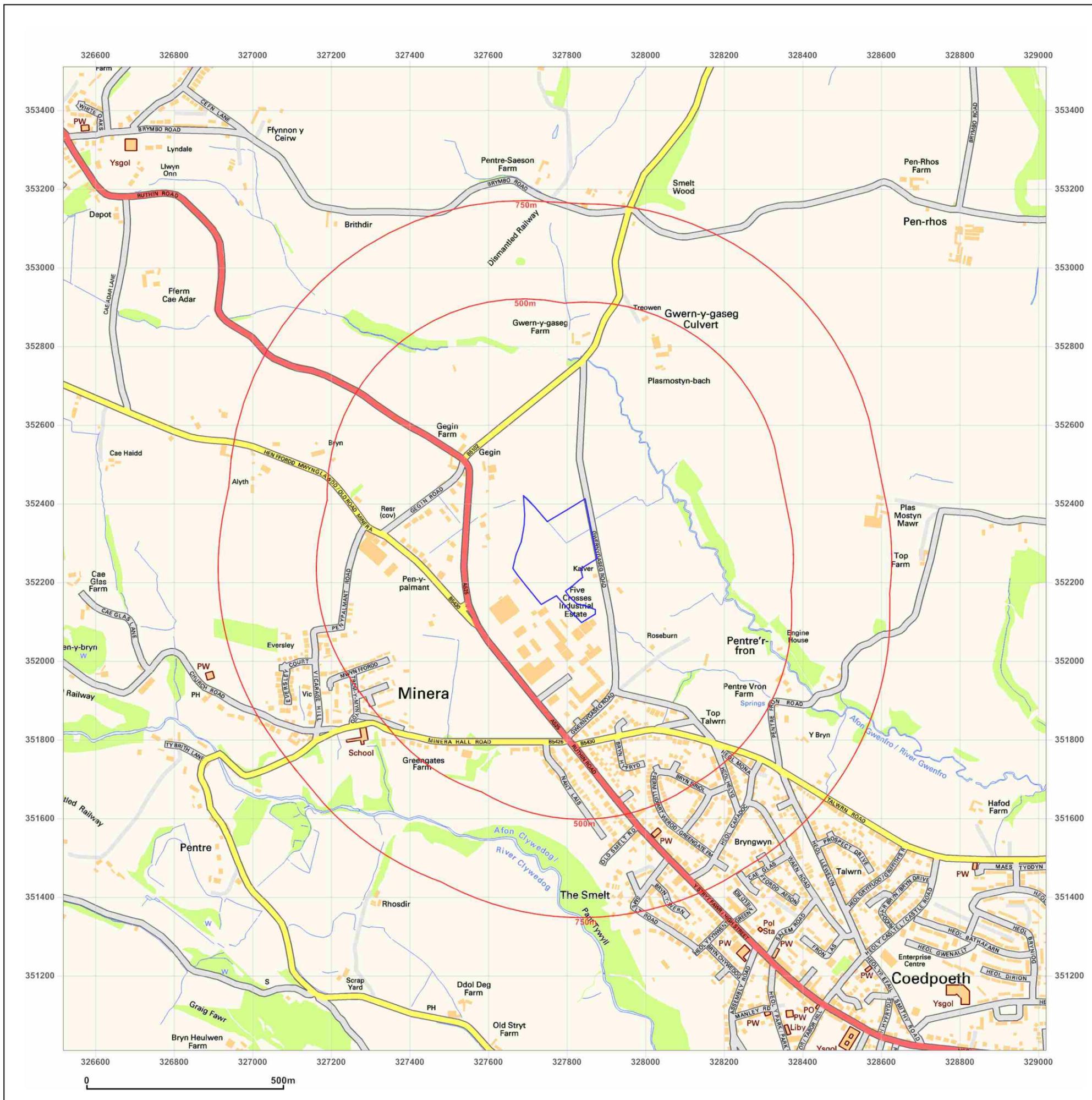


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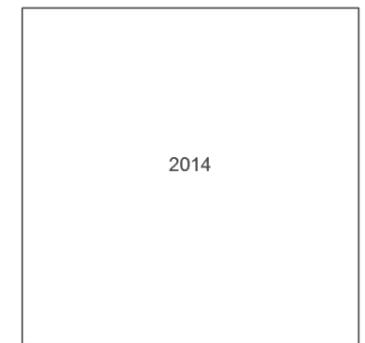
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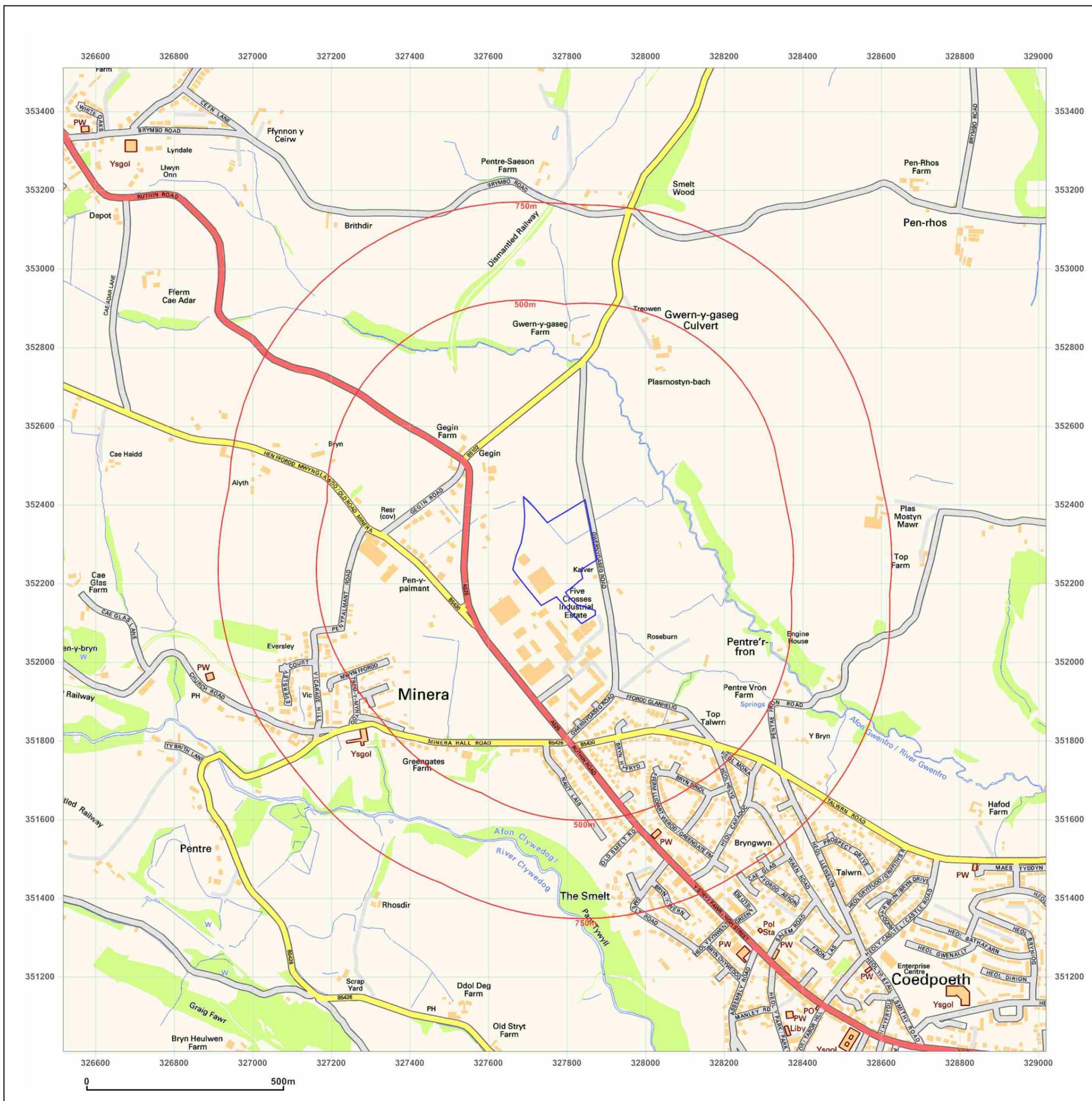


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GROUND INVESTIGATION
FOR NEW DAIRY AND MILK PROCESSING FACILITY
ADJACENT TO FIVE CROSSES INDUSTRIAL ESTATE
COEDPOETH
NEAR WREXHAM

CARRIED OUT FOR:-

CLIENT: TOMLINSON'S DAIRIES LIMITED

ENGINEER: MARK DADY ASSOCIATES

DATE: FEBRUARY 2004

REPORT NO: 457

REPORT NO. 457

GROUND INVESTIGATION
FOR NEW DAIRY AND MILK PROCESSING FACILITY
ADJACENT TO FIVE CROSSES INDUSTRIAL ESTATE
COEDPOETH
NEAR WREXHAM

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2.0 THE SITE	2
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4.0 LABORATORY TESTING	4
5.0 GROUND CONDITIONS	6
6.0 ENGINEERING DISCUSSION	9
7.0 CABLE PERCUSSION BOREHOLE LOGS	
8.0 CONSOLIDATION TEST RESULTS	
9.0 SOIL CONTAMINATION TEST RESULTS	
10.0 SITE PLAN	

REPORT NO: 457

GROUND INVESTIGATION
FOR NEW DAIRY AND MILK PROCESSING FACILITY
ADJACENT TO FIVE CROSSES INDUSTRIAL ESTATE
COEDPOETH
NEAR WREXHAM

1.0 INTRODUCTION

A ground investigation has been carried out on a plot of arable land adjacent to the Five Crosses Industrial Estate in Coedpoeth near Wrexham in North Wales. The work was commissioned by Tomlinson's Dairies Limited in December 2003. Mark Dady Associates were appointed Consulting Structural Engineers for the project which is likely to comprise the construction of one 50m x 40m and one 20m x 16m single storey steel framed buildings to house a new dairy and milk processing facility.

The purpose of the investigation was to ascertain the nature and structure of the near surface soils, in order that an assessment could be made of certain environmental and geotechnical properties with regard to the new development.

Site works consisted of sinking four cable percussion boreholes and taking samples for laboratory analysis. This report contains a factual record of the work carried out and discusses the findings in respect of the design of foundations for the new buildings. The general level of soil contamination is also discussed in respect of the presence of certain contaminants on the site.

For additional information reference should be made to a desk study prepared by the Engineer in November 2003.

2.0 THE SITE

The site is situated on the northern edge of Coedpoeth, 10km to the west of Wrexham. It is currently an undulating plot of worked arable land approximately 2.25 hectares in size. The site is bordered by Owernygaseg Road to the east while streams are found on the northern and south eastern boundary, the later exiting the site by way of a culvert. A disused railway embankment forms the north western boundary.

The site falls in height about 20 metres from west to east and a high voltage electricity pylon straddles the eastern end of the northern boundary. High voltage cables stretch across the site towards the south west.

3.0 FIELDWORK

Fieldworks were carried out between the 22nd and 27th January 2004 and the terms of reference required four boreholes of 150 mm diameter to be sunk by means of a cable percussion boring rig to a maximum depth of 10.0 metres at positions shown approximately on the appended site plan (section 10.0).

At regular intervals within the boreholes, Standard Penetration Tests (SPT's) were carried out in order to determine the strength of the Boulder Clay horizon. In between these tests nominal 104mm diameter undisturbed samples were also taken to determine their shear strength characteristics.

Sampling was carried out in accordance with the British Standards Code of Practice for Site Investigations BS 5930:1999. Representative bulk samples were recovered at each major soil change and at frequent intervals throughout

each stratum to provide a continuous record of the strata under consideration. The depths at which sampling commenced are recorded on the appended borehole logs which show, in addition, detailed information regarding the strata encountered as observed in the boreholes (section 7.0).

Due to the very soft nature of the ground surface it was decided not to supplement the borehole investigation with a number of trial pits for fear of severely damaging the crops growing in the field.

4.0 LABORATORY TESTING

4.1 Introduction

Using UKAS accredited laboratories the following programme of laboratory testing has been generally carried out on selected samples in accordance with BS 1377: Methods of Test for Soil and Civil Engineering Purposes 1990.

4.2 Atterberg Limit Tests

As an aid to their classification the liquid limit, plastic limit and plasticity index tests were carried out on three undisturbed samples of boulder clay from

borehole 2 at 1.60 metres, borehole 3 at 1.00 metre and borehole 4 at 1.00. All these results are presented on the borehole logs in section 7.0.

4.3 Triaxial Compression Tests

Quick undrained single- stage triaxial compression tests were undertaken on three undisturbed samples of Boulder Clay, as a guide to their shear strength characteristics. The moisture content and bulk and dry densities were also calculated as part of each test. Unfortunately there was not enough sample in several of the other undisturbed samples for them to be tested. All these results are included on the cable percussion borehole logs in section 7.0.

4.4 Consolidation Tests

As an indication of the settlement characteristics of the Boulder Clay, one dimensional consolidation tests were carried out on two undisturbed samples obtained from 1.00 metres in borehole 3 and 1.00 metres in borehole 4. The results of these tests are included in section 8.0.

4.3 Chemical Tests

Chemical analysis was employed to determine the pH value and soluble sulfate content (using a 2:1 water soil extract) of one sample of soil from 0.50 metres in every borehole.

The same four soil samples were tested for a general screening suite of contaminants and a general screen for any organo- phosphorous and organo- chlorine pesticides which may have been used on the site.

All the chemical test results are presented in section 9.0.

5.0 GROUND CONDITIONS

5.1 Geology

According to the available geological information, the site is expected to be underlain by glacial drift (boulder clay) overlying the Westphalian Middle Coal Measures (Productive Coal Measures) which are expected to dip towards the east.

5.2 Site History

Mark Dady Associates have produced a Desk Top Study Report for the site which contains an overview of Ordnance Survey plans dating back to 1872. This would show that the site has remained undeveloped through out its history. The adjacent Five Crosses Trading estate is not indicated on the plans until 1976.

5.3 Coal Mining

Consultation of the Desk Top Study would indicate that according to the Coal Authority Report (ref 493900 – 03), a coal seam last worked in 1884 is present between 90 and 110 metres below the site. The Authority have concluded that ground movement related to these “past coal workings should by now have ceased”.

There are no known shafts on the site and no know current workings beneath the site.

5.4 Strata Encountered

Detailed descriptions of the strata encountered by this investigation are given on the borehole logs.

The boreholes proved an average topsoil thickness of 0.4 metres. This was underlain by Boulder Clay consisting of stiff fissured mottled brown and grey very silty sandy gravelly clay which becomes dark brown or grey in colour with depth. Cobbles and boulders were proved within the horizon.

Bedrock expected to consist of the Westphalian Middle Coal Measures was not proved by the borehole investigation with all of the boreholes terminating in the glacial drift.

5.5 Groundwater

The speed with which the boring was carried out combined with the low permeability of the glacial drift deposits have precluded from the true groundwater conditions being encountered in all four boreholes. All four boreholes were dry for the short period they were open with the exception of borehole 2 where a seepage was noted at a depth of 1.00 metre. Large influxes

of groundwater are not anticipated during excavations for the foundations. Any water which does enter should be readily removed by pumping from open sumps.

6.0 ENGINEERING DISCUSSION

6.1 Introduction

The site plan presented in section 10.0 indicates the possible location of the two steel framed buildings. These will be constructed in the western half of the site and will have a combined area of 2320 m².

At the time of writing this report, it was not known what the level of the new buildings will be in relation to the existing topography. Depending on the final ground profile some regrading operations may be required to form developable plateaus.

6.2 Foundations

The borehole investigation has proved that below the surface of the site up to 0.4 metres of topsoil is underlain by a firm to stiff becoming stiff fissured brown very silty sandy gravelly clay to at least 10.0 metres.

Prior to construction the topsoil should be stripped from each building area.

As a general guide, safe allowable bearing pressures (kN/m^2) for both strip and pad foundations at depths of 1.00 and 2.00 metres below existing ground level are given below assuming a breadth to the pad foundation of 2 metres and a 1 metre breadth for strip foundations:-

<u>Foundation Type</u>	<u>Depth (metres) below existing ground level</u>	
	<u>1.00 metre</u>	<u>2.00 metres</u>
Strip	140	250
Pad	150	270

The above are based on shear strength values derived from the Standard Penetration Tests and Triaxial Compression Tests.

