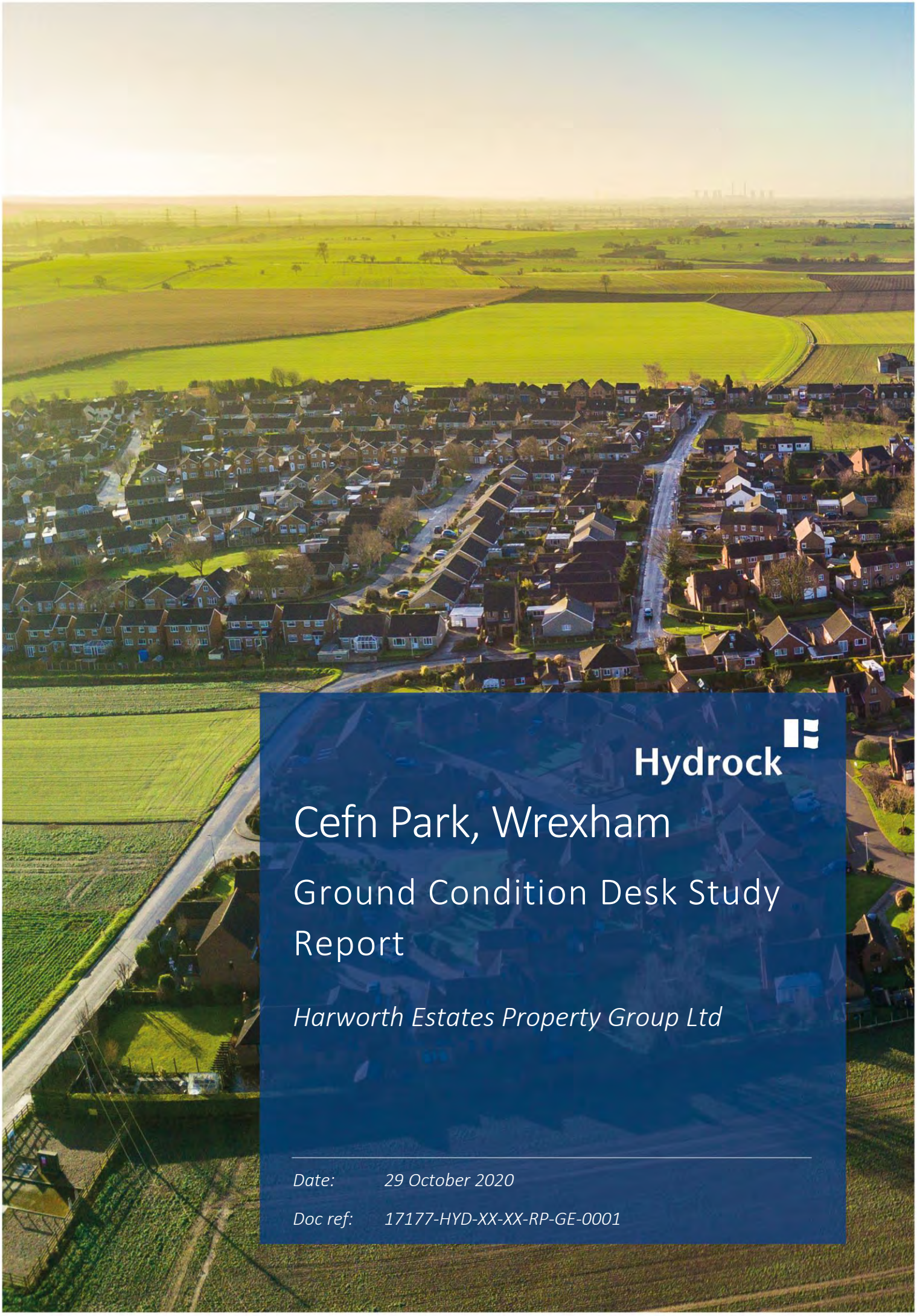


Hydrock

Cefn Park, Wrexham

Ground Condition Desk Study Report

Harworth Estates Property Group Ltd

Date: *29 October 2020*

Doc ref: *17177-HYD-XX-XX-RP-GE-0001*

DOCUMENT CONTROL SHEET

Issued by	Hydrock Consultants Limited 4 Lakeside Festival Park Stoke on Trent Staffordshire ST1 5RY	Tel: 01782 261919 E-mail: stoke@hydrock.com www.hydrock.com
Client	Harworth Estates Property Group Limited	
Project name	Cefn Park, Wrexham	
Title	Ground Condition Desk Study Report	
BIM reference	17177-HYD-XX-XX-RP-GE-0001	
Project reference	C-17177-C	
Date	29/10/2020	

Document Production Record		
Status and Revision	P01 S2	Name
Prepared by		Russell Summer BSc (Hons) FGS
Checked by		Martin Cross BSc MA MSc MBA PhD CEng FICE CGeol EurGeol CSci CEnv RoGEP Adviser SiLC
Approved by		Martin Cross BSc MA MSc MBA PhD CEng FICE CGeol EurGeol CSci CEnv RoGEP Adviser SiLC

Document Revision Record			
Status	Revision	Date	Revision Details
S2	P01	28/10/2020	First Issue

Hydrock Consultants Limited (Hydrock) has prepared this report in accordance with the instructions of the above-named Client, under the terms of appointment for Hydrock, for the sole and specific use of the Client and parties commissioned by them to undertake work where reliance is placed on this report. Any third parties who use the information contained herein do so at their own risk. Hydrock shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared or for use of the report by any parties not defined in Hydrock's appointment.

CONTENTS

1. INTRODUCTION 1
2. PHASE 1 STUDY (DESK STUDY AND FIELD RECONNAISSANCE) 3
3. OUTLINE CONCEPTUAL SITE MODEL 14
4. DESK STUDY CONCLUSIONS 17
5. UNCERTAINTIES AND LIMITATIONS 18
6. RECOMMENDATIONS FOR FURTHER WORK 19
7. REFERENCES 21

Appendices

Appendix A Drawings

Appendix B Field Reconnaissance Photographs

Appendix C Historical Ordnance Survey Maps

Appendix D Desk Study Research Information

Appendix E Preliminary Geotechnical Risk Register

Appendix F Plausible Source-Pathway-Receptor Contaminant Linkages

Appendix G Hydrock Methodologies

Tables

Table 2.1: Site referencing information 3
Table 2.2: Site description 4
Table 2.3: Site history review 5
Table 2.4: Geology 6
Table 2.5: Aquifer system 8
Table 2.6: Surface water features 9
Table 2.7: Regulatory information within 500m of the site 11
Table 2.8: Natural soil chemistry 12
Table 2.9: Non-specialist UXO screening (for the purposes of ground investigation) 12
Table 4.1: Possible Pollutant Linkages (for Risk Levels of Moderate or Greater) 17

Figures

Figure 2.1: Site location (reproduced with permission from Groundsure) 3
Figure 2.2: Extract from the Ordnance Survey Map. (Starred) 3
Figure 2.3: Suspected Japanese Knotweed on the western boundary. 5
Figure 2.4: Suspected badger sett in the south east corner of the site. 5
Figure 2.5: Pond within the woodland. 5

Figure 2.6: Undulating field in the south west of the site. 5
Figure 2.7: Superficial deposits. 7
Figure 2.8: Solid geology. 7

EXECUTIVE SUMMARY

SITE INFORMATION AND SETTING	
Objectives	Ground Condition Desk Study
Client	Harworth Estates Property Group Limited
Site name and location	Cefn Park, Land east of Cefn Road, Wrexham, LL13 9NH.
Proposed development	The proposed development is not yet defined, but the site is being promoted for a proposed end use to be residential.
PHASE 1 (DESK STUDY AND SITE RECONNIASANCE)	
Ground Model	The roughly irregular shaped parcel of land which currently consists of arable land used for corn growth, woodland areas, playing fields and a pond. Generally, the western section of the site is fairly flat with localised gradually sloping ground, surrounding the rugby pitches. Arable land to the east undulates and slopes from west to east, with topographical low points located adjacent to the eastern boundary of the site. Subject to confirmation by an ecological appraisal, two suspected badger setts were observed, one noted along a tree line in the centre of the site and the other adjacent to the south eastern boundary. Two areas of suspected Japanese Knotweed are present on the western boundary. Another smaller area of suspected Japanese Knotweed is present in the centre of the site. Mature trees and hedgerows are present along the boundaries and sporadically across the site. Review of historical Ordnance Survey mapping indicates: • The site has remained predominantly undeveloped throughout time, with the presence of two backfilled ponds, one in the centre and one in the south east, and a pond that currently remains onsite. • Surrounding land use to the east has remained predominantly arable and agricultural with residential development to the north and west. In the 1980s there was an unspecified tank adjacent to the north west of the site on Rhosnesni Farm and a second unspecified tank was recorded 44m south east of the site on Llwyn Knottia Farm. A non-specialist UXO assessment indicates a low bomb risk. The geology at the site consists of superficial deposits comprising Glaciofluvial Sheet Deposits over the majority of the site and Glacial Till in the west overlying bedrock of the Salop Formation consisting of mudstone, sandstone and conglomerate. Very low risk posed by post coal mining activities. No probable shallow unrecorded workings underlying the site. There are no coal outcrops shown to underly the site. The Glaciofluvial Sheet Deposits comprise a Secondary A aquifer and the Salop Formation is a Secondary A Aquifer. The Glacial Till is classified as a Secondary Undifferentiated Aquifer. The site does not lie within a Groundwater Source Protection Zone and there are no groundwater abstractions within 1km of the site. There are no rivers, streams or ditches in the vicinity of the site. There is a pond present on site. The pond was noted in poor condition containing an algal bloom. 3-5% of homes in the areas are affected by Radon, therefore basic radon measures will be required within new dwellings.
ASSESSMENT AND CONCLUSIONS	
Preliminary Geotechnical Hazards	The following plausible geotechnical risks are identified. • Variable Made Ground - settlement or differential settlement of foundations, floor slabs, roads and infrastructure elements. • Low strength, compressible ground – risk of shear failure and excessive settlement of foundations, roads and infrastructure elements.

<table>
<tr><td></td><td>

Variable Made Ground within backfilled ponds - settlement or differential settlement of foundations, floor slabs, roads and infrastructure elements.
Low strength, compressible ground – risk of shear failure and excessive settlement of foundations, roads and infrastructure elements.
Attack of buried concrete by aggressive ground conditions within localised Made Ground – the development site may contain Made Ground and potentially sulphate bearing soils.
Shrinkage/swelling of clay – settlement/heave of foundations, especially where located within the influence of trees and vegetation.
Designing foundations to accommodate heave due to extensive tree removal and extensive excavation involved in the removal of former trees root systems
Loose Made Ground or Glaciofluvial Sheet Deposits, leading to difficulty with excavation due to trench instability.
Earthworks – Low bearing capacity or settlement of new fill and impact on foundations, floor slabs, roads and infrastructure and construction plant.
Potential for unforeseen ground conditions and the risks associated with limited data.

</td></tr>
<tr><td>Preliminary Geo-environmental Conclusions</td><td>
Based on historical land uses and its current use as public open space and arable fields, the overall risk from land contamination at the site is considered to be low for the current development, and low to moderate for a redeveloped site, but would need to be confirmed by appropriate intrusive investigation, testing and assessment of the results of the investigation.
It is considered that it is unlikely that the site would be classified as Contaminated Land under Part 2A of the EPA 1990.
The possible pollutant linkages on an unremediated site determined by desk study and walk-over are summarised below for risk levels of moderate or greater.
<table>
<tr><th>Source(s)</th><th>◄ potential Impact on ►</th><th>Receptor(s)</th></tr>
<tr><td colspan="2">Metals, metalloids, PAH and asbestos in Made Ground associated with backfilled pond.</td><td>Site users</td></tr>
<tr><td colspan="2">Ground gases (carbon dioxide and methane) from organic materials in the Made Ground within the backfilled pond.</td><td>Site Users</td></tr>
<tr><td colspan="2">Radon</td><td>Site Users</td></tr>
</table>
</td></tr>
<tr><td colspan="2">FUTURE CONSIDERATIONS</td></tr>
<tr><td>Further work</td><td>
In order to confirm the actual risks to receptors and confirm the ground conditions with respect to potential geotechnical and geo-environmental risks, an appropriate intrusive investigation will need to be undertaken. This investigation will need to:

determine the depth and distribution of Made Ground and natural strata across the site;
determine the soil strength/density profile beneath the site;
determine the depth/level of groundwater beneath the site;
assess the distribution and extent of mine workings below the site;
assess the potential for mine entries at the site;
assess the potential for solution features at the site;
determine the ground gas concentrations beneath the site;
determine CBRs to assist with pavement design;
assess trench stability, over break potential and ‘diggability’;
allow soil infiltration rate testing;
allow sampling for chemical and geotechnical laboratory testing;
allow soil classification to allow geotechnical characterisation and determine suitability for re-use of soils within earthworks;

</td></tr>
</table>

	• obtain information in terms of Aggressive Chemical Environment for Concrete Class (ACEC Class). Following investigation, assessment will be required to: • update the Ground Model; • update the Geotechnical Risk Register; • provide Geotechnical Design recommendations; • update the Conceptual Site Model (CSM), including identification of plausible pollution linkages; • undertake generic quantitative risk assessment of potential chemical contaminants to establish 'suitability for use' under the current planning regime; • discuss potential environmental liabilities associated with land contamination (soil, water and gas); and • provide outline mitigation recommendations to ensure the site is 'suitable for use'.

This Executive Summary forms part of Hydrock Consultants Limited report number 17177-HYD-XX-XX-RP-GE-0001 and should not be used as a separate document.

1. INTRODUCTION

1.1 Terms of reference

In September 2020, Hydrock Consultants Limited (Hydrock) was commissioned by Harworth Estates Property Group Limited (the Client) to undertake a ground condition desk study at Cefn Park, land east of Cefn Road, Wrexham, LL13 9NH.

The site is located to the eastern edge of Wrexham, and is a roughly irregular shaped parcel of land which currently consists of arable land used for corn growth, woodland areas, playing fields and a pond. Generally, the western section of the site is fairly flat with localised gradually sloping ground surrounding the rugby pitches. Arable land to the east undulates and slopes from west to east with topographical low points located adjacent to the eastern boundary of the site.

The proposed development plan is yet to be finalised, however Hydrock understand that the site is being promoted for a residential end use with associated access road, car parking, soft landscaping and garden areas. There is the possibility for retention of various trees and woodland currently onsite.

The works have been undertaken in accordance with Hydrock's proposal referenced (17177-FP-GE-0001_Rev A , dated 12th October 2020) and the Client's instructions to proceed (email dated September 2020).

1.2 Objectives

The works have been commissioned to support the planning application.

The objective of the Phase 1 Desk Study is to formulate an outline Conceptual Ground Model of the site to identify key geo-environmental and geotechnical risks to the proposed development.

1.3 Scope

The scope of the Phase 1 Desk Study comprises:

- a field reconnaissance (walkover) to determine the nature of the site and its surroundings including current and former land uses, topography and hydrology;
- acquisition and review of:
  - historical Ordnance Survey maps, to identify former potentially contaminative uses shown at the site and immediately surrounding it, and an assessment of the associated contamination risks;
  - a third-party environmental report to identify flooding warning areas, local landfills, pollution incidents, abstractions, environmental permits etc. which may have had the potential to have environmental impact on the site;
  - topographical, geological and hydrogeological maps;
  - British Geological Survey (BGS) archive records;
  - regional UXB risk maps;
  - the Coal Authority's Interactive Viewer;
  - a site-specific Coal Authority 'Consultants Coal Mining Report';
- development of a preliminary Ground Model representing ground conditions at the site;

- development of an outline Conceptual Model (oCM), including identification of potential pollution linkages;
- a qualitative assessment of any geo-environmental risks identified; and
- identification of plausible geotechnical hazards.

1.4 Available information

The following have been provided to Hydrock by Harworth for use in the preparation of this report:

- Harworth. 3rd March 2020. 'Land Area Plan, Cefn Park, Wrexham', Ref: 002/CFP/NOW/A3.