Great care should be taken to inspect the soils exposed at the formation level of the foundations, to ensure that conditions are similar to those described on the borehole logs and assumed for the above allowable bearing pressures.

Weathering could rapidly soften the cohesive deposits and reduce their bearing capacity; hence care should be taken to avoid such occurrences by, for example, immediately blinding the formation upon exposure within a layer of concrete where possible.

Consolidation tests carried out at a depth of 1.00 metre in borehole 3 and 4 indicate that the near surface weathered boulder clays have a medium compressibility (section 8.0). Allowing for the fact that the clays are over consolidated, total settlements are unlikely to exceed an order of 25 mm, provided the required bearing capacities for a particular depth and foundation type are kept within those loadings mentioned in the table.

The atterberg limit tests have indicated that the clays are of a low to intermediate plasticity and low shrinkage potential. Consequently the minimum depth of foundation should be 0.75 metres. For buildings sited in their proposed position, founding levels would not need to be increased due to the proximity of the trees which are at least 20 – 25 metres away.

It is expected that due to the highly cohesive nature of the sub surface soils, disposal of surface waters by means of soakaways would be impractical.

6.3 Buried Concrete

In accordance with BRE Special Digest 1 (SD1) chemical analysis has been carried out on four soil samples in order to determine the Aggressive Chemical Environment for Concrete (ACEC) class of the site. Based on the results and the guidelines contained in part 1 of SD1 it should be possible to assign an ACEC class for the site of AC – 1 for all buried concrete.

6.4 Soil Contamination

Four samples of soil have been tested for a general range of contaminants as listed in section 9.0.

Where appropriate the new Contaminated Land Exposure Assessment Model (CLEA) has been used to compare the concentrations of arsenic, cadmium, chromium, mercury, nickel, selenium and lead with their appropriate Soil

Guideline Values (SGV). In using the SGV the proposed land use has been considered as commercial/ industrial.

The concentrations for arsenic, cadmium, chromium, mercury, nickel, selenium and lead were all well below their respective Soil Guideline Values as listed in SGV 1, 3, 4, 5, 7, 9 and 10, and as such based on these contaminants the site could be considered suitable for development without the need for any remedial action to be taken.

The levels found for the other contaminants did not give cause for concern for the proposed end use. No organo-chlorine and organo-phosphorous pesticides were detected in the clay soils directly below the topsoil.

T.J. McLaren, BSc.,FGS

Engineering Geologist

H.S. Lister, BSc., C. Geol.,FGS.,

Director

7.0 CABLE PERCUSSION BOREHOLE LOGS

GROUND INVESTIGATION SPECIALISTS LIMITED

BOREHOLE RECORD	BORING COMMENCED: 22.01.04	TYPE OF BORING: Cable Percussion	CLIENT: Tomlinson's Dairies Limited
	BORING COMPLETED: 22.01.04	DIAMETER OF HOLE: 150 mm	ENGINEER: Mark Dady Associates
	GROUND LEVEL:	BOREHOLE CASING: 1.50 metres	CONTRACT: Coedpoeth, Nr Wrexham
			BOREHOLE: 1 SHEET: 1 OF 1 JOB NO: 457

DESCRIPTION OF STRATA	LEGEND	WATER LEVEL	THICKNESS	DEPTH	REDUCED LEVEL	DEPTH	INDEX PROPERTIES				DENSITIES			STRENGTH TESTS		IN-SITU CHEMICAL AND OTHER TESTS AND REMARKS (SPT Blows)			
							'N' VALUE	M/C %	LL %	PL %	PI	WET (kg/m ³)	DRY (kg/m ³)	TYPE	COHESION (kN/m ²)		ANGLE OF INTERNAL FRICTION (degrees)		
							TYPE												
Dark brown TOPSOIL (drillers description)			0.50	0.50		GL													
Stiff fissured mottled brown and grey silty sandy CLAY with some fine to medium gravel of various lithologies. (RQIII DFR CLAY) Becomes dark brown in colour from 2.00 metres.			7.55	0.50			B1										(1.3.3.3.4.3.)		
				1.00				S2										(5.4.6.7.7.7.)	
				1.80				B3											
				2.00				S4											
				2.80				B5											
				3.00				U6	13										
				3.30				B7											
				3.80				B8											
				4.00				S9											(3.4.3.4.4.5.)
				4.50				B10											
		5.00				U11											Insufficient recovery for triaxial tests		
		5.80				B12													
		6.00				S13											(2.3.4.4.5.5.)		
		6.80				B14													
		7.00				U15	13												
		7.45				B16													
		7.60				S17											(11.6.4.5.6.6.)		
Borehole complete						8.05													

SAMPLES		RESULTS OF TESTS	
DESCRIPTION	TEST RESULT	TEST TYPE	REMARKS
W - Water Sample	M/C - Natural Moisture Content	'N' - Standard or Cone Penetration Test Result	S - Standard Penetration Test
B - Bulk Sample	LL - Liquid Limit	T - Undrained Triaxial	C - Cone Penetration Test
J - Jar Sample	PL - Plastic Limit	M - Multi-stage Undrained Triaxial	V - Vane Test (pocket)
U - Undisturbed Sample	PI - Plasticity Index		SO ₃ - Soluble Sulphate Analysis

GROUNDWATER OBSERVATIONS:	SYMBOL	DESCRIPTION
Final groundwater level	▼	
Groundwater first struck	▽	
Standpipe	▲	
Piezometer	●	

Dry

GROUND INVESTIGATION SPECIALISTS LIMITED

BOREHOLE RECORD	BORING COMMENCED: 23.01.04	TYPE OF BORING: Cable Percussion	CLIENT: Tomlinson's Dairies Limited
	BORING COMPLETED: 23.01.04	DIAMETER OF HOLE: 150 mm	ENGINEER: Mark Dady Associates
	GROUND LEVEL:	BOREHOLE CASING: 1.50 metres	CONTRACT: Coedpoeth, Nr Wrexham
			BOREHOLE: 2 SHEET: 1 OF 1 JOB NO: 457

DESCRIPTION OF STRATA	LEGEND	WATER LEVEL	THICKNESS	DEPTH	REDUCED LEVEL	RESULTS OF TESTS										IN-SITU CHEMICAL AND OTHER TESTS AND REMARKS (SPT Blows)	
						INDEX PROPERTIES					DENSITIES		STRENGTH TESTS		ANGLE OF INTERNAL FRICTION (degrees)		
						'N' VALUE	M/C %	LL %	PL %	PI	WET (kg/m ³)	DRY (kg/m ³)	TYPE	COHESION (kN/m ²)			
Dark brown TOPSOIL (drillers description)			0.40	0.40													
Firm to stiff mottled brown and light grey very silty sandy CLAY with some fine to coarse angular to sub-angular gravel of various lithologies and occasional limestone cobbles. (BOULDER CLAY)	▽			1.00				14	32	18	14	2200	1940	T	93		No recovery (2.5.8.8.6.6.)
Becomes stiff, dark brown in colour and includes fine to medium gravel from 1.90 metres.																	Poor recovery (8.6.3.3.3.3.)
Includes much light brown sandstone fragments from 2.10 - 2.80 metres.																	(2.2.2.2.3.4.)
Becomes firm to stiff below 3.30 metres			9.60														Insufficient recovery for triaxial test
																	(1.2.3.3.5.4.)
																	Poor recovery due to cobble
																	(8.3.3.3.4.6.)
Becomes stiff from 9.50 metres. Borehole complete				10.00													(8.3.5.6.8.8.)

GROUNDWATER OBSERVATIONS:	W - Water Sample B - Bulk Sample J - Jar Sample U - Undisturbed Sample
Seepage at 1.00 metres. Water cut off by casing at 1.50 metres.	M/C - Natural Moisture Content LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index
	'N' - Standard or Cone Penetration Test Result T - Undrained Triaxial M - Multi-stage Undrained Triaxial
	S - Standard Penetration Test C - Cone Penetration Test V - Vane Test (pocket) SO ₃ - Soluble Sulphate Analysis

GROUND INVESTIGATION SPECIALISTS LIMITED

BOREHOLE RECORD	BORING COMMENCED: 26.01.04	TYPE OF BORING: Cable Percussion	CLIENT: Tomlinson's Dairies Limited
	BORING COMPLETED: 26.01.04	DIAMETER OF HOLE: 150 mm	ENGINEER: Mark Dady Associates
	GROUND LEVEL:	BOREHOLE CASING: 1.50 metres	CONTRACT: Coedpoeth, Nr Wrexham
			BOREHOLE: 3 SHEET: 1 OF 1 JOB NO: 457

DESCRIPTION OF STRATA	LEGEND	WATER LEVEL	THICKNESS	DEPTH	REDUCED LEVEL	DEPTH	INDEX PROPERTIES				DENSITIES		STRENGTH TESTS		IN-SITU CHEMICAL AND OTHER TESTS AND REMARKS (SPT Blows)		
							N' VALUE	M/C %	LL %	PL %	PI	WET (kg/m ³)	DRY (kg/m ³)	TYPE		COHESION (kN/m ²)	ANGLE OF INTERNAL FRICTION (degrees)
Dark brown TOPSOIL (drillers description)			0.30	GL 0.30													
Firm to stiff becoming stiff fissured mottled brown and light grey silty sandy CLAY with some fine to coarse sub-angular gravel of various lithologies. (BOULDER CLAY)								24	41	24	17				Insufficient recovery due to nature of material (1.5.6.6.6.7.)		
Becomes dark brown in colour from 2.00 metres.								25							(3.4.5.6.6.5.)		
Becomes grey in colour from 3.00 metres.								22							(4.6.6.5.6.7.)		
Becomes very clayey SILT from 3.80 – 4.00 metres and 4.80 – 5.45 metres.			8.23					24							Insufficient recovery due to nature of material (4.5.7.5.6.7.)		
Becomes very silty from 6.00 – 6.80 metres.								50	Blows for 200 mm penetration						Poor recovery (2.5.8.9.28.5.)		
Borehole complete								50	Blows for 80 mm penetration						Chiselled for ½ Hour from 8.30- 8.53 metres. (3.4.42.8)		

GROUNDWATER OBSERVATIONS: ▼ - Final groundwater level ▽ - Groundwater first struck ▲ - Standpipe ● - Piezometer	W - Water Sample B - Bulk Sample J - Jar Sample U - Undisturbed Sample	M/C - Natural Moisture Content LL - Liquid Limit PL - Plastic Limit PI - Plasticity Index	'N' - Standard or Cone Penetration Test Result T - Undrained Triaxial M - Multi-stage Undrained Triaxial
			S - Standard Penetration Test C - Cone Penetration Test V - Vane Test (pocket) SO ₃ - Soluble Sulphate Analysis

GROUND INVESTIGATION SPECIALISTS LIMITED

BOREHOLE RECORD	BORING COMMENCED: 22.01.04	TYPE OF BORING: Cable Percussion	CLIENT: Tomlinson's Dairies Limited
	BORING COMPLETED: 22.01.04	DIAMETER OF HOLE: 150 mm	ENGINEER: Mark Dady Associates
	GROUND LEVEL:	BOREHOLE CASING: 1.50 metres	CONTRACT: Coedpoeth, Nr Wrexham
			BOREHOLE: 4
			SHEET: 1 OF 1
			JOB NO: 457

DRILLING

DESCRIPTION OF STRATA	LEGEND	WATER LEVEL	THICKNESS	DEPTH	REDUCED LEVEL	DEPTH	INDEX PROPERTIES				DENSITIES		STRENGTH TESTS		IN-SITU CHEMICAL AND OTHER TESTS AND REMARKS (SPT Blows)	
							'N' VALUE	M/C %	LL %	PL %	PI	WET (kg/m ³)	DRY (kg/m ³)	TYPE		COHESION (kN/m ²)
Dark brown TOPSOIL (drillers description)			0.40	0.50		GL										
Firm to stiff becoming stiff fissured mottled brown and light grey silty sandy CLAY with some fine to medium sub-angular gravel of various lithologies. (BOULDER CLAY)				1.00				14	34	19	15					
Becomes very clayey SILT and moist from 1.80 - 2.00 metres. Becomes grey grey in colour from 2.00 metres.				1.45												Insufficient recovery due to nature of material
Becomes very silty from 3.00 - 4.00 metres.				1.80												(5.6.6.6.9.6.)
Includes boulder from 3.50- 3.80 metres.			7.12	2.00												(8.10.5.6.6.6.)
Becomes very silty from 5.80 - 6.80 metres and from 7.10 metres.				2.80												Chiselled for 1/2 hour from 3.50 - 3.80 metres.
				3.00												(2.3.3.4.5.6.)
				4.80												No recovery
				5.00												(3.7.6.6.5.6.)
				5.10												(5.6.3.4.6.6.)
				5.10												No recovery
				5.80												(2.4.6.6.8.30.)
				6.00												Chiselled for 1 hour from 7.50- 7.52 metres.
				6.80												25 blows for 10 mm, then 50 blows for 10 mm
Borehole terminated on possible boulder.				7.00												
				7.10												
				7.50												
				7.50												

SAMPLES		RESULTS OF TESTS	
TYPE	'N' VALUE	TEST RESULT	TESTS
B1	14	'N' - Standard or Cone Penetration Test Result	S - Standard Penetration Test
U2	34	LL - Liquid Limit	C - Cone Penetration Test
B3	19	PL - Plastic Limit	V - Vane Test (pocket)
B4	15	PI - Plasticity Index	SO ₃ - Soluble Sulphate Analysis
S5			
B6			
S7			
S8			
B9			
U10			
B11			
S12			
B13			
S14			
B15			
U16			
S17			
S18			

GROUNDWATER OBSERVATIONS:	W - Water Sample	M/C - Natural Moisture Content	'N' - Standard or Cone Penetration Test Result
▼ - Final groundwater level	B - Bulk Sample	LL - Liquid Limit	T - Undrained Triaxial
▽ - Groundwater first struck	J - Jar Sample	PL - Plastic Limit	M - Multi-stage Undrained Triaxial
▲ - Standpipe	U - Unsettled Sample	PI - Plasticity Index	
● - Piezometer			

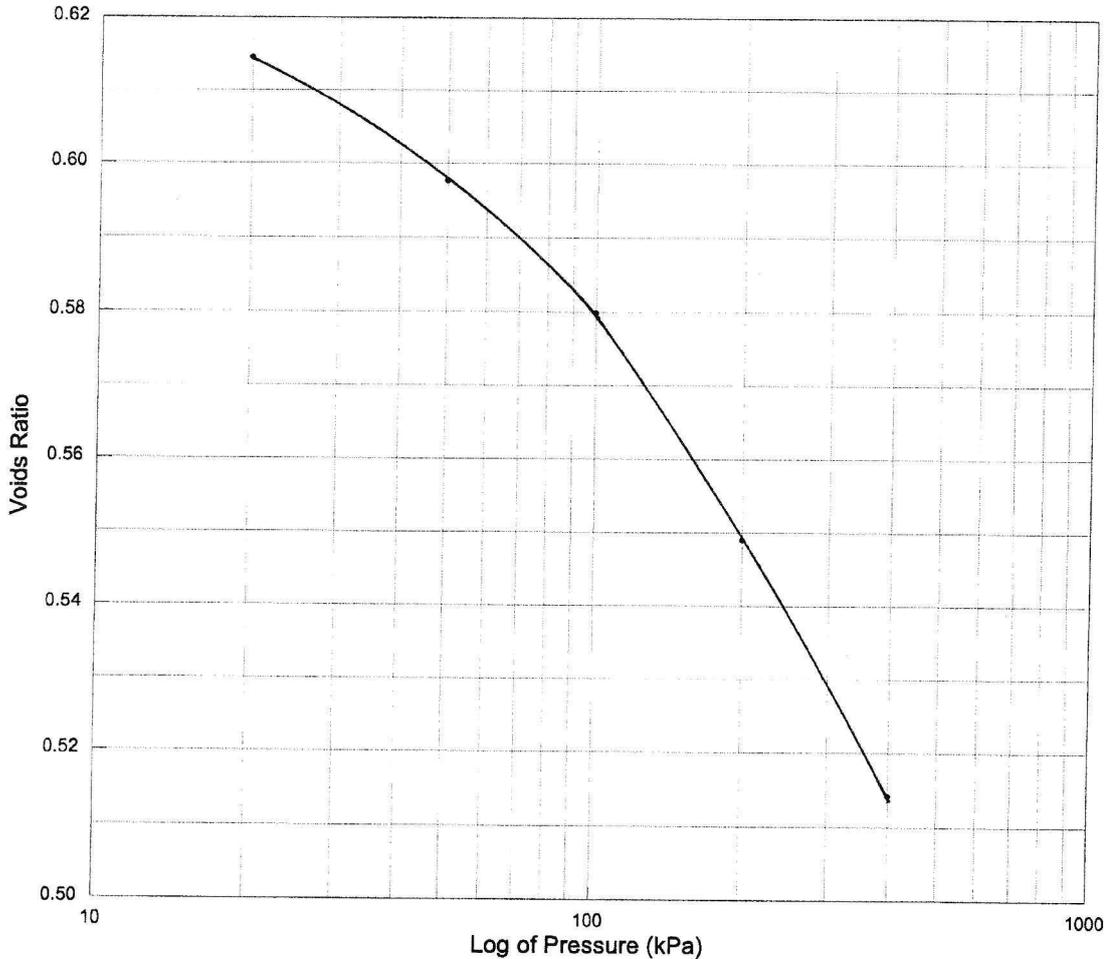
Dry

8.0 CONSOLIDATION TEST RESULTS

Determination of One Dimensional Consolidation Properties of Soil

Borehole No: 3
 Sample No: U2
 Depth: 1.00m
 Depth within original sample: 1.30m
 Orientation: Vertical
 Specimen preparation: Undisturbed

Description:
 Soft to firm brown slightly sandy CLAY with occasional fine to coarse gravel.