The Client has commissioned or obtained assignment of the above documents and Hydrock and Hydrock is entitled to full reliance upon their contents.

1.5 Regulatory context and guidance

The geo-environmental section of this report is written in broad agreement with BS 10175:2011+ A2:2017, 'Land Contamination: Risk Management' (LCRM, 2019) and the AGS (2006) 'Good Practice Guidelines for Site Investigations'. The methods used follow a risk-based approach, with the first stage being a Phase 1 desk study and field reconnaissance (this report), with the potential geo-environmental risk assessed qualitatively in future report(s) using the 'source-pathway-receptor contaminant linkage' concept to assess risk as introduced in the Environmental Protection Act 1990 (EPA, 1990).

The geotechnical section of this report is prepared in general accordance with BS EN 1997 (EC7) and BS 8004:2015. This report forms the Preliminary Sources Study Report (PSSR) as defined by DMRB CD622.

Where relevant, the NHBC Standards (2019), have been applied.

Remaining uncertainties and recommendations for further work are listed in Section 5 and Section 6.

Reference to the technical details of the approach and the methodologies adopted are provided in Appendix G.

2. PHASE 1 STUDY (DESK STUDY AND FIELD RECONNAISSANCE)

2.1 Data

A number of desk study sources have been used to assemble the following information. These are presented in Appendix D and include:

- Third-party environmental report (Groundsure report, reference HYD-7149854);
- Historical Ordnance Survey mapping;
- BGS Archive Records;
- Zetica UXB Risk Maps (https://zeticauxo.com/downloads-and-resources/risk-maps/);
- Coal Authority 'CON29 Consultants Coal Mining Report' (Reference: HYD-7149853);
- Coal Authority's Interactive Viewer (http://mapapps2.bgs.ac.uk/coalauthority/home.html);

2.2 Site referencing

The site is referenced in Table 2.1 and the location is indicated in Figure 2.1 and Figure 2.2.

Table 2.1: Site referencing information

Item	Brief Description
Site name	Cefn Park
Site address	Land east of Cefn Road, Wrexham, LL13 9NH
Site location and grid reference	The site is located 2.7km East of Wrexham town centre. The National Grid Reference of the approximate centre of the site is 335636E, 350780N.



Figure 2.1: Site location (reproduced with permission from Groundsure)

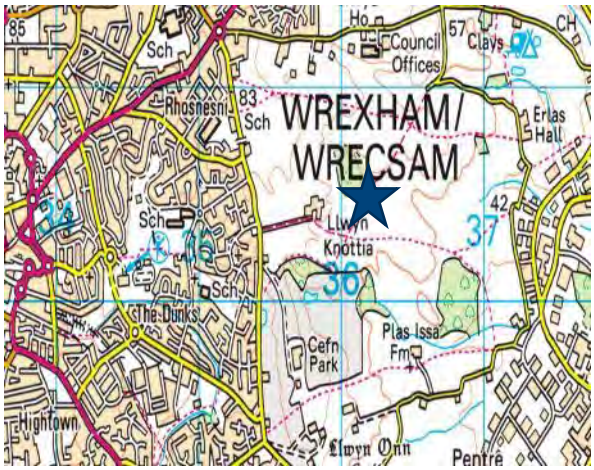


Figure 2.2: Extract from the Ordnance Survey Map. (Starred)

(OS Licence 100023353).

A site location plan (Hydrock Drawing 17177-HYD-XX-XX-DR-GE-0001) is presented in Appendix A.

2.3 Site description and field reconnaissance survey

A field reconnaissance survey was undertaken on 13th October 2020 to visually assess potential geotechnical hazards, contaminant sources and receptors. The weather during the field reconnaissance survey was sunny and mild.

A basic site description is presented in Table 2.2 and selected photographs are presented in Figure 2.3 to Figure 2.6. Additional photographs are presented in Appendix B.

Table 2.2: Site description

Item	Brief Description
Site access	The site is accessed from via a locked farm gate off Cefn Road on the western side of the site. There are other gated access points in the north west and south west of the site. Two pedestrian access points are present in the west and north west of the site.
Site area	The site is irregular shaped and has an area of approximately 40.35 ha.
Elevation, topography and any geomorphic features	Localised gradual slopes are present surrounding the rugby field in the north west of the site. Generally, the north west of the site slopes gradually from south to north. The north west corn field slopes towards the north west corner. Cornfields present in the east of the site are undulating and slope generally from west to east. Topographically low areas of the site are present along the eastern boundary. A topographical depression was noted within the south west field with a topographical low point adjacent to the southern boundary.
Present land use	The site is split into various fields which are divided by hedgerows and fence lines. Fields in the east, north west south west are currently used for corn growth. A public footpath is present transecting from west to east across the northern section of the site. The west of the site is currently used for public open space with rugby fields present. There is a woodland present in the western section of the site, with a shallow pond located in the centre. On the walkover algae growth was noted across the ponds with various fly-tipping of bikes and wooden pallets. A manhole cover is located in the eastern field, likely containing a sewer or surface water drainage. An overhead power cable with wooden poles is aligned west to east across the southern section of the site. A fly-tipped corroded motorbike was noted in the treeline near the centre of the site. Various litter was present throughout the woodland in the centre of the site. Shown on the site features plan (Hydrock Drawing 17177-HYD-XX-XX-DR-GE-0002) presented in Appendix A, subject to confirmation by an ecological appraisal, two suspected badger setts were noted, one along a tree line in the centre of the site and the other adjacent to the south eastern boundary. A section of a small foot bridge crossing over Cefn Road is present in the south west of the site.
Vegetation	Two areas of suspected Japanese Knotweed are present on the western boundary. Another smaller area of suspected Japanese Knotweed is present in the centre of the site. These are shown on the site features plan (Hydrock Drawing 17177-HYD-XX-XX-DR-GE-0002) presented in Appendix A. Mature trees and hedgerows are present along the boundaries and sporadically across the site. Subject to an arboricultural survey species noted include: mature Oak, Holly, Sycamore, Norway Maple, Willow and Rowan. There is a woodland containing various species of mature trees present in the western section of the site.
General site sensitivity	The site is within a generally residential area, with the commercial area being further west of the site in the town Wrexham. The eastern section of the site is classified within the environmental report as very good quality agricultural land. Cefn Park Lodge, located 138m south of the site, is classified as a Grade II listed building.
Site boundaries and surrounding land	To the west and north west of the site are residential areas, the north east is bordering Wrexham Rugby Club. The south of the site is bound by Llywn Knottia Farm. The east borders further field and a woodland area referenced as fox covert.

A site features plan (Hydrock Drawing 17177-HYD-XX-XX-DR-GE-0002) are presented in Appendix A.



Figure 2.3: Suspected Japanese Knotweed on the western boundary.



Figure 2.4: Suspected badger sett in the south east corner of the site.



Figure 2.5: Pond within the woodland.



Figure 2.6: Undulating field in the south west of the site.

2.4 Site history

A review of historical Ordnance Survey maps (Appendix C) has been undertaken to identify any former land uses at the site and surrounding areas which may have geotechnical or geo-environmental implications for the proposed development. The key findings are summarised in Table 2.3.

Table 2.3: Site history review

Reference	Key Features on Site	Key Features off Site
OS Map[i] 1872: 1:10,560	The site comprises a series of undeveloped fields. Various mature trees are present across the site. A public footpath is situated in the northern section of site. Three ponds are present on site, two in the centre, one in the south east.	Woodbine Farm and Hulluh Farm are located adjacent to the west. Llywn Knottia farm is located adjacent to the south. There is woodland adjacent to the south east called Fox Covert. The surrounding area is open fields separated by mature trees. A pond is present adjacent to the western boundary.

Reference	Key Features on Site	Key Features off Site
OS Map 1898-1901 1:10,560	A woodland area is recorded in the western section of the site, one pond is recorded within the woodland and second adjacent to the north of the site.	Two farms are recorded to the north, Rhosnesni Farm and Home Farm which are both adjacent to each other.
OS Map 1909 – 1914 1:10,560	The pond to the north of woodland is no longer recorded and likely backfilled or naturally silted up. A public footpath is shown to transect from Woodbine Farm off site and cuts though the north.	No significant changes off site.
OS Map 1949-1958 1:10,560	No significant changes on site.	To the west of the site there is residential development and a teacher training college. In 1958 unnamed garages are shown 200m west of the site boundary. Unspecified tanks are shown 101m south at Llwyn Knottia Farm
OS Map 1960–1964 1:10,560 1967 1:1,250	No significant changes on site.	Further residential development to the west of the site. A pond formerly adjacent to the western boundary of the site is no longer recorded and likely backfilled during residential development to the west.
OS Map 1980-1992 10:10,000 1984 1:1,250	In 1992 the pond situated in the south east of the site is no longer recorded and has likely been backfilled or naturally silted up.	North of the site there is Wrexham Sports Club and Garden Cottages. Tanks are present 44m south east at Llwyn Knottia Farm. An unspecified tank is adjacent to the north west at Rhosnesni Farm. An electricity substation is shown 43m west.
OS Map 2001: 10:10,000 2003 1:1,250	No significant changes on site.	No significant changes off site.
OS Map 2010-2020 1:10,000	No significant changes on site.	No significant changes off site.

2.5 Geology

The general geology of the site area is shown on the British Geological Survey (BGS) 1:50,000 geological map of Wrexham (Sheet 121). The 1:10,000 British Geological Survey (BGS) map extract reproduced as part of the Groundsure report is summarised in Table 2.4. Extracts from the map are shown in Figure 2.7 and Figure 2.8.

Table 2.4: Geology

Ref. for Figures	Location	Stratigraphic Name	Description
Superficial Deposits (Figure 2.7)			
1	On site	Glacial Till	Diamicton, sandy gravelly clay. Detrital, fine grained, created by the action of ice and meltwater,
2	On site	Glaciofluvial Sheet Deposits	Sand and Gravel. Detrital, generally coarse-grained, they form beds, channels, plains and fans associated with meltwater.

Ref. for Figures	Location	Stratigraphic Name	Description
Solid Geology (Figure 2.8)			
1	On site.	Salop Formation- Mudstone, Sandstone and Conglomerate	These sedimentary rocks are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting).

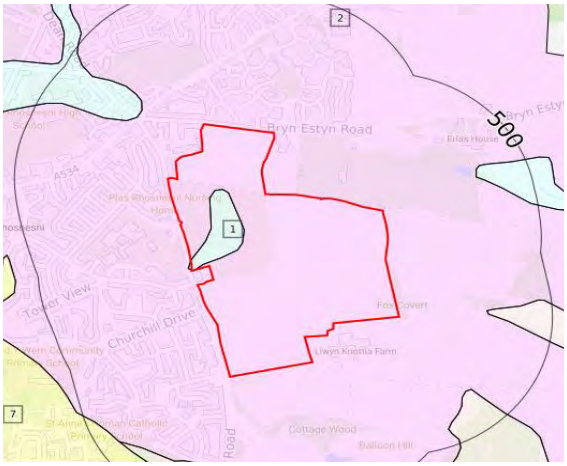


Figure 2.7: Superficial deposits.

(Reproduced with permission from Groundsure)

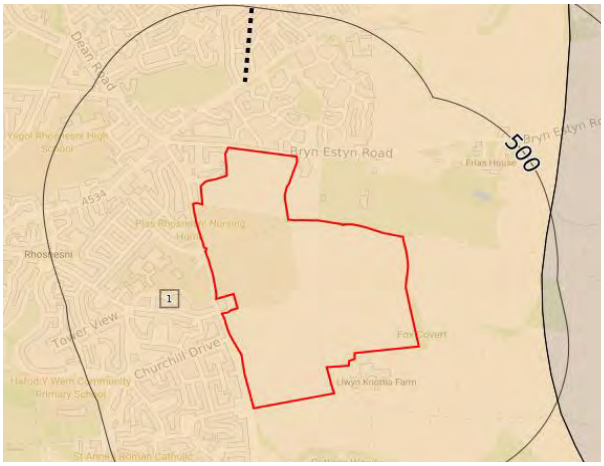


Figure 2.8: Solid geology.

(Reproduced with permission from Groundsure)

An unknown Fault, trending approximately north-south, is located 221m to the north of the site.

The western section of the site is recorded on the eastern edge of a buried valley which extends deeper off site towards Wrexham. The buried valley on site in the west of the site is recorded as 10-20m deep. Therefore, superficial deposits are expected to be preferentially deeper across this section of the site.

A number of borehole logs from the BGS archive have been reviewed. Selected records are summarised below:

- SJ35SE22, located in the south east of the site adjacent to Fox Covert (NGR 335960E, 350390N), drilled to a depth of 25.00m and recorded:
  - Greyish brown sandy gravel from ground level to 13.00m (bgl) (probable Glaciofluvial Sheet Deposits);
  - Greyish brown gravelly sand 13.00m and 21.0m bgl (probable Glaciofluvial Sheet Deposits);
  - Dark grey sandy gravel with thin bands of clay between 21.00m and 22.00m bgl (probable Glaciofluvial Sheet Deposits);
  - Red brown gravelly clay from 22.00m to 23.00m bgl (probable Glaciofluvial Sheet Deposits); and
  - Silty sand from 23.00m bgl to the base of the borehole at 25.00m bgl.

No groundwater strikes were recorded within the borehole. Water was added to retain a head of water for drilling the Glaciofluvial Sheet Deposits from 1.50m bgl.

- SJ35SE197, located 100m to the north east Wrexham 2/2A (NGR 335670E, 351300N), drilled to a depth of 9.00m and recorded:
  - Topsoil and clay fill from ground level to 0.20m (bgl);
  - Medium dense brown sand and gravel with small clay bands from 0.20m to 9.00m bgl (probable Glaciofluvial Sheet Deposits);

No groundwater strikes were recorded within the borehole. Water was added to retain a head of water for drilling the Glaciofluvial Sheet Deposits.

2.6 Hydrogeology

Based on the inferred geological sequence presented in Section 2.5 and the Environment Agency's interactive aquifer designation map, the aquifer system presented in Table 2.5 applies. Additional information on the hydraulic characteristics of the geological units has been abstracted from Allen *et al.* (1997) and Jones *et al.* (2000).

Table 2.5: Aquifer system

Stratum	Aquifer Designation	Comments
Superficial Deposits		
Glaciofluvial Sheet Deposits	Secondary A Aquifer	Intergranular permeability. Dominated by moderate to high permeability layers of sand and occasional gravel, interbedded with low permeability clay. Overall, this unit is likely to be relatively anisotropic in nature with horizontal permeability similar to vertical permeability (i.e. kh>kv). Groundwater flow is likely to be variable and discontinuous as water migrates around low permeability areas.
Glacial Till	Secondary Undifferentiated	Predominantly clay of low permeability, interbedded with occasional layers of sand and gravel, of moderate to high permeability. Overall, this unit is likely to be anisotropic in nature with horizontal permeability greater than vertical permeability (i.e. kh>kv).
Solid Geology		
Salop Formation-Mudstone, Sandstone and Conglomerate	Secondary A aquifer	Dominated by low permeability and low porosity clay, which is interbedded with moderate to high permeability layers of sandstone. Potentially fractured, with high secondary permeability. Overall, this unit is likely to be very anisotropic in nature with horizontal permeability significantly greater than vertical permeability (i.e. kh>>kv).

2.6.1 Groundwater abstraction

There are no active licensed groundwater abstractions within 1000m of the site.

2.6.2 *Groundwater source protection zones and groundwater vulnerability*

The site is not within a Groundwater Source Protection Zone (SPZ). A Source Protection Zone 3 for the Total Catchment is located 413m east within the off-site Kinnerton Sandstone Formation

2.6.3 *Groundwater levels, recharge, and flow*

Shallow groundwater is likely to be present within the Glaciofluvial Sheet Deposits. Due to the possible presence of low permeability bands of clay within the Glaciofluvial Sheet Deposits previously confirmed in the historic borehole in the south east of the site, there will be limited connectivity between shallow groundwater and deeper groundwater within the Salop Formation. There is the potential for localised perched water in the western section of the site, sitting on the localised low permeability Glacial Till.

Recharge to the Glaciofluvial Sheet Deposits would be expected to take place locally with recharge to the Salop Formation taking place on an outcrop area approximately 2km north east of the site near Borras.