Initial Conditions:

Moisture Content (%) 25
 Voids Ratio 0.627
 Diameter (mm) 76.2
 Height (mm) 18.6
 Bulk Density (Mg/m³) 2.05
 Dry Density (Mg/m³) 1.64

Final Conditions:

Moisture Content (%) 22
 Voids Ratio 0.514
 Particle Density (Mg/m³) 2.67 (Assumed)
 Laboratory Temperature (°C) 19.1

Pressure Range (kPa)	Mv (m ² /MN)	Cv (m ² /yr)	Time Fitting Method	Voids Ratio
0 - 20	0.377	2.15	t50	0.614
20 - 50	0.347	2.20	t50	0.598
50 - 100	0.223	3.90	t50	0.580
100 - 200	0.195	2.83	t50	0.549
200 - 400	0.112	4.69	t50	0.514

Checked and Approved

Initials: *[Signature]*

Date: 1/3/04

Project Number:

GEO / 6744

Project Name:

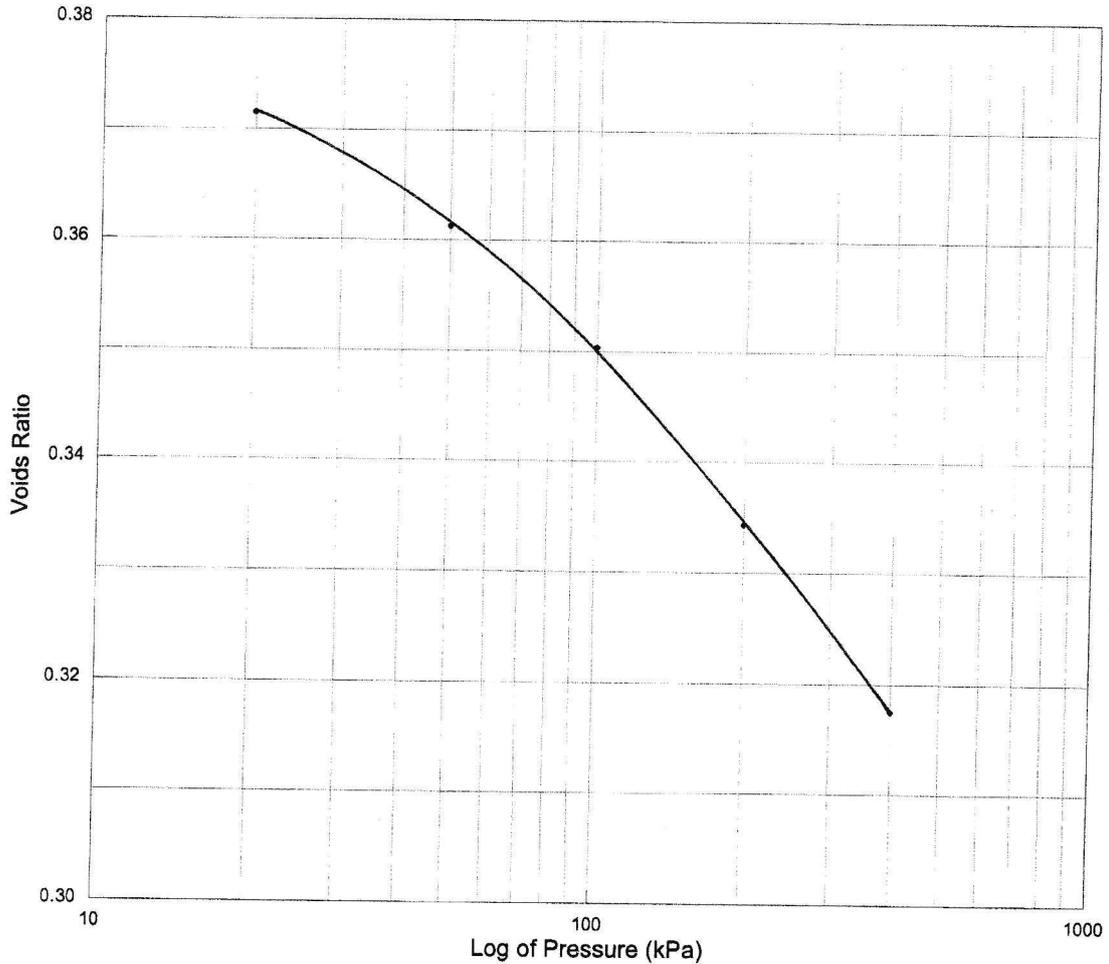
COEDPOETH - WREXHAM

GEOLABS

Determination of One Dimensional Consolidation Properties of Soil

Borehole No: 4
 Sample No: U2
 Depth: 1.00m
 Depth within original sample: 1.25m
 Orientation: Vertical
 Specimen preparation: Undisturbed

Description:
 Firm mottled grey and brown silty CLAY with occasional fine to coarse gravel.



Initial Conditions:

Moisture Content (%) 15
 Voids Ratio 0.382
 Diameter (mm) 76.2
 Height (mm) 18.7
 Bulk Density (Mg/m³) 2.24
 Dry Density (Mg/m³) 1.94

Final Conditions:

Moisture Content (%) 15
 Voids Ratio 0.317
 Particle Density (Mg/m³) 2.68 (Assumed)
 Laboratory Temperature (°C) 19.1

Pressure Range (kPa)	Mv (m ² /MN)	Cv (m ² /yr)	Time Fitting Method	Voids Ratio
0 - 20	0.372	6.08	t50	0.372
20 - 50	0.250	3.45	t50	0.361
50 - 100	0.160	4.50	t50	0.350
100 - 200	0.119	3.58	t50	0.334
200 - 400	0.063	6.43	t50	0.317

Checked and Approved

Initials: *SK*

Date: 1/3/04

Project Number:

GEO / 6744

Project Name:

COEDPOETH - WREXHAM

GEOLABS

9.0 SOIL CONTAMINATION TEST RESULTS

ALcontrol Geochem Analytical Services

Table Of Results - Appendix

Job Number: 04/02169/02
Client: Ground Investigation Specialists Limited
Client Ref. No.:

Report Key :

NDP No Determination Possible * Subcontracted test
 NFD No Fibres Detected » Result previously reported (Incremental reports only)
 # ISO 17025 accredited

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Monohydric Phenols by HPLC with electro-chemical detection	Y	N	WET
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser	Y	N	DRY
TM105	Method 4500D, AWWA/APHA, 20th Ed., 1999	Determination of Acid Soluble Sulphide in soil samples using the Kone Analyser	Y	N	WET
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	Y	N	DRY
TM133	BS 1377: Part 3 1990	Determination of pH in Soil and Water using the GLpH pH Meter	Y	N	WET
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC	Y	N	DRY
TM148	BS 1377: Part 3 1990 (Extraction)	Analysis of Total Sulphate using Unicam 701 Spectrophotometer	N	N	DRY
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser	Y	N	WET
TM154	In - house Method	Determination of Petroleum Hydrocarbons by EZ Flash GC-FID in the Carbon range C6- C40	Y	N	WET

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Alcontrol Geochem

Organo-Chlorine and Organo-Phosphorous Pesticides

Sample Identity - 200402169-001/BH1 0.5
Client / Sample matrix - /soil
Units - µg/kg

CAS Number	Compound	Concentration
62-73-7	Dichorvos	<1
7786-34-7	Mevinphos	<1
319-84-6	Alpha-BHC	<1
319-85-7	Beta-BHC	<1
58-89-9	Gamma-BHC	<1
333-41-5	Diazinon	<1
298-00-0	Methyl Parathion	<1
76-44-8	heptachlor	<1
122-14-5	Fenitrothion	<1
121-75-5	Malathion	<1
309-00-2	Aldrin	<1
56-38-2	Parathion	<1
1024-57-3	Heptachlor Epoxide	<1
959-98-8	Endosulfan I	<1
72-55-9	4,4-DDE	<1
60-57-1	Dieldrin	<1
72-20-8	Endrin	<1
33213-65-9	Endosulfan II	<1
72-54-8	4,4-DDD	<1
563-12-2	Ethion	<1
50-29-3	4,4-DDT	<1
1031-07-8	Endosulfan Sulphate	<1
72-43-5	Methoxychlor	<1
86-50-0	Azinphos Methyl	<1
Total		<1

Alcontrol Geochem

Organo-Chlorine and Organo-Phosphorous Pesticides

Sample Identity - 200402169-002/BH2 0.5
Client / Sample matrix - /soil
Units - µg/kg

CAS Number	Compound	Concentration
62-73-7	Dichorvos	<1
7786-34-7	Mevinphos	<1
319-84-6	Alpha-BHC	<1
319-85-7	Beta-BHC	<1
58-89-9	Gamma-BHC	<1
333-41-5	Diazinon	<1
298-00-0	Methyl Parathion	<1
76-44-8	heptachlor	<1
122-14-5	Fenitrothion	<1
121-75-5	Malathion	<1
309-00-2	Aldrin	<1
56-38-2	Parathion	<1
1024-57-3	Heptachlor Epoxide	<1
959-98-8	Endosulfan I	<1
72-55-9	4,4-DDE	<1
60-57-1	Dieldrin	<1
72-20-8	Endrin	<1
33213-65-9	Endosulfan II	<1
72-54-8	4,4-DDD	<1
563-12-2	Ethion	<1
50-29-3	4,4-DDT	<1
1031-07-8	Endosulfan Sulphate	<1
72-43-5	Methoxychlor	<1
86-50-0	Azinphos Methyl	<1
Total		<1

Alcontrol Geochem

Organo-Chlorine and Organo-Phosphorous Pesticides

Sample Identity - 200402169-003/BH3 0.5
Client / Sample matrix - /soil
Units - µg/kg

CAS Number	Compound	Concentration
62-73-7	Dichorvos	<1
7786-34-7	Mevinphos	<1
319-84-6	Alpha-BHC	<1
319-85-7	Beta-BHC	<1
58-89-9	Gamma-BHC	<1
333-41-5	Diazinon	<1
298-00-0	Methyl Parathion	<1
76-44-8	heptachlor	<1
122-14-5	Fenitrothion	<1
121-75-5	Malathion	<1
309-00-2	Aldrin	<1
56-38-2	Parathion	<1
1024-57-3	Heptachlor Epoxide	<1
959-98-8	Endosulfan I	<1
72-55-9	4,4-DDE	<1
60-57-1	Dieldrin	<1
72-20-8	Endrin	<1
33213-65-9	Endosulfan II	<1
72-54-8	4,4-DDD	<1
563-12-2	Ethion	<1
50-29-3	4,4-DDT	<1
1031-07-8	Endosulfan Sulphate	<1
72-43-5	Methoxychlor	<1
86-50-0	Azinphos Methyl	<1
Total		<1

Alcontrol Geochem

Organo-Chlorine and Organo-Phosphorous Pesticides

Sample Identity - 200402169-004/BH4 0.5
Client / Sample matrix - /soil
Units - µg/kg

CAS Number	Compound	Concentration
62-73-7	Dichorvos	<1
7786-34-7	Mevinphos	<1
319-84-6	Alpha-BHC	<1
319-85-7	Beta-BHC	<1
58-89-9	Gamma-BHC	<1
333-41-5	Diazinon	<1
298-00-0	Methyl Parathion	<1
76-44-8	heptachlor	<1
122-14-5	Fenitrothion	<1
121-75-5	Malathion	<1
309-00-2	Aldrin	<1
56-38-2	Parathion	<1
1024-57-3	Heptachlor Epoxide	<1
959-98-8	Endosulfan I	<1
72-55-9	4,4-DDE	<1
60-57-1	Dieldrin	<1
72-20-8	Endrin	<1
33213-65-9	Endosulfan II	<1
72-54-8	4,4-DDD	<1
563-12-2	Ethion	<1
50-29-3	4,4-DDT	<1
1031-07-8	Endosulfan Sulphate	<1
72-43-5	Methoxychlor	<1
86-50-0	Azinphos Methyl	<1
Total		<1

10.0 SITE PLAN

Cynulliad Cenedlaethol Cymru National Assembly for Wales

IACS 2002

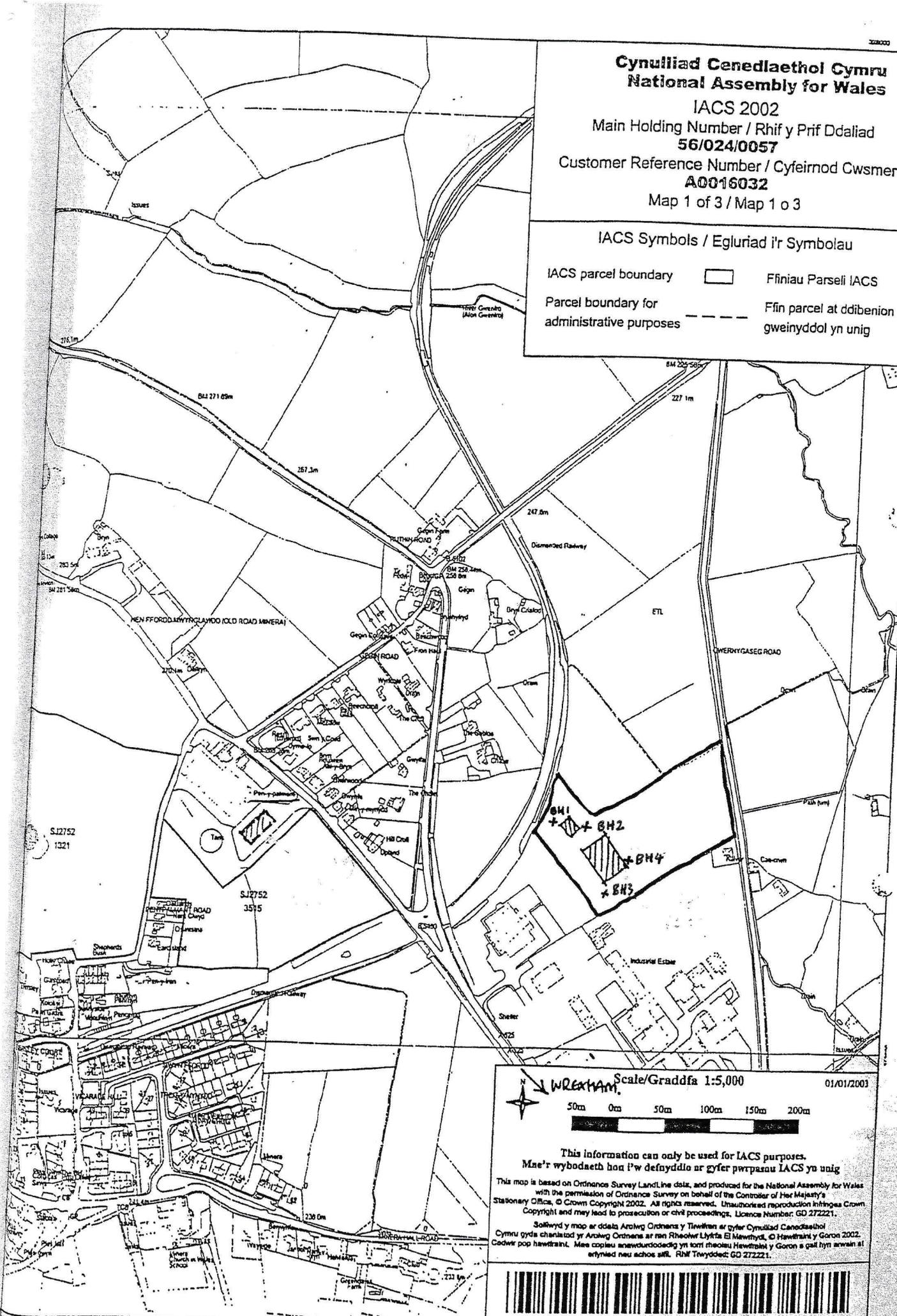
Main Holding Number / Rhif y Prif Ddaliad
56/024/0057