Shallow groundwater flow is likely to be topographically controlled due to the sloping ground in the eastern section of the site. However, historic borehole (SJ35SE22E20), found no evidence of shallow groundwater in the south east of the site, therefore, the unsaturated nature of the superficial deposits is such that the flux of water is likely to be small.

2.6.4 *Groundwater quality*

The groundwater body beneath the site (Dee Carboniferous Coal Measures) is currently (2016 Cycle 2), classified under the Water Framework Directive as ‘poor’.

The water body is currently given a 'poor' status due to ‘chemical status element' conditions. The objective is for the chemical status element to be ‘good’ by 2021.

2.6.5 *Groundwater flooding*

The environmental data report indicates a moderate risk of groundwater flooding across the majority of the site, with a low risk locally in the western section of the site associated with the Glacial Till.

2.7 Hydrology

2.7.1 *Surface water system and drainage*

The surface water features in the vicinity of the site are listed in Table 2.6 and, where appropriate, are marked on the Site Features Plan (Hydrock Drawing 17177-HYD-XX-XX-DR-GE-0002) in Appendix A.

Table 2.6: Surface water features

Feature	Location Relative to Site
Pond	On site

2.7.2 *Surface water abstractions and discharges*

There are no active licensed surface water discharges within 1km of the site.

2.7.3 *Surface water quality*

Reference to the Natural Resource Wales web site shows the site is located within the catchment of the Dee, with the specific river water body being the Cleobury Bk- Dee to Gwenfro. The current (2016 cycle 2), overall status under the Water Framework Directive is 'moderate'.

The water body is currently 'moderate' status due to invertebrates, ecological, Ammonia (Phys-Chem) and phosphate level. The objective is for invertebrates, ecological, Ammonia (Phys-Chem) and phosphate level to be 'good' by 2027.

2.7.4 *Surface water flooding*

The desk study information indicates the proposed development is in Flood Zone 1 (with a low probability of flooding from rivers or the sea).

The desk study information indicates the proposed development is not noted to be in a flood risk area.

No further consideration of flood risk is undertaken in this report. Specialist flood risk advice should be sought with regard to drainage and flooding.

2.8 Mining and mineral extraction

The Coal Authority Viewer shows the site to lie within a Coal Mining Reporting Area, therefore a 'CON29, Consultants Coal Mining Report' was obtained from The Coal Authority and is included in Appendix D. Key statements within the report are that:

- "the site is in an area where there are no probable unrecorded shallow workings";
- "there are no coal outcrops recorded below the site";
- there are no known coal mine entries within, or within 20 metres of, the boundary of the site";
- "no opencast workings are recorded within, or within 500m of the site boundary";
- "there is no risk of mine gas within, or within 500 metres of the site boundary",
- "No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence"; and
- "the Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994".

As the site is within a Development Low Risk Area, any past coal mining activity is at sufficient depth that it poses a very low risk to new development. As such, a Coal Mining Risk Assessment does not need to be submitted to the Planning Authority as part of any planning application.

2.9 Natural ground instability

Trees and hedges are present around the site boundaries and sporadically across the site. Cohesive deposits of the Glacial Till in the western section of the site may be affected by potential for shrink-swell ground movements in clays as a result of changes in moisture content from removal or growth of trees.

There are backfilled ponds present in the centre and south east of the site. The pond represents a geotechnical risk due to the presence of heterogeneous Made Ground. Foundations will need to be deepened to below the Made Ground.

The environmental report states that the risk posed by running sands, collapsible ground and landslides to be very low, and the risk posed by ground dissolution of soluble rocks and compressible ground is considered negligible.

2.10 Waste management

There are no historic waste management sites recorded within 250m of the site boundary.

2.11 Regulatory consultation

Information in the Groundsure Report (Appendix D), relating to various regulatory controls has been reviewed, with a summary presented below in Table 2.7.

Table 2.7: Regulatory information within 500m of the site

Regulatory Data	Distance from Site	Details	Potential Risk	Comment
Discharge Consents.	N/A	No entries for discharge consents within 500m of the site.	No	-
Local Authority Pollution Prevention and Controls.	141m south	Waste Exemption Deposits of dredging waste from inland.	No	Due to the small volumes of potential contaminants and its distance from the site.
	257m south west	Waste Exemption De-naturing of controlled drugs for disposal	No	Due to distance from the site
	463m west	Waste Exemption Authorised use of waste in construction	No	Due to distance from the site
	227m west	Part B Permitted Unloading of petrol into storage.	No	Due to distance from site and measures and control in place when discharging petrol into the tanks.
Pollution Incidents.	19m east	13/02/2017 no further details given.	No	Due to its location downgradient of the site and the Category 3 classification of the incident.
Trade Directory Entries.	25m south	Active Construction Services	No	Due to the small volumes of potential contaminants. All entries are likely underlain by hardstanding preventing the migration of contaminants into the underlying superficial deposits.
	43m/52m/146m/147m and 150m	Active Five electrical sub stations		
	86m east	Active Mast		
	258m north-west	Active Vehicle Dealerships		
Fuel Station Entries.	241m north west	Open Petrol station	No	Due to the distance between the fuel station and site, measures and

Regulatory Data	Distance from Site	Details	Potential Risk	Comment
				controls in place when discharging petrol into the tanks.
Control of major accident hazards sites (COMAH).	N/A	No Control of major accident hazards sites within 500m of the site.	No	-
Registered radioactive substances.	N/A	No entries on registered radioactive substances were recorded within 500m of the site.	No	-
Notification of installations handling hazardous substances.	N/A	No entries on notification of installations handling hazardous substances were recorded within 500m of the site.	No	-

2.12 Natural soil chemistry

Information contained within the environmental report (Appendix D) gives indicative (estimated) concentration values for the natural soils at the site for a selection of Contaminants of Potential Concern (CoPC). These have been reproduced in Table 2.8.

Table 2.8: Natural soil chemistry

Element	Arsenic	Cadmium	Chromium	Lead	Nickel
Concentration (mg/kg)	15	1.8	60 - 90	100	15 - 30

2.13 Radon

The radon risk reported in the environmental report indicates that the site is in a Radon Affected Area. Recorded radon levels in 3-5% of homes are above the action level and basic radon protection measures are required for new buildings at this location in line with current guidance.

2.14 Unexploded ordnance (UXO)

In general, in accordance with CIRIA Report C681 (Stone *et al.* 2009) a non-specialist UXO screening exercise has been undertaken for the purposes of ground investigation and is presented in Table 2.9 .

Table 2.9: Non-specialist UXO screening (for the purposes of ground investigation)

Data	Comment	Further Assessment Required
Site History	There is no indication of former military use from the desk study.	No
Post War Development	The 1953 OS mapping shows a no evidence of 'ruins' or missing housing, suggesting bomb damage.	No

Data	Comment	Further Assessment Required
Geology Type	The ground conditions comprise Glaciofluvial Sheet Deposits. There is the potential that UXO, if present, would remain undetected.	No
Surface Cover during WWI	The surface cover during WWII comprised open fields. There is the potential that UXO, if present, would remain undetected.	No
Indicator of Aerial Delivered UXO	Screening against the regional bomb risk map (Anglesey) presented in Appendix D indicates the site to be in an area where the bomb risk is low	No

The non-specialist UXO screening exercise has indicated no further assessment is required with regard to UXO in relation to ground investigation. Further assessment may be considered prudent for construction activities.

3. OUTLINE CONCEPTUAL SITE MODEL

3.1 Introduction

The outline Conceptual Model (oCM) incorporates evidence from the site walkover, the Desk Study and previous investigations carried out at the site. The development of an outline Conceptual Model is a key component of the LCRM methodology. The oCM incorporates a ground model of the site physical conditions and an exposure model of the possible contaminant linkages; it forms the basis for Generic Quantitative Risk Assessment (GQRA) in accordance with current guidelines.

3.2 Ground model

The preliminary ground model presented in Section 2 provides an understanding of the ground conditions and is the basis for preparing the preliminary geotechnical hazard assessment (Section 3.3) and the preliminary geo-environmental exposure model (Section 3.4).