Customer Reference Number / Cyfeirnod Cwsmer
A0016032

Map 1 of 3 / Map 1 o 3

IACS Symbols / Egluriad i'r Symbolau

- IACS parcel boundary Ffiniau Parseli IACS
- Parcel boundary for administrative purposes Ffin parcel at ddibenion gweinyddol yn unig



Scale/Graddfa 1:5,000 01/01/2003

WREXHAM

50m 0m 50m 100m 150m 200m

This information can only be used for IACS purposes.
Mae'r wybodaeth hon i'w defnyddio ar gyfer pwrparau IACS yn unig

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ANNEX D Groundsure Report



Paul Downing Ltd
23, Carlton Road,
Headley Down, GU35 8JW

Groundsure Reference: GS-3343997
Your Reference: Tomlinsons_Dairy
Report Date: 3 Oct 2016
Report Delivery Method: Email - pdf

Groundsure Enviro Insight

Address: UNIT D, FIVE CROSSES INDUSTRIAL ESTATE, WREXHAM, LL11 3RD

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Groundsure Enviro Insight

Address: UNIT D, FIVE CROSSES INDUSTRIAL ESTATE, WREXHAM, LL11 3RD
Date: 3 Oct 2016
Reference: GS-3343997
Client: Paul Downing Ltd



Aerial Photograph Capture date: 09-Jun-2013
Grid Reference: 327762,352256
Site Size: 3.98ha

Report Reference: GS-3343997
Client Reference: Tomlinsons_Dairy

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Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	3	19	31	90
1.2 Additional Information – Historical Tank Database	0	0	1	1
1.3 Additional Information – Historical Energy Features Database	0	0	3	3
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	4
1.6 Potentially Infilled Land	0	9	16	95
Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	3	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	2
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	2
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency Historic Landfill Sites	0	0	0	0	1	3
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	1
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency Licensed Waste Sites	0	0	2	0	0	3

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	2	5	23	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	1	1
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	1	1
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	2	0	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500

Section 6: Hydrogeology and Hydrology

0-500m

6.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	1	1	8	8	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No
7.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site	No
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	2
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	3
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	1	8	39
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	1	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Very Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Very Low
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is in a Radon Affected Area, as between 5 and 10% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	Basic radon protective measures are necessary.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	Yes
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	Yes
10.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

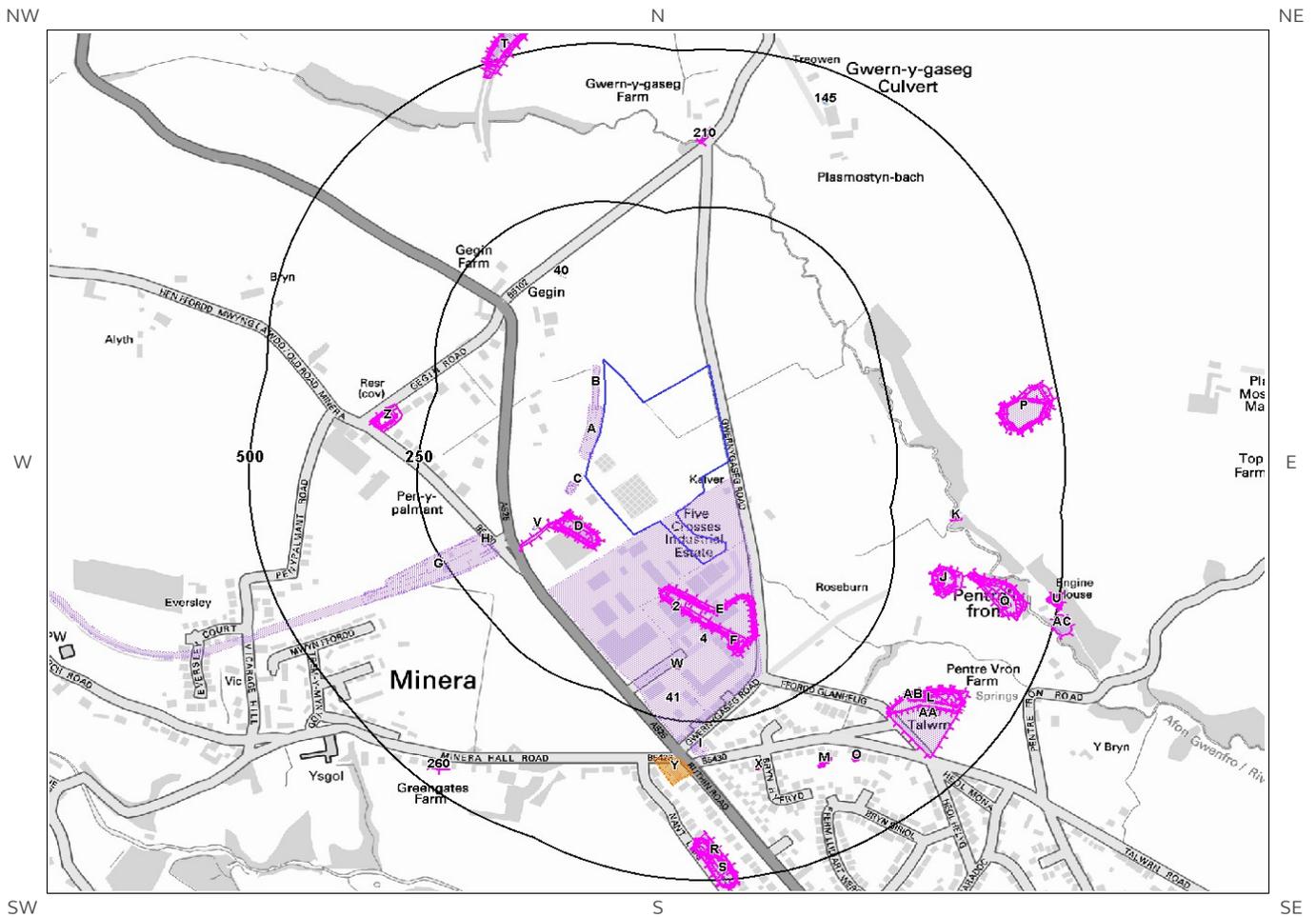
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



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1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 143

ID	Distance [m]	Direction	Use	Date
1A	0	On Site	Railway Sidings	1960
2	0	On Site	Unspecified Commercial/Industrial	1989
3A	0	W	Railway Sidings	1938
4	1	SE	Unspecified Works	1985
5C	3	W	Railway Station	1900
6B	7	W	Railway Building	1938
7B	7	W	Railway Building	1960
8B	8	W	Railway Building	1949
9A	8	W	Railway Sidings	1910
10C	18	SW	Railway Station	1938
11C	19	SW	Railway Station	1910
12C	19	SW	Railway Station	1960
13C	20	SW	Railway Station	1949
14D	41	SW	Unspecified Heap	1938
15D	41	SW	Unspecified Heap	1938
16D	42	SW	Unspecified Heap	1900
17D	42	SW	Unspecified Ground Workings	1910
18D	43	SW	Unspecified Heap	1949
19D	44	SW	Unspecified Heap	1985
20D	44	SW	Unspecified Heap	1974
21D	44	SW	Unspecified Heap	1989
22D	44	SW	Unspecified Heap	1960
23E	52	SW	Unspecified Heap	1985
24E	52	SW	Unspecified Heap	1974
25E	55	S	Unspecified Heap	1900
26E	56	SW	Unspecified Heap	1938
27E	56	SW	Unspecified Heap	1938
28E	59	SW	Unspecified Ground Workings	1910
29E	61	SW	Unspecified Heap	1949
30E	62	SW	Unspecified Heap	1960
31V	99	SW	Railway Building	1949
32F	130	S	Unspecified Old Shaft	1938

33F	130	S	Unspecified Old Shaft	1938
34F	131	S	Unspecified Old Shaft	1910
35F	132	SE	Unspecified Old Shaft	1900
36F	132	S	Unspecified Old Shaft	1949
37F	134	S	Unspecified Disused Shaft	1985
38F	134	S	Unspecified Disused Shaft	1974
39F	134	S	Unspecified Old Shaft	1960
40	142	NW	Railway Building	1872
41	161	S	Unspecified Works	1974
42G	173	SW	Mineral Railway Sidings	1938
43	174	SW	Railway Sidings	1900
44H	176	SW	Railway Building	1938
45G	178	SW	Railway Sidings	1960
46G	179	SW	Railway Sidings	1949
47H	179	SW	Railway Building	1938
48H	180	SW	Railway Building	1949
49H	181	SW	Railway Building	1960
50G	196	SW	Railway Sidings	1910
51G	245	SW	Railway Building	1938
52G	248	SW	Railway Building	1960
53G	249	SW	Railway Building	1949
54I	277	S	Smithy	1900
55I	282	S	Smithy	1872
56J	308	E	Unspecified Heap	1949
57J	309	E	Unspecified Heap	1938
58J	309	E	Unspecified Heap	1938
59J	310	E	Unspecified Heap	1910
60J	311	E	Unspecified Heap	1960
61J	316	E	Refuse Heap	1872
62J	319	E	Unspecified Old Shafts	1949
63J	319	E	Unspecified Old Shafts	1910
64J	320	E	Unspecified Old Shafts	1960
65J	321	E	Unspecified Old Shafts	1938
66J	321	E	Unspecified Old Shafts	1938
67J	325	E	Unspecified Old Shafts	1900
68K	338	E	Unspecified Old Shaft	1949
69K	340	E	Unspecified Old Shaft	1910
70K	340	E	Unspecified Old Shaft	1938
71K	340	E	Unspecified Old Shaft	1938
72K	340	E	Unspecified Disused Shaft	1974
73K	340	E	Unspecified Disused Shaft	1989
74K	340	E	Unspecified Disused Shaft	1985
75K	340	E	Unspecified Old Shaft	1960
76L	349	SE	Old Colliery	1910
77L	349	SE	Colliery	1938
78L	349	SE	Colliery	1938

79AA	351	SE	Old Colliery	1949
80L	352	SE	Unspecified Ground Workings	1910
81L	353	SE	Unspecified Heap	1938
82L	353	SE	Unspecified Heap	1938
83L	353	SE	Unspecified Ground Workings	1949
84L	354	SE	Unspecified Heap	1960
85M	356	SE	Unspecified Old Shaft	1938
86M	356	SE	Unspecified Old Shaft	1938
87M	357	SE	Unspecified Disused Shafts	1974
88M	357	SE	Unspecified Disused Shafts	1985
89M	358	SE	Unspecified Old Shaft	1910
90M	358	SE	Unspecified Old Shaft	1949
91AB	359	SE	Unspecified Old Shaft	1900
92N	360	E	Unspecified Ground Workings	1938
93N	360	E	Unspecified Ground Workings	1938
94M	360	SE	Unspecified Old Shaft	1900
95N	361	E	Unspecified Heap	1949
96M	361	SE	Unspecified Old Shaft	1960
97N	366	E	Unspecified Heap	1872
98N	367	E	Unspecified Heap	1960
99O	376	SE	Unspecified Disused Shafts	1985
100O	376	SE	Unspecified Disused Shafts	1974
101P	409	E	Unspecified Heap	1949
102P	409	E	Unspecified Heap	1910
103P	411	E	Unspecified Heap	1938
104P	411	E	Unspecified Heap	1938
105P	412	E	Unspecified Heap	1960
106P	414	E	Unspecified Heap	1872
107Q	419	E	Unspecified Old Shafts	1949
108P	419	E	Refuse Heap	1900
109Q	420	E	Unspecified Old Shafts	1910
110N	421	E	Unspecified Old Shafts	1938
111N	421	E	Unspecified Old Shafts	1938
112Q	422	E	Unspecified Old Shafts	1960
113R	426	S	Refuse Heap	1900
114Q	426	E	Unspecified Old Shafts	1900
115R	433	S	Unspecified Heap	1938
116R	433	S	Unspecified Heap	1938
117R	435	S	Unspecified Heaps	1910
118R	435	S	Refuse Heap	1872

119R	435	S	Unspecified Heap	1949
120R	441	S	Unspecified Heap	1960
121R	449	S	Unspecified Shaft	1900
122R	455	S	Unspecified Old Shaft	1938
123R	455	S	Unspecified Old Shaft	1938
124R	457	S	Unspecified Shaft	1949
125R	458	S	Unspecified Tank	1910
126R	459	S	Coal Shaft	1872
127S	461	S	Unspecified Heap	1938
128S	461	S	Unspecified Heap	1938
129S	462	S	Unspecified Heap	1949
130T	476	N	Cuttings	1872
131T	479	N	Cuttings	1900
132U	481	E	Unspecified Pit	1960
133U	484	E	Unspecified Pit	1938
134U	484	E	Unspecified Pit	1938
135U	485	E	Unspecified Pit	1949
136T	491	N	Cuttings	1910
137T	492	N	Cuttings	1938
138T	495	N	Cuttings	1949
139T	498	N	Cuttings	1960
140T	498	N	Cuttings	1974
141T	498	N	Cuttings	1985
142T	498	N	Cuttings	1989
143AC	499	E	Unspecified Heap	1872

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

2

ID	Distance (m)	Direction	Use	Date
144V	109	SW	Unspecified Tank	1962
145	448	N	Unspecified Tank	1993

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary:

6

ID	Distance (m)	Direction	Use	Date
146W	165	S	Electricity Substation	1989
147W	165	S	Electricity Substation	1984
148W	165	S	Electricity Substation	1993
149X	330	S	Electricity Substation	1993
150X	331	S	Electricity Substation	1989
151X	331	S	Electricity Substation	1984

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary:

0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary:

4

ID	Distance (m)	Direction	Use	Date
152Y	309	S	Garage	1993
153Y	309	S	Garage	1962
154Y	322	S	Garage	1989
155Y	322	S	Garage	1984

1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 120

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

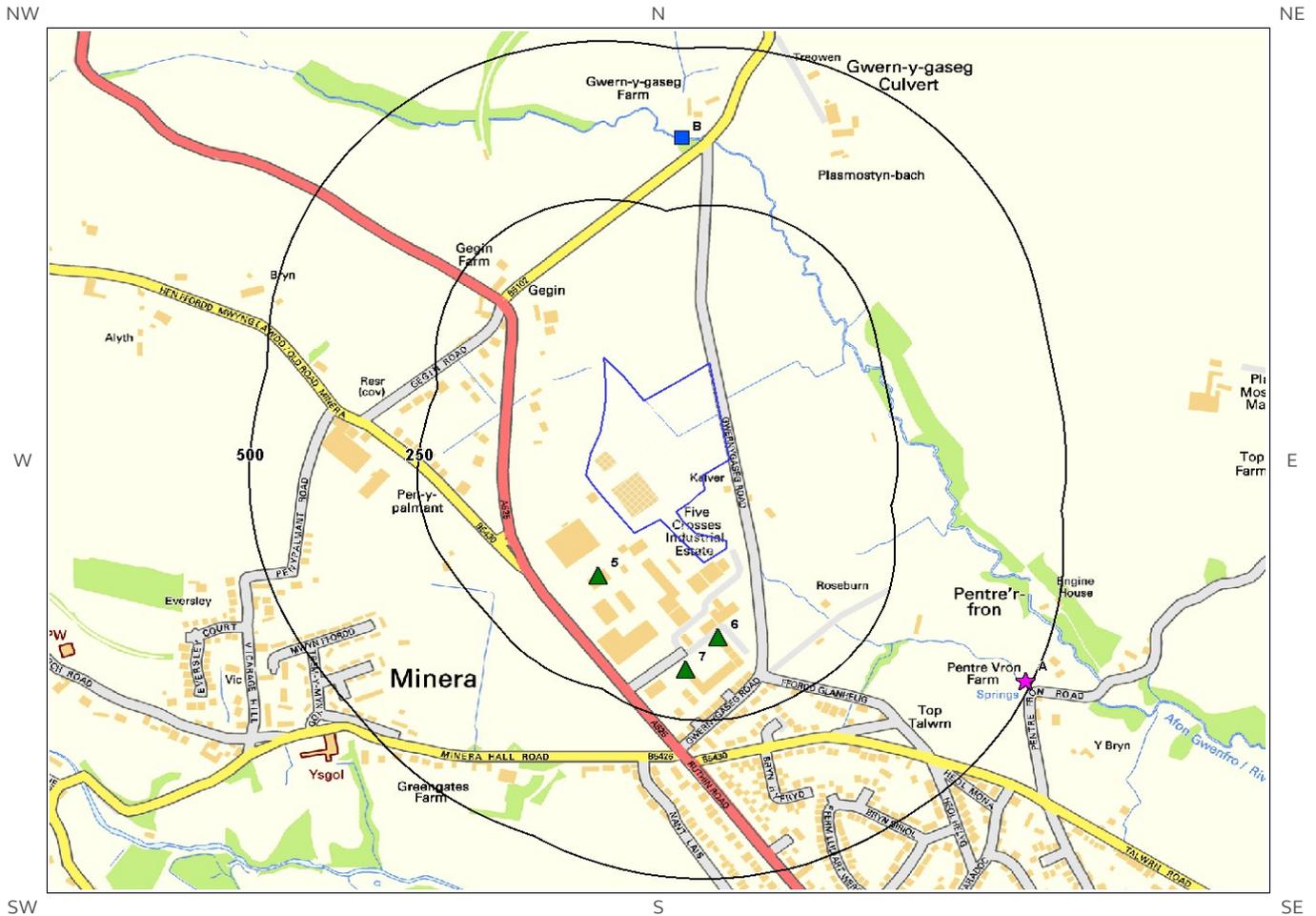
ID	Distance(m)	Direction	Use	Date
156D	41	SW	Unspecified Heap	1938
157D	41	SW	Unspecified Heap	1938
158D	42	SW	Unspecified Heap	1900

159D	42	SW	Unspecified Ground Workings	1910
160D	43	SW	Unspecified Heap	1949
161D	44	SW	Unspecified Heap	1960
162D	44	SW	Unspecified Heap	1985
163D	44	SW	Unspecified Heap	1989
164D	44	SW	Unspecified Heap	1974
165E	52	SW	Unspecified Heap	1974
166E	52	SW	Unspecified Heap	1985
167E	55	S	Unspecified Heap	1900
168E	56	SW	Unspecified Heap	1938
169E	56	SW	Unspecified Heap	1938
170E	59	SW	Unspecified Ground Workings	1910
171E	61	SW	Unspecified Heap	1949
172E	62	SW	Unspecified Heap	1960
173F	130	S	Unspecified Old Shaft	1938
174F	130	S	Unspecified Old Shaft	1938
175F	131	S	Unspecified Old Shaft	1910
176F	132	SE	Unspecified Old Shaft	1900
177F	132	S	Unspecified Old Shaft	1949
178F	134	S	Unspecified Old Shaft	1960
179F	134	S	Unspecified Disused Shaft	1974
180F	134	S	Unspecified Disused Shaft	1985
181Z	288	W	Pond	1974
182Z	288	W	Pond	1985
183Z	293	W	Reservoir	1900
184Z	298	W	Reservoir	1872
185Z	299	W	Reservoir	1949
186Z	300	W	Reservoir	1938
187J	308	E	Unspecified Heap	1949
188J	309	E	Unspecified Heap	1938
189J	309	E	Unspecified Heap	1938
190J	310	E	Unspecified Heap	1910
191J	311	E	Unspecified Heap	1960
192J	316	E	Refuse Heap	1872
193J	319	E	Unspecified Old Shafts	1949
194J	319	E	Unspecified Old Shafts	1910
195J	320	E	Unspecified Old Shafts	1960
196J	321	E	Unspecified Old Shafts	1938
197J	321	E	Unspecified Old Shafts	1938
198J	325	E	Unspecified Old Shafts	1900
199K	338	E	Unspecified Old Shaft	1949
200K	340	E	Unspecified Old Shaft	1910
201K	340	E	Unspecified Old Shaft	1938
202K	340	E	Unspecified Old Shaft	1938

203K	340	E	Unspecified Disused Shaft	1985
204K	340	E	Unspecified Disused Shaft	1989
205K	340	E	Unspecified Disused Shaft	1974
206K	340	E	Unspecified Old Shaft	1960
207L	349	SE	Old Colliery	1910
208L	349	SE	Colliery	1938
209L	349	SE	Colliery	1938
210	351	N	Pond	1872
211AA	351	SE	Old Colliery	1949
212L	352	SE	Unspecified Ground Workings	1910
213L	353	SE	Unspecified Heap	1938
214L	353	SE	Unspecified Heap	1938
215L	353	SE	Unspecified Ground Workings	1949
216AB	354	SE	Unspecified Heap	1960
217M	356	SE	Unspecified Old Shaft	1938
218M	356	SE	Unspecified Old Shaft	1938
219M	357	SE	Unspecified Disused Shafts	1974
220M	357	SE	Unspecified Disused Shafts	1985
221M	358	SE	Unspecified Old Shaft	1910
222M	358	SE	Unspecified Old Shaft	1949
223AB	359	SE	Unspecified Old Shaft	1900
224N	360	E	Unspecified Ground Workings	1938
225N	360	E	Unspecified Ground Workings	1938
226M	360	SE	Unspecified Old Shaft	1900
227Q	361	E	Unspecified Heap	1949
228M	361	SE	Unspecified Old Shaft	1960
229Q	366	E	Unspecified Heap	1872
230Q	367	E	Unspecified Heap	1960
231O	376	SE	Unspecified Disused Shafts	1985
232O	376	SE	Unspecified Disused Shafts	1974
233P	409	E	Unspecified Heap	1949
234P	409	E	Unspecified Heap	1910
235P	411	E	Unspecified Heap	1938
236P	411	E	Unspecified Heap	1938
237P	412	E	Unspecified Heap	1960
238P	414	E	Unspecified Heap	1872
239Q	419	E	Unspecified Old Shafts	1949
240P	419	E	Refuse Heap	1900
241Q	420	E	Unspecified Old Shafts	1910
242Q	421	E	Unspecified Old Shafts	1938

243Q	421	E	Unspecified Old Shafts	1938
244Q	422	E	Unspecified Old Shafts	1960
245R	426	S	Refuse Heap	1900
246Q	426	E	Unspecified Old Shafts	1900
247R	433	S	Unspecified Heap	1938
248R	433	S	Unspecified Heap	1938
249S	435	S	Unspecified Heaps	1910
250R	435	S	Refuse Heap	1872
251R	435	S	Unspecified Heap	1949
252S	441	S	Unspecified Heap	1960
253R	449	S	Unspecified Shaft	1900
254R	455	S	Unspecified Old Shaft	1938
255R	455	S	Unspecified Old Shaft	1938
256R	457	S	Unspecified Shaft	1949
257R	459	S	Coal Shaft	1872
258S	461	S	Unspecified Heap	1938
259S	461	S	Unspecified Heap	1938
260	462	SW	Pond	1872
261S	462	S	Unspecified Heap	1949
262T	476	N	Cuttings	1872
263T	479	N	Cuttings	1900
264U	481	E	Unspecified Pit	1960
265U	484	E	Unspecified Pit	1938
266U	484	E	Unspecified Pit	1938
267U	485	E	Unspecified Pit	1949
268T	491	N	Cuttings	1910
269T	492	N	Cuttings	1938
270T	495	N	Cuttings	1949
271T	498	N	Cuttings	1989
272T	498	N	Cuttings	1985
273T	498	N	Cuttings	1974
274T	498	N	Cuttings	1960
275AC	499	E	Unspecified Heap	1872

2. Environmental Permits, Incidents and Registers Map



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- | | | | | | |
|---|-------------------------------|---|--|---|---|
|  | Site Outline |  | Recorded Pollution Incident |  | RAS 3 & 4 Authorisations |
|  | Dangerous Substances (List 1) |  | Part A(1) Authorised Processes and Historic IPC Authorisations |  | Part A(2) and Part B Authorised Processes |
|  | Dangerous Substances (List 2) |  | Water Industry Referrals |  | COMAH / NIHHS Sites |
|  | Search Buffers (m) |  | Licenced Discharge Consents |  | Sites Determined as Contaminated Land |
|  | |  | Red List Discharge Consents |  | Hazardous Substance Consents and Enforcements |

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

3

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
5	88	SW	327680 352075	Address: Minera Building Supplies Ltd, Five Crosses Industrial Estate, Ruthin Road, Minera, Wrexham, LL11 3RD Process: Mineral Process Status: Current Permit Permit Type: Part B Enforcement: No Enforcement Notified. Date of Enforcement: No Enforcement Notified. Comment: No Enforcement Notified.
6	123	S	327858 351977	Address: Jones Automotive Services, Minera Garage, Unit 30, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD Process: Waste Oil Burning Process Status: New Legislation Applies Permit Type: Part B Enforcement: No Enforcement Notified. Date of Enforcement: No Enforcement Notified. Comment: No Enforcement Notified.
7	174	S	327810 351926	Address: Minera Tyres and Exhausts Ltd, Unit 36, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD Process: Waste Oil Burning Process Status: New Legislation Applies Permit Type: Part B Enforcement: No Enforcement Notified. Date of Enforcement: No Enforcement Notified. Comment: No Enforcement Notified.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

2

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
3B	358	N	327805 352768	Address: BARN A & B, GWERN Y GASEG FARM, MINERA ROAD, MINERA, WREXHAM, CLWYD, LL11 3AJ Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: NPSWQD005307 Permit Version: 1 Receiving Water: Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/11/2008 Effective Date: 26-Nov-2008 Revocation Date: -

ID	Distance (m)	Direction	NGR	Details	
4B	358	N	327805 352768	Address: BARN A & B, GWERN Y GASEG FARM, MINERA ROAD, MINERA, WREXHAM, CLWYD, LL11 3AJ Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: NPSWQD005307 Permit Version: 1	Receiving Water: Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/11/2008 Effective Date: 26-Nov-2008 Revocation Date: -

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

2.3 Environment Agency Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

2

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1A	489	SE	328314 351911	Incident Date: 13-Mar-2003 Incident Identification: 142816 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Distance (m)	Direction	NGR	Details	
2A	489	SE	328314 351911	Incident Date: 13-Mar-2003 Incident Identification: 142816 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

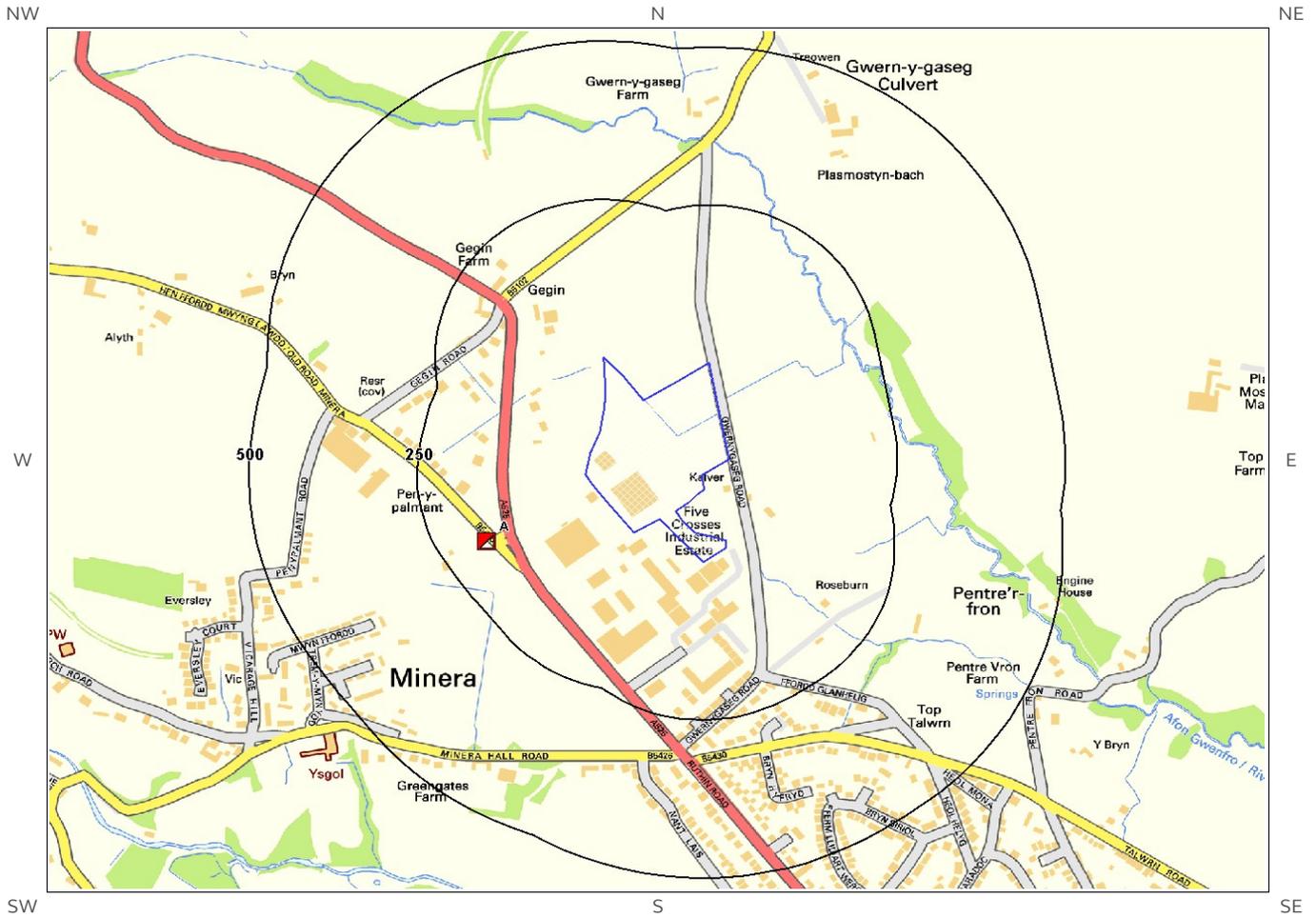
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



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- | | | | | | |
|---|------------------------|---|---------------------------|---|---|
|  | Site Outline |  | E.A. Active Landfill |  | Historic and Planned Waste Sites |
|  | 250 Search Buffers (m) |  | E.A. Historic Landfill |  | E.A. Licensed Waste Site |
|  | 500 Search Buffers (m) |  | BGS / DoE Survey Landfill |  | Local Authority/Historical Mapping Landfill Records |

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

4

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	735	N	327800 353100	Site Address: Pentre Saeson Foundry, Brymbo Road, Wrexham, Bwlchgwyn Waste Licence: Yes Site Reference: WMBC L/20 Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 29-Sep-1977 Licence Surrendered: 31-Dec-1989 Licence Holder Address: - Operator: - Licence Holder: Taylor Brothers First Recorded: 31-Dec-1935 Last Recorded: 31-Dec-1985
Not shown	1271	E	329100 352100	Site Address: Peniel House, Peniel, Wrexham, Fron Waste Licence: Yes Site Reference: WMBC L/27 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 29-Feb-1980 Licence Surrendered: 28-Feb-1982 Licence Holder Address: - Operator: - Licence Holder: Mr P Dempsey First Recorded: 31-Dec-1980 Last Recorded: 28-Feb-1982
Not shown	1396	NE	329641 352527	Site Address: Works Bank, Brymbo, Lodge, Wrexham Waste Licence: Yes Site Reference: - Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: WU1/L/BRI001	Licence Issue: 19-Jul-1977 Licence Surrendered: 19-May-2008 Licence Holder Address: Parkhill House, Newport, 133 High Street, Shropshire Operator: Brymbo Steel Works Ltd Licence Holder: Brymbo Steel Works Ltd First Recorded: 30-Dec-1899 Last Recorded: -
Not shown	1438	NE	329000 353400	Site Address: Brymbo Steelworks, Wrexham, Brymbo Waste Licence: Yes Site Reference: WMBC L/11 Waste Type: Industrial, Special, Liquid sludge Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 19-Jul-1977 Licence Surrendered: 31-Dec-1990 Licence Holder Address: - Operator: - Licence Holder: Brymbo Steel Works Limited First Recorded: 31-Dec-1940 Last Recorded: 31-Dec-1985