3.3 Geotechnical hazard identification

3.3.1 Context

The preliminary geotechnical hazard identification has been undertaken in accordance with the general requirements of ICE/DETR Document 'Managing Geotechnical Risk' and the HE documents HD 41/15 and CD 622.

The following section sets out the identified geotechnical hazards and the development elements potentially affected (see Table E.1 in Appendix E for further information).

3.3.2 Plausible geotechnical hazards

Plausible geotechnical hazards identified at the site are:

- Uncontrolled Made Ground locally associated with backfill in ponds (variable strength and compressibility).
- Soft / loose compressible ground (low strength and high settlement potential).
- Extensive excavations for the removal of tree root systems.
- Desiccation of soils, shrinkage / swelling of the clay fraction of soils under the influence of vegetation and after removal of mature trees.
- Designing foundations to accommodate heave due to extensive tree removal.
- Variable lateral and vertical changes in ground conditions.
- Attack of buried concrete by aggressive ground conditions locally associated with pond backfill.
- Existing below ground structures to remain (foundations of footbridge in the south west).
- Shallow groundwater.
- Changing groundwater conditions.
- Loose Made Ground or Glaciofluvial Sheet Deposits, leading to difficulty with excavation and collapse of side walls.
- Earthworks – poor bearing capacity of new fill.

- Earthworks – unsuitability of site-won material to be reused as fill.

3.3.3 Potential development elements affected

Development elements potentially affected by geotechnical hazards are:

- Buildings – foundations.
- Buildings – floor Slabs
- Roads and pavements.
- Services.
- Gardens.
- Construction staff, vehicles and plant operators.
- Concrete below ground.
- Earthworks control, inability to place and compact fill.

Health and safety risks to site Contractors and maintenance workers have not been assessed during these works and will need to be considered separately during design.

The above plausible geotechnical hazards and development elements affected have been carried forward for investigation and assessment.

3.4 Geo-environmental exposure model

3.4.1 Context

The preliminary exposure model is used to identify geo-environmental hazards and to establish potential pollution linkages, based on the source-pathway-receptor (SPR) approach.

A viable pollution linkage requires all the components of an SPR to be present. If only one or two are present, there is no linkage and no further assessment is required.

3.4.2 Potential contaminants

For the purpose of this assessment the potential contaminants have been separated according to whether they are likely to have originated from an on-site or off-site source.

Potential on-site sources of contamination

- Made Ground, associated with backfilled pond possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials and PAHs (S01).
- Ground gases (carbon dioxide and methane) from organic materials in the Made Ground within the backfilled pond (S02).
- Pesticides (organochlorine or organophosphates) spread across the farmland to the east and south west to aid the growth of corn (S03).
- Radon (S04).

Potential off-site sources of contamination

- Hydrocarbon fuels from the unspecified tank adjacent to the north west including leakage from the Tank, general spillage, together with uncontrolled disposal and spillage from waste receptacles (S05).

The location of the unspecified tank on Llwyn Knottia, 44m south east is down-gradient. Therefore, any uncontrolled spillage from this tank will migrate via topographical controls away from the site. Therefore, this source has not been included within the initial conceptual site model.

3.4.3 Potential receptors

The following potential receptors in relation to the proposed land use have been identified.

- People (neighbours, site end users) (R01).
- Development end use (buildings, utilities and landscaping) (R02).
- Groundwater: Secondary A aquifer status of the Glaciofluvial Sheet Deposits (R03).
- Surface water: on-site pond (R04).

Groundwater within the Glaciofluvial Sheet Deposits is unlikely to be in connection with deeper groundwater within the Salop Formation some >20.00m deep, due to the presence of cohesive bands within the superficial deposits. Horizontal flow is likely to be far greater than vertical flow.

3.4.4 Potential pathways

The following potential pathways have been identified.

- Ingestion, skin contact, inhalation of dust and outdoor air by people (P01).
- Methane or carbon dioxide ingress via permeable soils and/or construction gaps (P02).
- Petroleum hydrocarbon vapour or radon ingress via permeable soils and/or construction gaps (P03).
- Root uptake by plant (P04).
- Migration of contaminant via leachate migration through the unsaturated zone in the Glaciofluvial Sheet Deposits (P05).
- Surface water via base flow from groundwater (P06).

Health and safety risks to site development contractors and maintenance workers have not been assessed as part of this study and will need to be considered separately.

The above sources, pathways and receptors have been considered as part of the Preliminary Risk Assessment in accordance with LCRM (2019), are considered to be plausible in the context of this site and have been carried forward for investigation and assessment. An assessment of the Source – Pathway – Receptor linkages is presented in Appendix F (Table F.1).

A summary of the plausible linkages is presented on the Initial Conceptual Model provided in Appendix A (Hydrock Drawing 17177-HYD-XX-XX-DR-GE-0003).

4. DESK STUDY CONCLUSIONS

4.1 Geotechnical conclusions

The following plausible geotechnical risks are identified.

- Variable Made Ground within backfilled ponds - settlement or differential settlement of foundations, floor slabs, roads and infrastructure elements.
- Low strength, compressible ground – risk of shear failure and excessive settlement of foundations, roads and infrastructure elements.
- Attack of buried concrete by aggressive ground conditions within localised Made Ground – the development site may contain Made Ground and potentially sulphate bearing soils.
- Shrinkage/swelling of clay – settlement/heave of foundations, especially where located within the influence of trees and vegetation.
- Designing foundations to accommodate heave due to extensive tree removal and extensive excavation involved in the removal of former trees root systems
- Loose Made Ground or Glaciofluvial Sheet Deposits, leading to difficulty with excavation due to trench instability.
- Earthworks – Low bearing capacity or settlement of new fill and impact on foundations, floor slabs, roads and infrastructure and construction plant.
- Potential for unforeseen ground conditions and the risks associated with limited data.

These plausible risks require further investigation and assessment (see Section 6).

4.2 Geo-environmental conclusions

Based on historical and current land uses and in accordance with the processes set out in Appendix G:

- It is considered that it is unlikely that the site would be classified as Contaminated Land under Part 2A of the EPA 1990.
- Based on historical land uses and its current use as public open space and arable fields, the overall risk from land contamination at the site is considered to be low for the current development
- The overall risk for a redeveloped site is assessed to be low to moderate, but this would need to be confirmed by appropriate intrusive investigation, testing and assessment of the results of the investigation.

The possible pollutant linkages (for risk levels of moderate or greater) on an unremediated redeveloped site, as determined by the desk study and walk-over, are summarised in Table 4.1:

Table 4.1: Possible Pollutant Linkages (for Risk Levels of Moderate or Greater)

Source(s)	◄ potential Impact on ►	Receptor(s)
Metals, metalloids, PAH and asbestos in Made Ground associated with backfilled pond.		Site users
Ground gases (carbon dioxide and methane) from organic materials in the Made Ground within the backfilled pond		Site Users
Radon		Site Users

These possible pollutant linkages require further investigation and assessment (see Section 6).

5. UNCERTAINTIES AND LIMITATIONS

5.1 Site specific comments

Its recommended that a preliminary ecological appraisal is undertaken to confirm the presence of suspected badger setts, suspected Japanese Knotweed and possible aquatic ecosystems present within the on-site pond.

Due to the presence of mature and semi-mature trees across large portions of the site and the presence of hedgerows an arboricultural survey should be undertaken to confirm trees species, age and heights.

5.2 General comments

Hydrock Consultants Limited (Hydrock) has prepared this report in accordance with the instructions of Harworth Estates Property Group Limited (the Client), by e-mail dated September 2020 under the terms of appointment for Hydrock, for the sole and specific use of the Client and parties commissioned by them to undertake work where reliance is placed on this report. Any third parties who use the information contained herein do so at their own risk. Hydrock shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared or for use of the report by any parties not defined in Hydrock's appointment.

This report details the findings of work carried out in October 2020. The report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, not all potential environmental constraints or liabilities associated with the site may have been revealed.

Groundwater data are only representative of the dates on which they were obtained and both levels and quality may vary.

Information provided by third parties has been used in good faith and is taken at face value; however, Hydrock cannot guarantee its accuracy or completeness.