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

1

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	1013	E	328915 352249	Refuse Tip	1961 mapping	Polygon

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

3.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

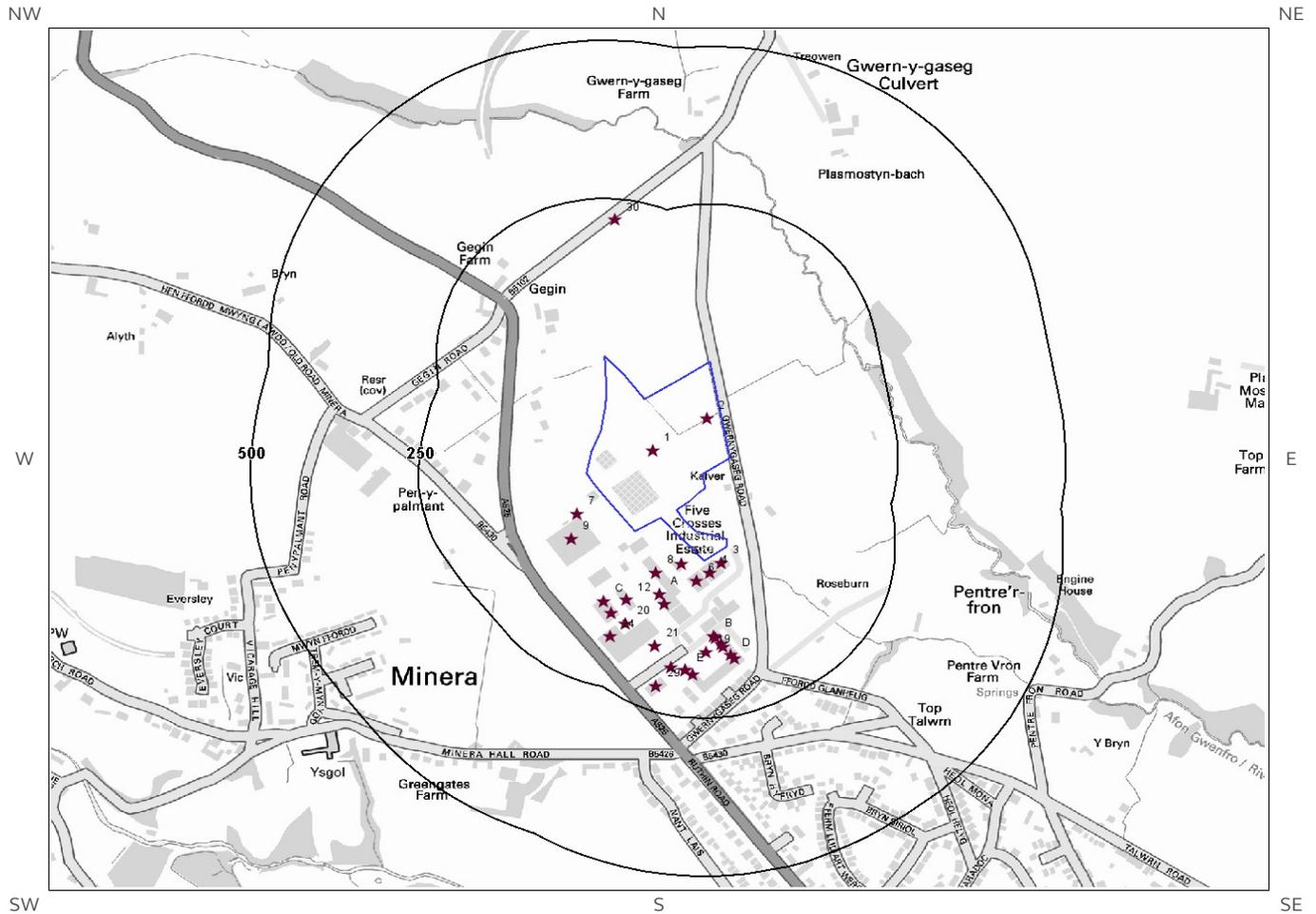
5

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
5A	181	SW	327515 352131	Site Address: Station House, Old Road, Minera, Wrexham, Clwyd, LL11 3YQ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SKM001 EPR reference: JP3694FP/A001 Operator: S And K Matthews Skip Hire Waste Management licence No: 37287 Annual Tonnage: 4500.0 Issue Date: 29/11/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: S And K Matthews Skip Hire Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details	
6A	181	SW	327515 352131	Site Address: S And K Matthews Skip Hire, Minera, Wrexham, Wrexham, LL11 3YQ Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: JP3694FP EPR reference: - Operator: S And K Matthews Skip Hire Waste Management licence No: 0 Annual Tonnage: 5000.0	Issue Date: 29/11/2005 Effective Date: 29/11/2005 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -
Not shown	1054	SW	327254 351206	Site Address: Marions House, New Brighton, Minera, Wrexham, Clwyd, LL11 3DS Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HKM001 EPR reference: EA/EPR/XP3394FK/V005 Operator: Williams Henry Kingsley Waste Management licence No: 37059 Annual Tonnage: 4999.0	Issue Date: 16/02/1993 Effective Date: - Modified: 28/01/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: H K Motors Correspondence Address: -
Not shown	1054	SW	327254 351206	Site Address: Marions House, New Brighton, Minera, Wrexham, Clwyd, LL11 3DS Type: Metal Recycling Site (Vehicle Dismantler) Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: HKM001 EPR reference: XP3394FK/V005 Operator: Williams Henry Kingsley Waste Management licence No: 37059 Annual Tonnage: 0.0	Issue Date: 16/02/1993 Effective Date: - Modified: 28/01/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: H K Motors Correspondence Address: -
Not shown	1054	SW	327254 351206	Site Address: H K Motors, New Brighton, Minera, Wrexham, LL11 3DS Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: XP3394FK EPR reference: - Operator: Henry Kingsley Williams Waste Management licence No: 0 Annual Tonnage: 4999.0	Issue Date: 16/02/1993 Effective Date: 16/02/1993 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Effective Site Name: - Correspondence Address: -

4. Current Land Use Map



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 Site Outline

 Current Industrial Sites

 Electricity Transmission Cables

 Search Buffers (m)

 Petrol & Fuel Sites

 Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

30

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0	On Site	Electricity Sub Station	327760 352273	LL11	Electrical Features	Infrastructure and Facilities
2	0	On Site	Pylon	327841 352324	LL11	Electrical Features	Infrastructure and Facilities
3	16	SE	Alpine Engineering Ltd	327862 352095	Unit 9, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Industrial Engineers	Engineering Services
4	20	SE	Strafford's Coaches	327845 352079	Unit 7-8, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Bus and Coach Stations, Depots and Companies	Public Transport, Stations and Infrastructure
5	27	SW	Industrial Estate	327803 352094	LL11	Business Parks and Industrial Estates	Industrial Features
6	33	S	Industrial Engineering Services Wrexham Ltd	327825 352066	Unit 5, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Industrial Engineers	Engineering Services
7	48	SW	Electricity Sub Station	327648 352173	LL11	Electrical Features	Infrastructure and Facilities
8	65	SW	D S W	327764 352079	Unit 4, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Electronic Equipment	Industrial Products
9	80	SW	The Village Bakery Ltd	327638 352133	Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Baking and Confectionery	Foodstuffs
10A	84	SW	C A M Gas	327770 352045	Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Fuel Distributors and Suppliers	Household, Office, Leisure and Garden
11A	90	SW	Site Solutions Engineering Ltd	327777 352030	Unit 1, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Industrial Engineers	Engineering Services
12	108	S	A & C Pierce	327721 352036	Unit C, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing
13C	119	SW	C J C Motor Services	327687 352034	Unit K-I, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing
14B	119	S	A & P Autopanel	327851 351979	Unit 31, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Parts and Accessories	Motoring
15B	124	S	Minera Garage	327853 351975	Unit 30, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
16C	133	S	Fat Dubbers	327699 352016	Unit G, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing
17B	134	S	Wrexham Installations	327862 351966	Unit 28-29, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Lifting and Handling Equipment	Industrial Products
18B	139	S	Minera M O T Centre	327865 351961	Unit 27, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing
19	144	S	Gas Valve Compound	327839 351954	LL11	Gas Features	Infrastructure and Facilities
20	146	S	Pylon	327720 351999	LL11	Electrical Features	Infrastructure and Facilities
21	153	SW	Industrial Estate	327764 351964	LL11	Business Parks and Industrial Estates	Industrial Features
22D	154	S	T R Ogden Auto Body Repairs	327876 351948	Unit 24, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing
23D	160	S	D C Autos	327881 351944	Unit 23, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing
24	169	S	F W B Cymru Ltd	327697 351978	Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	General Construction Supplies	Industrial Products
25E	175	S	Minera Tyres & Exhausts	327808 351925	Unit 36, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Parts and Accessories	Motoring
26E	175	S	HiQ Centre	327808 351925	Unit 36, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing
27E	176	S	Electricity Sub Station	327788 351929	LL11	Electrical Features	Infrastructure and Facilities
28E	181	S	Wrexham Auto Kraft	327820 351918	Unit 35, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Vehicle Repair, Testing and Servicing	Repair and Servicing
29	211	S	Reclaim Services	327764 351900	Unit 50, Five Crosses Industrial Estate, Minera, Wrexham, LL11 3RD	Colours, Chemicals and Water Softeners and Supplies	Industrial Products
30	218	N	Pylon	327704 352638	LL11	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TILLD	TILL, DEVENSIAN	DIAMICTON

5.3 Bedrock and Solid Geology

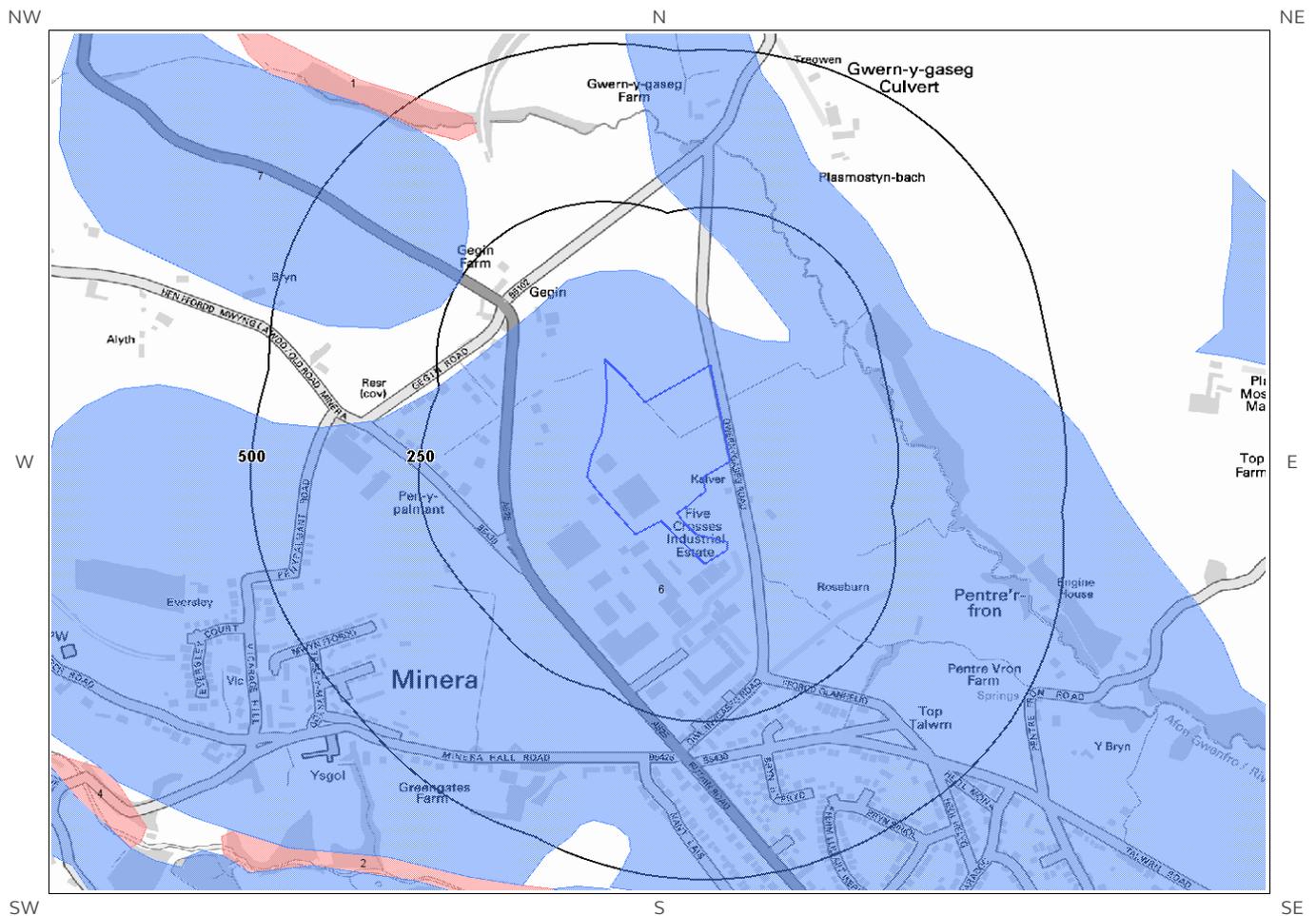
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
PLMC-SDST	PENNINE LOWER COAL MEASURES FORMATION AND PENNINE MIDDLE COAL MEASURES FORMATION (UNDIFFERENTIATED)	SANDSTONE
PLMC-MDSS	PENNINE LOWER COAL MEASURES FORMATION AND PENNINE MIDDLE COAL MEASURES FORMATION (UNDIFFERENTIATED)	MUDSTONE, SILTSTONE AND SANDSTONE
PLMC-MDSS	PENNINE LOWER COAL MEASURES FORMATION AND PENNINE MIDDLE COAL MEASURES FORMATION (UNDIFFERENTIATED)	MUDSTONE, SILTSTONE AND SANDSTONE
PLMC-MDSS	PENNINE LOWER COAL MEASURES FORMATION AND PENNINE MIDDLE COAL MEASURES FORMATION (UNDIFFERENTIATED)	MUDSTONE, SILTSTONE AND SANDSTONE

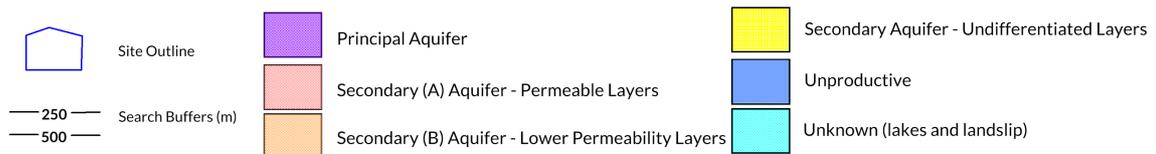
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