The work has been carried out in general accordance with recognised best practice. The various methodologies used are referenced in Appendix G. Unless otherwise stated, no assessment has been made for the presence of radioactive substances or unexploded ordnance. Where the phrase 'suitable for use' is used in this report, it is in keeping with the terminology used in planning control and does not imply any specific warranty or guarantee offered by Hydrock.

The non-specialist UXO screening has been undertaken for the purposes of ground investigation only (i.e. low risk activity in accordance with CIRIA Report C681). Further assessment should be undertaken with regards to other higher risk activities e.g. construction.

Please note that notwithstanding any site observations concerning the presence or otherwise of archaeological sites, asbestos-containing materials or invasive weeds, this report does not constitute a formal survey of these potential constraints and specialist advice should be sought.

Any site boundary line depicted on plans does not imply legal ownership of land.

6. RECOMMENDATIONS FOR FURTHER WORK

6.1 Ground investigation objectives

In order to confirm the actual risks to receptors and confirm the ground conditions with respect to potential geotechnical and geo-environmental risks, an appropriate intrusive investigation will need to be undertaken. This investigation will need to:

- determine the depth and distribution of Made Ground and natural strata across the site;
- determine the soil strength/density profile beneath the site;
- determine the depth/level of groundwater beneath the site;
- determine the ground gas concentrations beneath the site;
- determine CBRs to assist with pavement design;
- assess trench stability, over break potential and 'diggability';
- allow soil infiltration rate testing;
- allow sampling for chemical and geotechnical laboratory testing;
- allow soil classification to allow geotechnical characterisation and determine suitability for reuse of soils within earthworks;
- obtain information in terms of Aggressive Chemical Environment for Concrete Class (ACEC Class).

Following investigation, assessment will be required to:

- update the Ground Model;
- update the Geotechnical Risk Register;
- provide Geotechnical Design recommendations;
- update the Conceptual Site Model (CSM), including identification of plausible pollution linkages;
- undertake generic quantitative risk assessment of potential chemical contaminants to establish 'suitability for use' under the current planning regime;
- discuss potential environmental liabilities associated with land contamination (soil, water and gas); and
- provide outline mitigation recommendations to ensure the site is 'suitable for use'.

6.2 Proposed scope and rationale for investigation works

Based on the current data, site investigation is proposed to comprise:

- the excavation of trial pits to allow collection of samples for geotechnical and chemical analysis, to assess trench stability, over break potential and 'diggability' and allow soil infiltration rate testing to be undertaken;
- the undertaking of soil infiltration rate tests within the Glaciofluvial Sheet Deposits;
- dynamic sampling to allow collection of samples for geotechnical and chemical analysis of shallow soils, and allow *in situ* testing (SPTs) to be undertaken to determine the strength of the clay and assess density of the sands and gravel, and allow the installation of gas and groundwater monitoring wells;

- cable percussive boreholes to allow collection of samples for geotechnical and chemical analysis of deeper soils, and allow *in situ* testing (SPTs) to be undertaken to determine the strength of the clay and assess density of the sands and gravel, and allow the installation of gas and groundwater monitoring wells;
- TRL Dynamic Cone Penetration tests to determine CBRs for pavement design;
- gas and groundwater monitoring installations to allow gas concentrations and groundwater levels to be monitored;
- six rounds of gas concentration and groundwater level monitoring;
- geotechnical testing of soils; and
- contamination analyses of soil and groundwater.

7. REFERENCES

ALLEN, D. L., BREWERTON, L. J., COLEBY, L. M., GIBBS, B. R., LEWIS, M. A., MACDONALD, A. M., WAGSTAFF, S. J. and WILLIAMS, A.T. 1997. The physical properties of major aquifers in England and Wales. British Geological Survey Technical Report WD/97/34. 312pp. Environment Agency R and D Publication 8.

ASSOCIATION OF GROUND INVESTIGATION SPECIALISTS. 2006. Guidelines for Good Practice in Site Investigation. Issue 2. AGS, Beckenham.

BRITISH STANDARDS INSTITUTION. 2007. Eurocode 7 – Geotechnical design - Part 2: Geotechnical investigation and testing. BS EN 1997-2. BSI, London.

BRITISH STANDARDS INSTITUTION. 2004+A1 2013. Eurocode 7 – Geotechnical design - Part 1: General rules. BS EN 1997-1+A1. Incorporating Corrigendum February 2009. BSI, London.

BRITISH STANDARDS INSTITUTION. 2011. Code of Practice for Investigation of Potentially Contaminated sites. BS 10175 Incorporating Amendment No. 2:2017. BSI, London.

BRITISH STANDARDS INSTITUTION. 2015. Code of practice for ground investigations. BS 5930. BSI, London.

CLAYTON, C. R. I. 2001. Managing Geotechnical Risk. Improving productivity in UK building and construction. Thomas Telford, London.

DCLG. February 2019. National Planning Policy Framework. DCLG, London.

ENVIRONMENT AGENCY. 2019. Land Contamination: Risk Management (LCRM). The Environment Agency.

THE HIGHWAYS AGENCY. 2019. Design Manual for Roads and Bridges. Managing Geotechnical Risk. CD 622 Rev 0. Highway Agency, London.

THE HIGHWAYS AGENCY. 2015. Design Manual, Road and Bridges: Volume 4, Geotechnics and Drainage; Section 1, Earthworks; Part 3, HD 41/15, Maintenance of highway geotechnical assets. HD 41/15.

JONES, H. K., MORRIS, B. L., CHENEY, C. S., BREWERTON, L. J., MERRIN, P. D., LEWIS, M. A., MACDONALD, A. M., COLEBY, L. M., TALBOT, J. C., MCKENZIE, A. A., BIRD, M. J., CUNNINGHAM, J. and ROBINSON, V. K. 2000. The physical properties of minor aquifers in England and Wales. British Geological Survey Technical Report WD/00/04. 234pp. Environment Agency R and D Publication 68.

MILES, J. C. H., APPLETON, J. D., REES, D. M., GREEN, B. M. R., ADLAM. K. A. M. and MYRES. A. H. 2007. Indicative Atlas of Radon in England and Wales. Health Protection Agency and British Geological Survey. Report HPA-RPD-033.

MINISTRY OF HOUSING, COMMUNITIES and LOCAL GOVERNMENT (MHCLG). Internet published Planning practice guidance https://www.gov.uk/government/collections/planning-practice-guidance. MHCLG. London