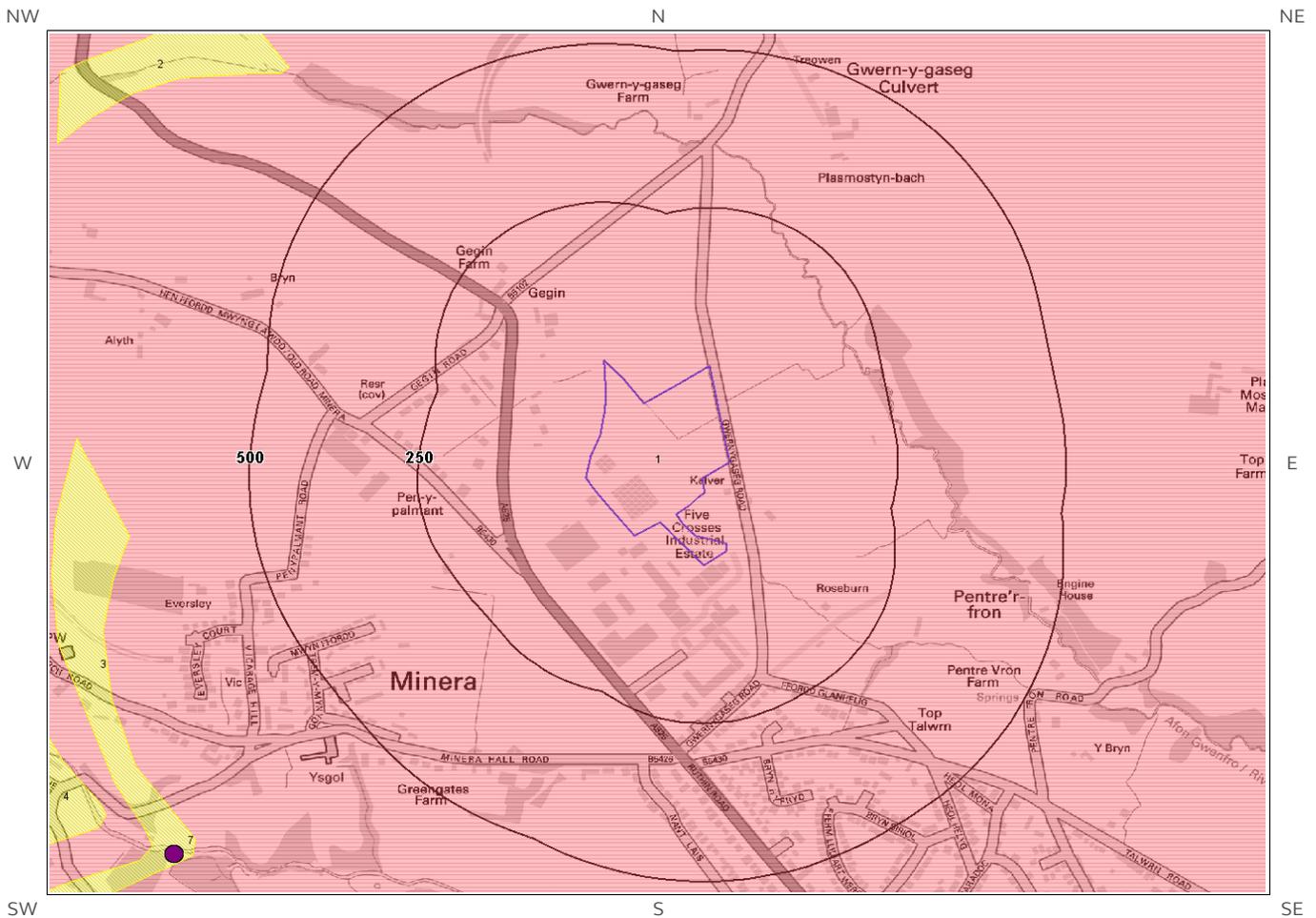
6a. Aquifer Within Superficial Geology



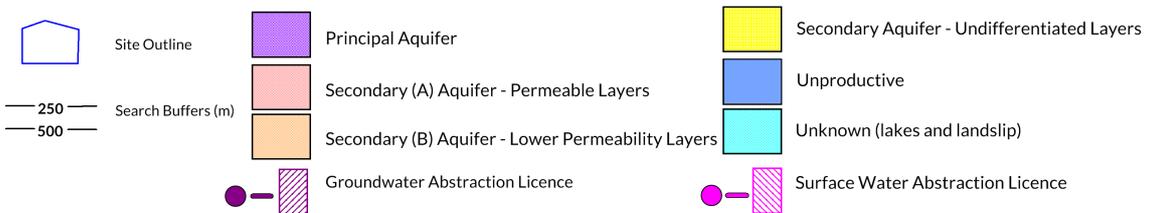
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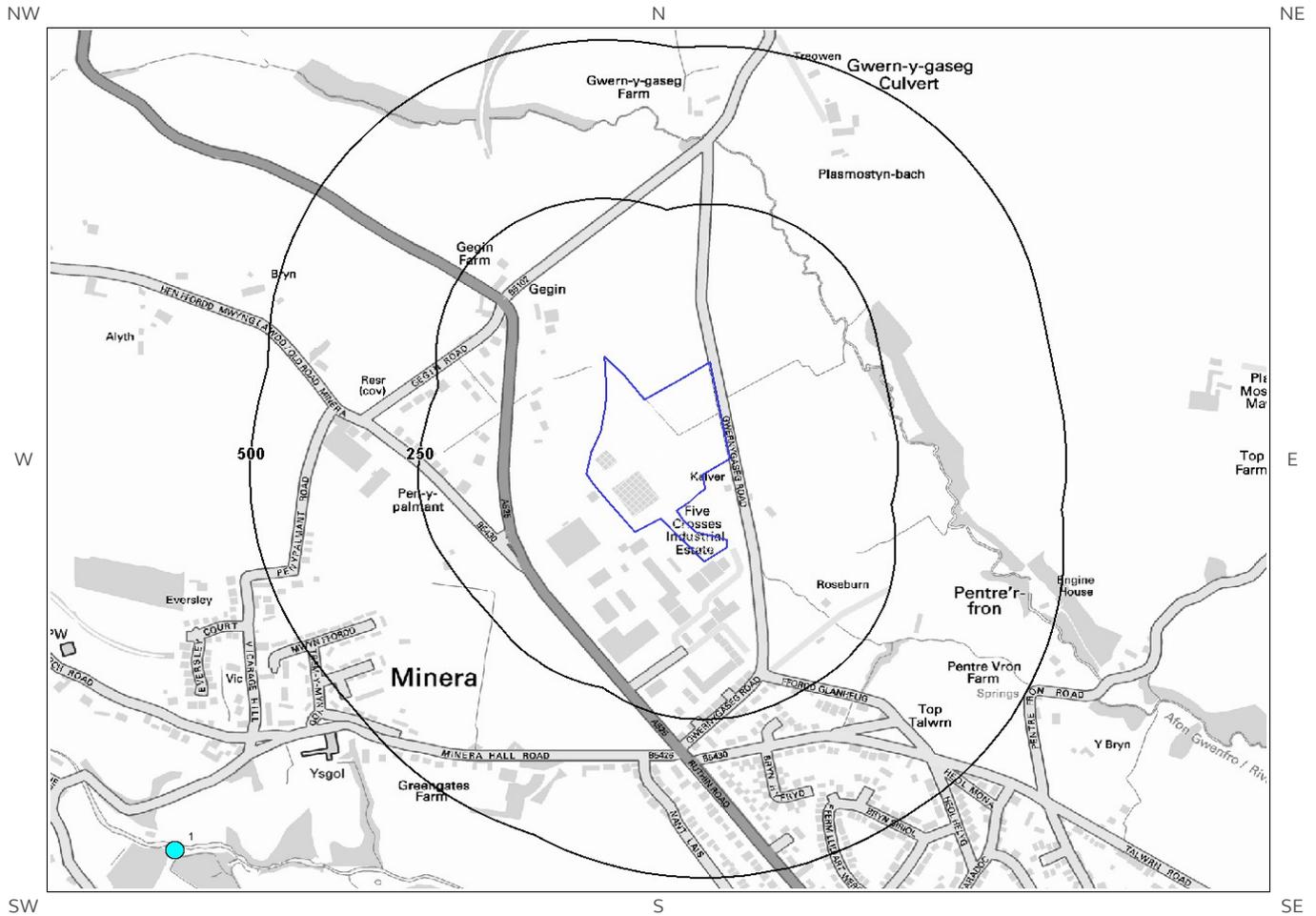
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



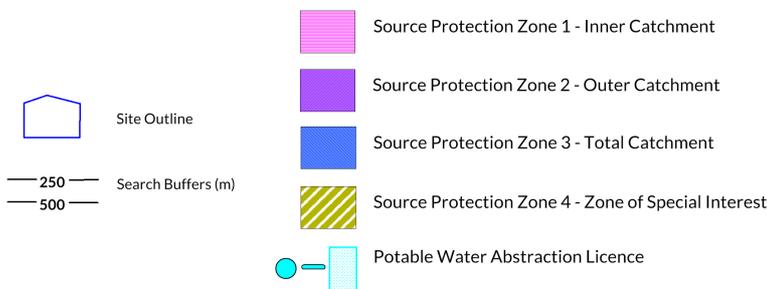
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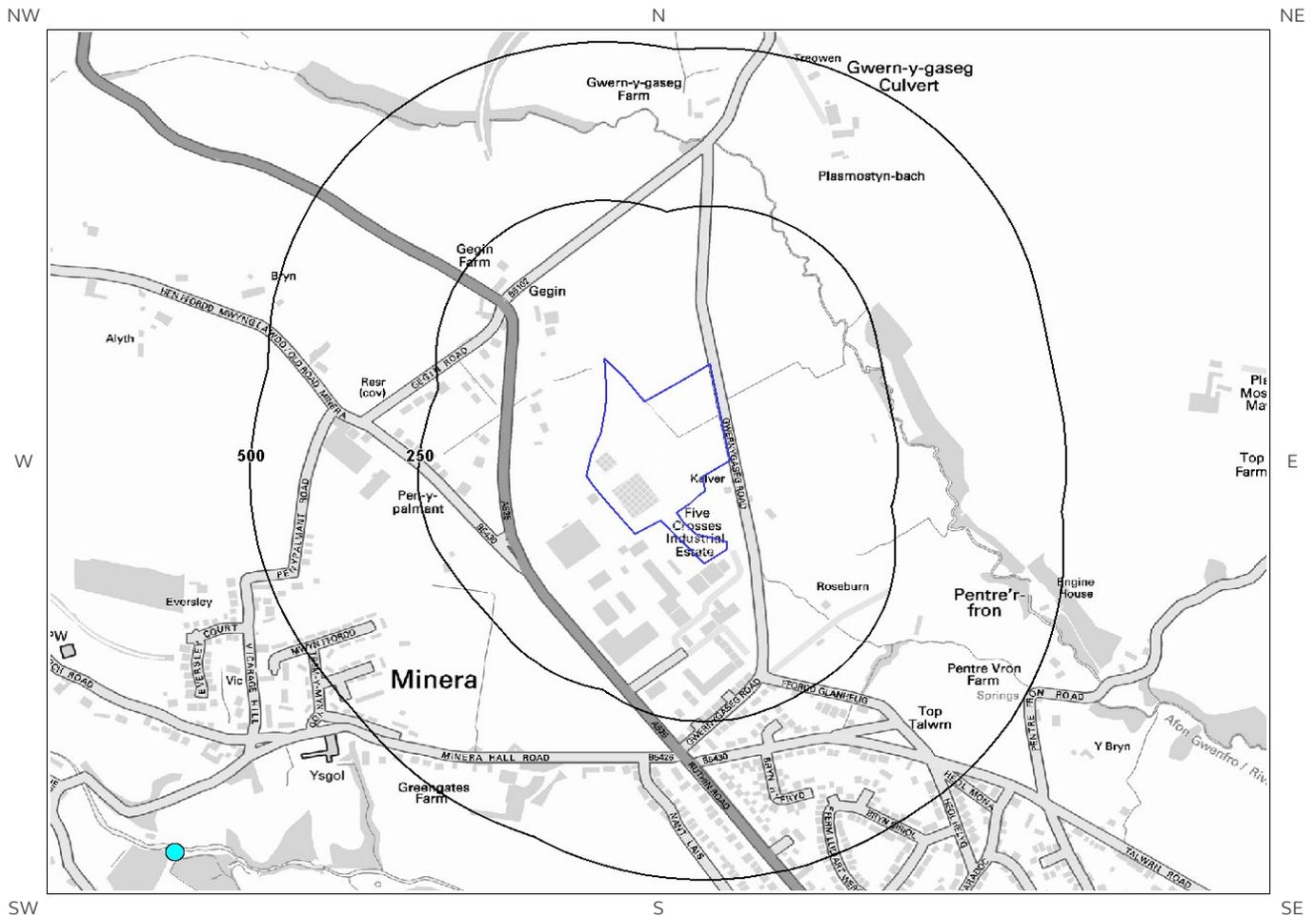
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



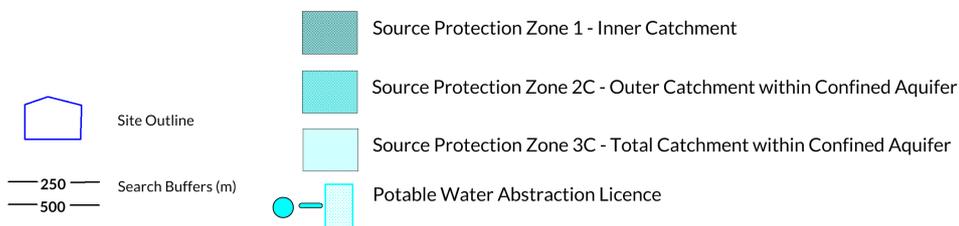
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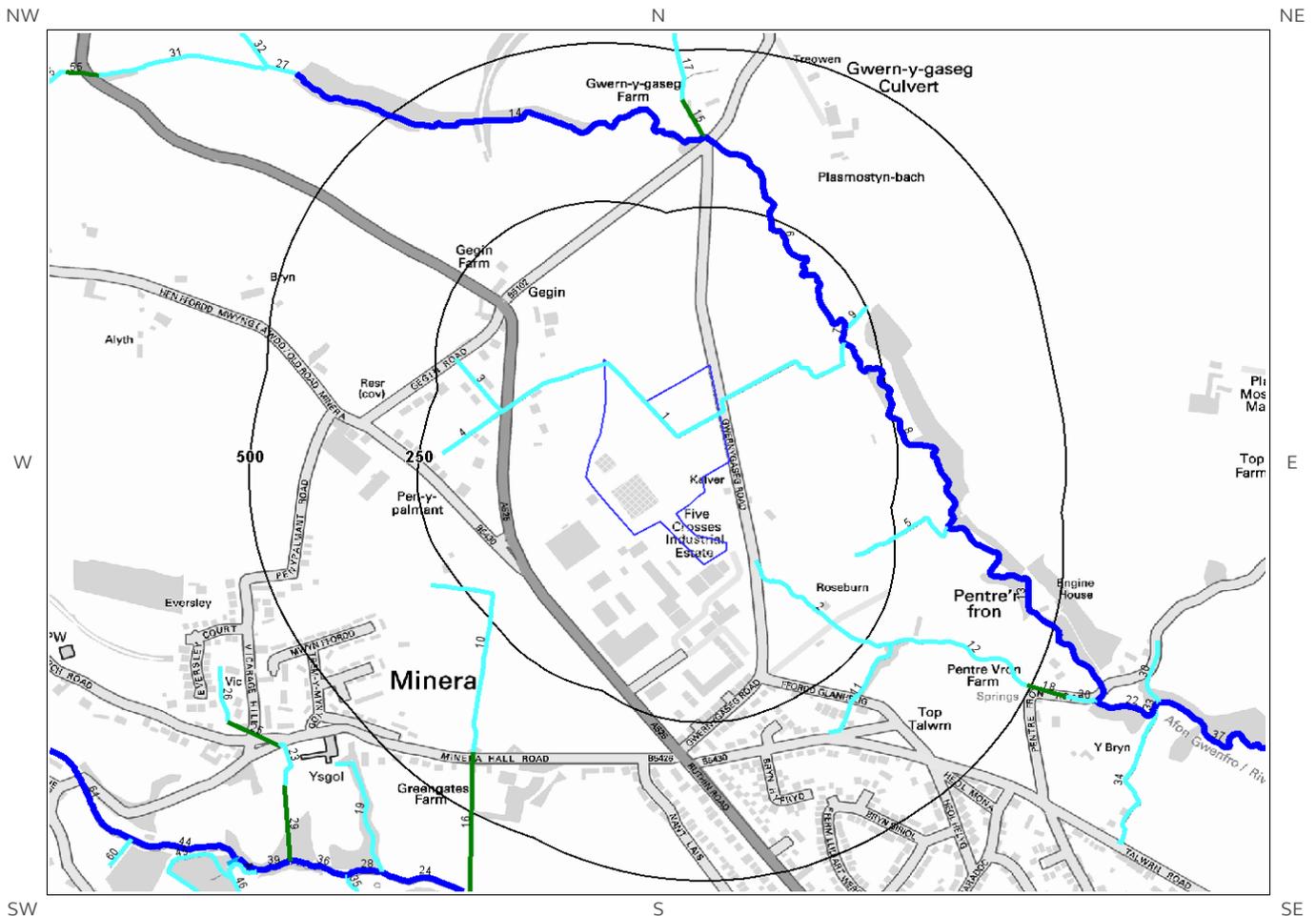
6d. Hydrogeology – Source Protection Zones within confined aquifer



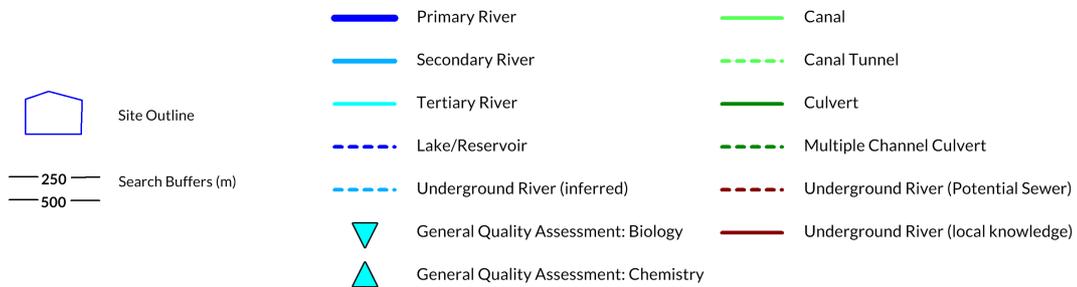
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6e. Hydrology – Detailed River Network and River Quality



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6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
6	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
7	248	NW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
1	409	NW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site?

Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
7	848	SW	327050 351641	Status: Historical Licence No: 24/67/7/0035 Details: Potable Water Supply - Direct Direct Source: Eaw Groundwater Point: Park Day Level Data Type: Point Name: Dee Valley Water Plc Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 4/9(h) Original Start Date: 5/7/1966 Expiry Date: - Issue No: 100 Version Start Date: 5/7/1966 Version End Date:
Not shown	1173	SW	326890 351330	Status: Historical Licence No: 24/67/7/0035 Details: Potable Water Supply - Direct Direct Source: Eaw Groundwater Point: Speedwell Shaft Data Type: Point Name: Dee Valley Water Plc Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 4/9(h) Original Start Date: 5/7/1966 Expiry Date: - Issue No: 100 Version Start Date: 5/7/1966 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site?

No

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (6c):

ID	Distance (m)	Direction	NGR	Details
1	848	SW	327050 351641	Status: Historical Licence No: 24/67/7/0035 Details: Potable Water Supply - Direct Direct Source: Eaw Groundwater Point: Park Day Level Data Type: Point Name: Dee Valley Water Plc Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 4/9(h) Original Start Date: 5/7/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1173	SW	326890 351330	Status: Historical Licence No: 24/67/7/0035 Details: Potable Water Supply - Direct Direct Source: Eaw Groundwater Point: Speedwell Shaft Data Type: Point Name: Dee Valley Water Plc Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 4/9(h) Original Start Date: 5/7/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
164	W	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
249	SE	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	0	On Site	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
2	46	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
3	148	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	148	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
5	190	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
6	192	NE	River Name: River Gwenfro Welsh River Name: Afon Gwenfro Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
7	201	E	River Name: River Gwenfro Welsh River Name: Afon Gwenfro Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
8	202	E	River Name: River Gwenfro Welsh River Name: Afon Gwenfro Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
9	209	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
10	221	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
11	283	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
12	285	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
13	330	E	River Name: River Gwenfro Welsh River Name: Afon Gwenfro Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
14	354	N	River Name: River Gwenfro Welsh River Name: Afon Gwenfro Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
15	361	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
16	418	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
17	422	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
18	494	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined

6.11 Surface Water Features

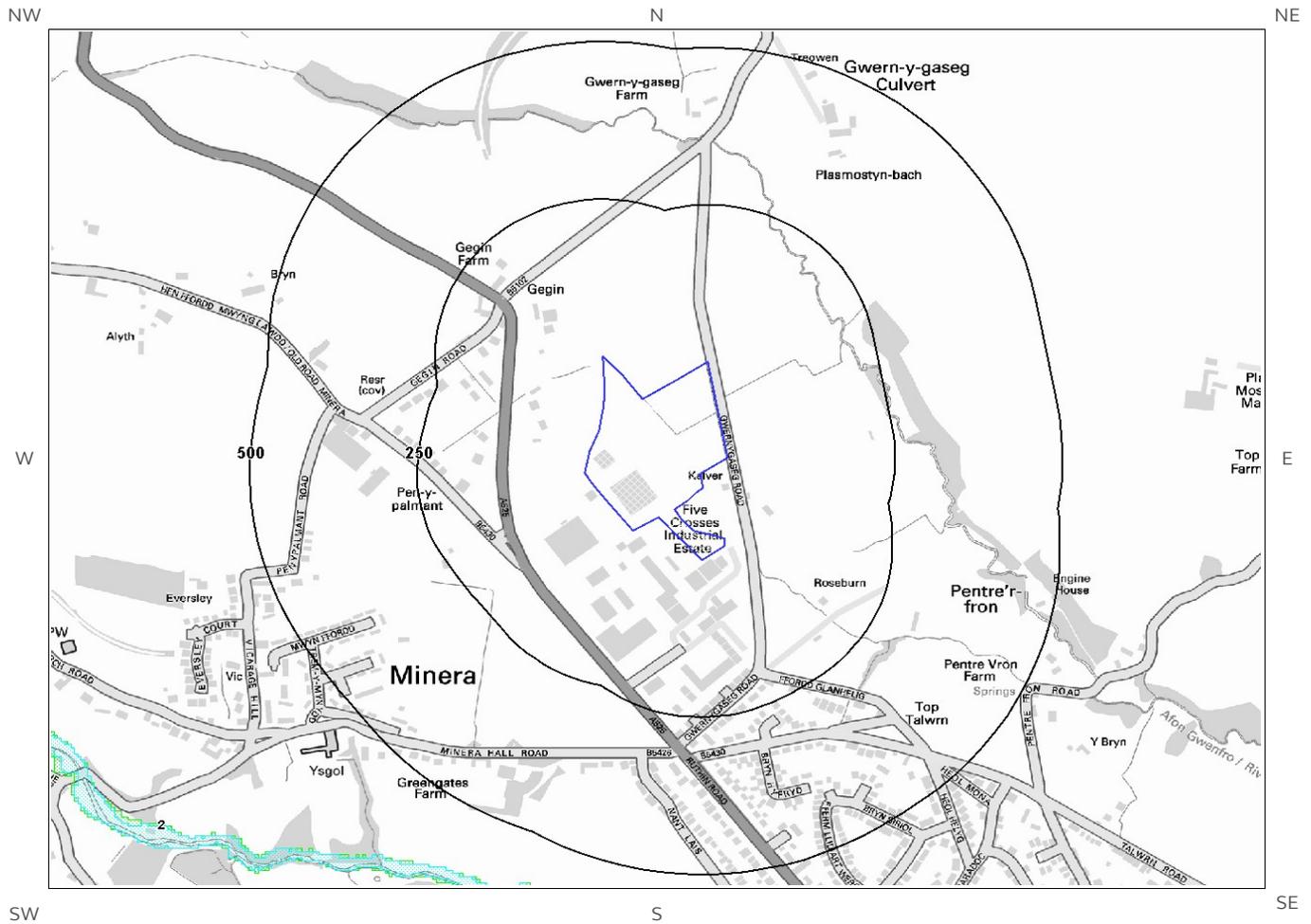
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
7	E
21	W
46	E
119	W
152	W
162	W
190	E
191	NE
195	SE
211	E
223	SW
228	SW

7a. Environment Agency Flood Map for Planning (from rivers and the sea)



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency Zone 2 floodplain? No

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency Zone 3 floodplain? No

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Very Low

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding?

Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

7.8 Groundwater Flooding Confidence Areas

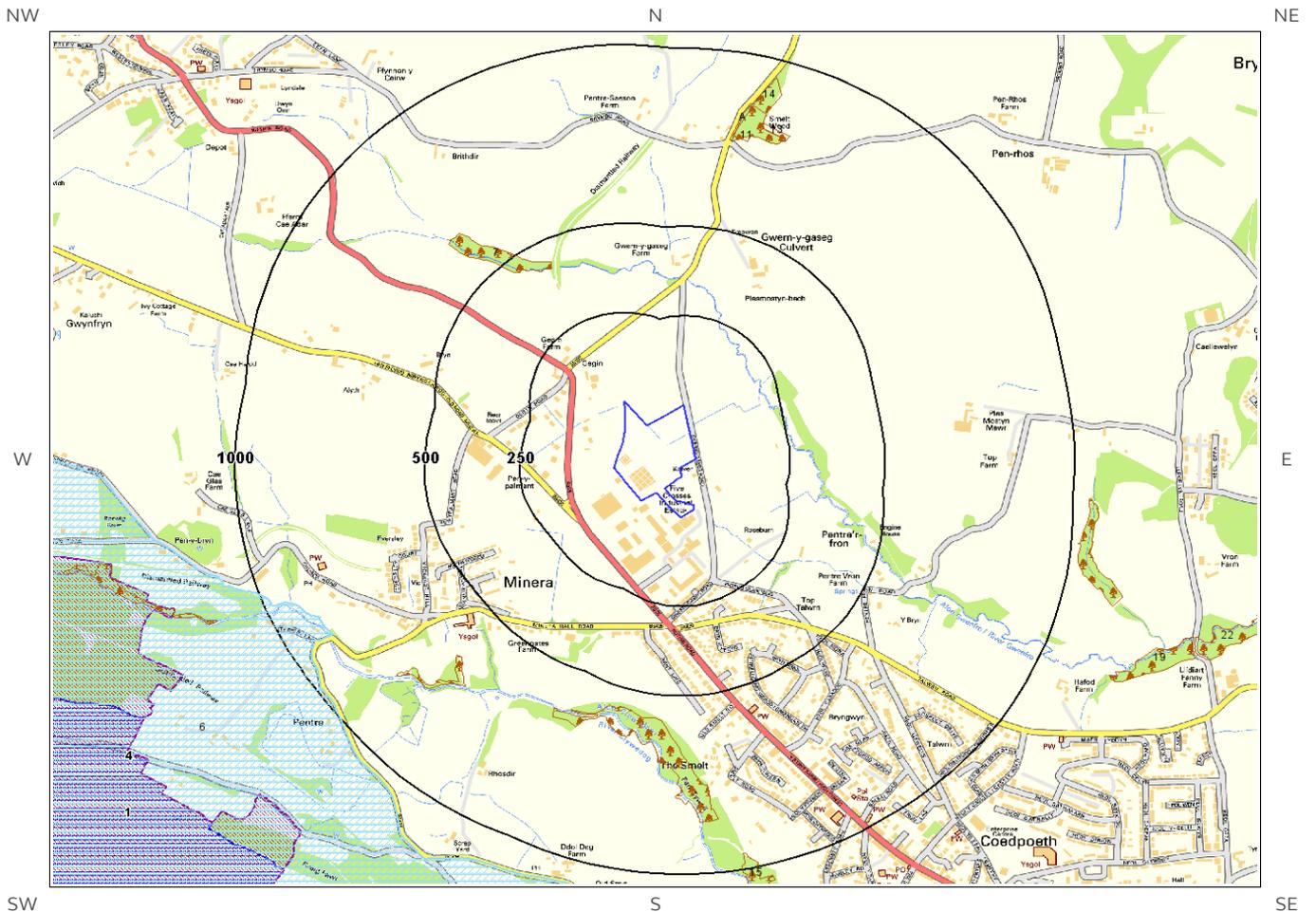
What is the British Geological Survey confidence rating in this result?

High

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



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- | | | | | | |
|---|--------------|---|---------------------------------|---|-------------------------|
|  | Site Outline |  | Green Belt |  | Ancient Woodland |
|  | 100 |  | Environmentally Sensitive Areas |  | National Nature Reserve |
|  | 250 |  | Special Areas of Conservation |  | Local Nature Reserves |
| | |  | Special Protection Areas |  | Ramsar Sites |
| | |  | SSSI | | |
| | |  | National Park |  | World Heritage Sites |
| | |  | AONB |  | Nitrate Sensitive Areas |
| | |  | Nitrate Vulnerable Zones | | |

8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

2

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
4	1225	W	RUABON/LLANTYSILIO MOUNTAINS AND MINERA	Natural Resources Wales
Not shown	1657	W	RUABON/LLANTYSILIO MOUNTAINS AND MINERA	Natural Resources Wales

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

3

The following Special Area of Conservation (SAC) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SAC Name	Data Source
1	1398	SW	Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains	Natural Resources Wales
Not shown	1657	W	Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains	Natural Resources Wales
Not shown	1668	W	Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains	Natural Resources Wales

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

48

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
7	420	NW	Unknown	Restored Ancient Woodland Site
8	552	S	Unknown	Ancient and Semi-Natural Woodland
9	646	SW	Unknown	Ancient and Semi-Natural Woodland
10A	750	N	Unknown	Restored Ancient Woodland Site
11	758	N	Unknown	Ancient and Semi-Natural Woodland
12A	762	N	Unknown	Restored Ancient Woodland Site
13	783	N	Unknown	Ancient and Semi-Natural Woodland
14	843	N	Unknown	Ancient and Semi-Natural Woodland
15	956	S	Unknown	Ancient and Semi-Natural Woodland
16	1017	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1063	S	Unknown	Restored Ancient Woodland Site
18	1131	W	Unknown	Ancient and Semi-Natural Woodland
19	1189	SE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1285	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1309	S	Unknown	Ancient and Semi-Natural Woodland
22	1370	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1433	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1433	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1462	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1487	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1526	N	Unknown	Ancient Replanted Woodland
Not shown	1538	N	Unknown	Ancient Replanted Woodland
Not shown	1540	S	Unknown	Restored Ancient Woodland Site
Not shown	1629	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1654	N	Unknown	Ancient Replanted Woodland
Not shown	1671	N	Unknown	Ancient Replanted Woodland
Not shown	1674	N	GLASCOED	Ancient and Semi-Natural Woodland

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1676	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1686	E	Unknown	Ancient and Semi-Natural Woodland
Not shown	1688	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1704	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1734	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1735	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1827	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1833	S	Unknown	Restored Ancient Woodland Site
Not shown	1834	N	Unknown	Ancient and Semi-Natural Woodland
Not shown	1881	SE	Unknown	Restored Ancient Woodland Site
Not shown	1897	NE	Unknown	Other Ancient Woodland
Not shown	1917	NE	Unknown	Other Ancient Woodland
Not shown	1925	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1934	E	Unknown	Other Ancient Woodland
Not shown	1957	E	Unknown	Other Ancient Woodland
Not shown	1960	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1967	NW	Unknown	Restored Ancient Woodland Site
Not shown	1972	NW	Unknown	Restored Ancient Woodland Site
Not shown	1976	NW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1986	N	GLASCOED	Ancient and Semi-Natural Woodland
Not shown	1999	NW	Unknown	Ancient Replanted Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

1

The following Area of Outstanding Natural Beauty (AONB) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	AONB/NSA Name	Data Source
6	878	SW	BRYNIAU CLWYD A DYFFRYN DYFRDWY/CLWYDIAN RANGE AND DEE VALLEY	Natural Resources Wales

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

8.14 Records of Green Belt land within 2000m of the study site:

Database searched and no data found.

0

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **Groundsure Geo Insight**, available from our **website**. The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand** hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is in a Radon Affected Area, as between 5 and 10% of properties are above the Action Level.

* This indicates an automatically generated 50m buffer and site.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? Basic radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Are there any coal mining areas within 75m of the study site? Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

Distance (m)	Direction	Name	Commodity	Assessment of likelihood
0.0	On Site	Not available	Iron Ore (Bedded)	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

Past underground mine workings may occur. The rock types present in these areas are such that small mineral veins may be present on which it is possible that small scale mining has been undertaken and/or it is possible that limited underground extraction of other materials may have occurred. All such occurrences are likely to be of minor localised extent and infrequent. It should be noted, however, that there is always the possibility of the existence of other sub-surface excavations, such as wells, cess pits, follies, air raid shelters/bunkers and other military structures etc. that could affect surface ground stability but which are outside the scope of this dataset. However, if in a coalfield area you should still consider a Coal Authority mining search for the area of interest.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No
Guidance: No Guidance Required.

Contact Details

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info@groundsure.com

British Geological Survey Enquiries

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Fax: 0115 936 3276.
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BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency

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Web:www.environment-agency.gov.uk

Email:enquiries@environment-agency.gov.uk

Public Health England

Public information access office
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The Coal Authority

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Ordnance Survey

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Local Authority

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England



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