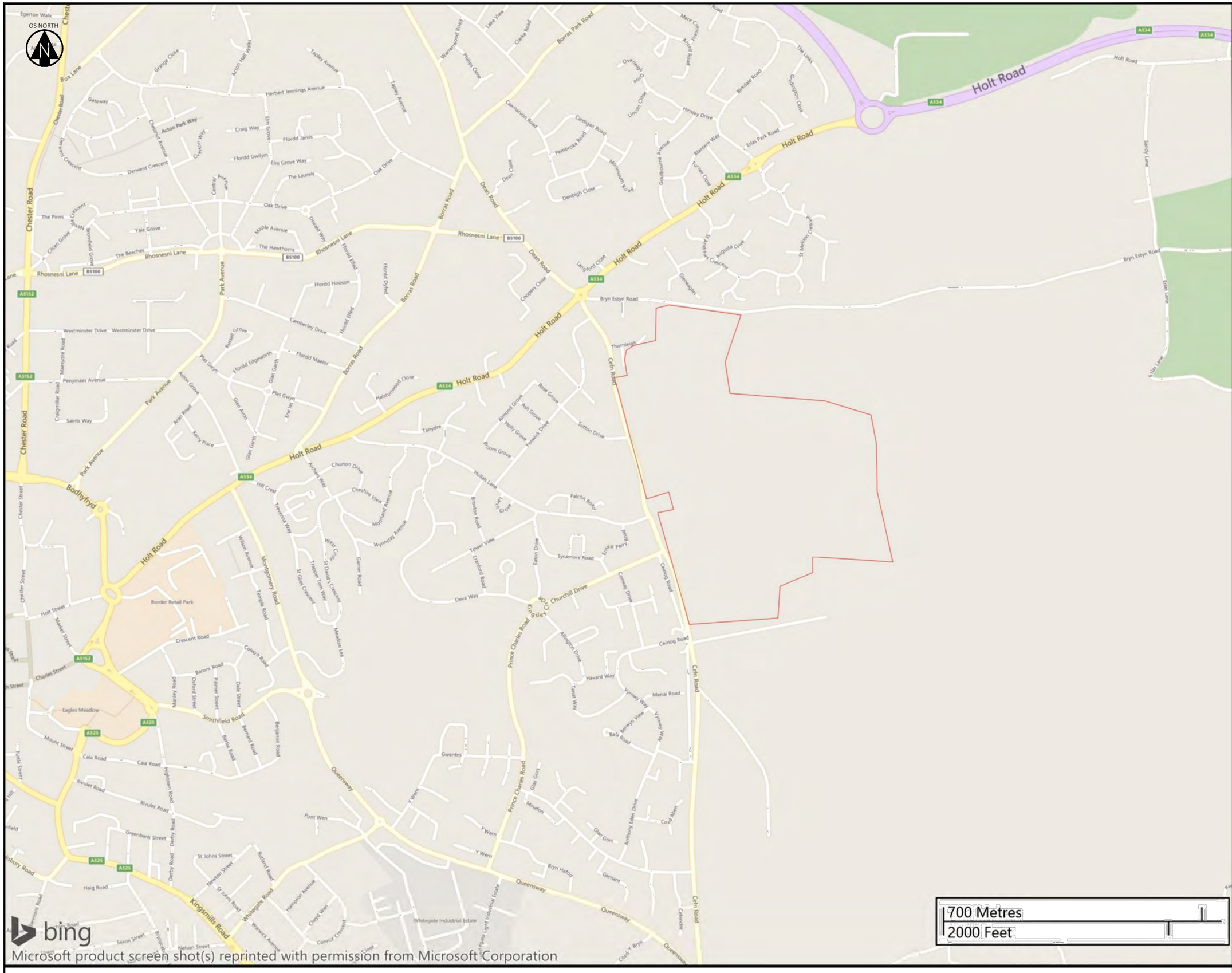
NHBC. 2019. NHBC Standards. NHBC, Milton Keynes.

SCIVYER, C. 2015. Radon: Guidance on protective measures for new buildings. Building Research Establishment Report BR 211. BRE, Garston.

STONE, K., MURRAY, A., COOKE, S., FORAN, J. and GOODERHAM, L. 2009. Unexploded ordnance (UXO), a guide to the construction industry. CIRIA Report C681. Contaminated Land: Applications in Real Environments, London.

Appendix A

Drawings





NOTES

1. The red dot on the map within the key shows the sites location in context of the wider UK. The site boundary is represented by the red line on the BING map.

P01	FIRST ISSUE					
	RS	28/10/20	MC	28/10/10	MC	28/10/20
REV.	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

Hydrock
4 Lakeside
Festival Way
Stoke-on-Trent
ST1 5RY
t: +44(0) 1782 261919
e: stoke@hydrock.com
or visit www.hydrock.com

CLIENT

HARWORTH ESTATES PROPERTY GROUP LTD

PROJECT

CEFN PARK, WREXHAM

TITLE

SITE LOCATION PLAN

HYDROCK PROJECT NO.	SCALE @ A3
C-17177-C	AS SHOWN

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
17177-HYD-XX-XX-DR-GE-0001	P1

OS NORTH

Farmers Track

Public Walkaway

Rugby Club

Various hedegrows

Access gate

Public Open Space

Public Open Space

Bridge Foundation

Public Open Space

Adjacent farm buildings

Overhead electricity with wooden poles

KEY

NOTES

1. This drawing has been based on the following drawings and information:
Harworth, Land Area Plan, 18/03/2020. Drawing referenced 002/CFP/NOW/A3

Key

- Sloping Ground
- Rugby Pitches
- Arable Farmland
- Woodland
- Raised manhole cover
- Historic Unspecified Tank
- Existing pond
- Suspected Japanese Knotweed
- Approximate location of mature trees
- Suspected Badger Sett

REV.	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P01	FIRST ISSUE					
	RS	28/10/20	MC	28/10/20	MC	28/10/20

Hydrock
4 Lakeside
Festival Way
Stoke-on-Trent
ST1 5RY
t: +44(0) 1782 261919
e: stoke@hydrock.com
or visit www.hydrock.com

CLIENT

HARWORTH ESTATES PROPERTY GROUP LTD

PROJECT

CEFN PARK, WREXHAM

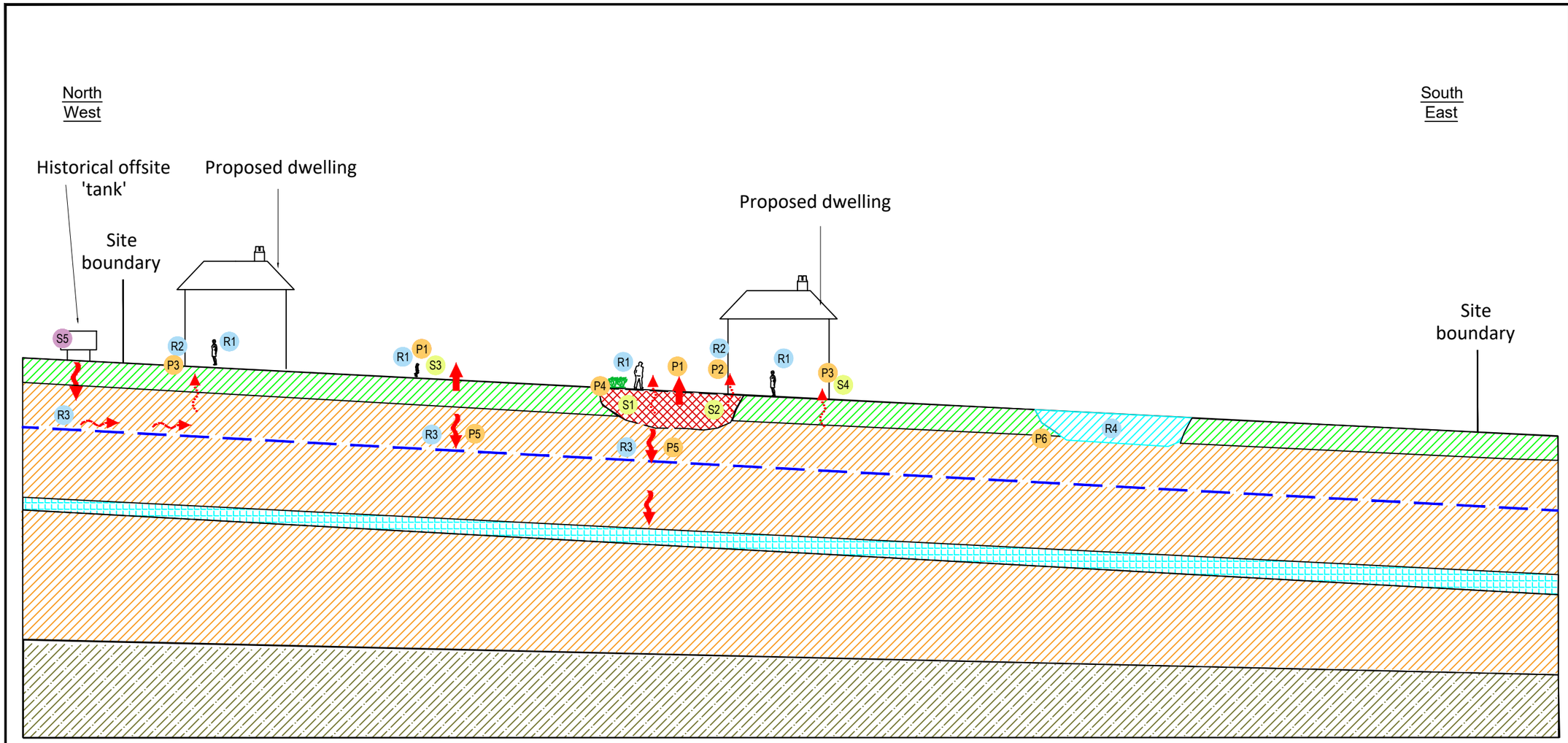
TITLE

SITE FEATURES PLAN

HYDROCK PROJECT NO.	SCALE @ A3
C-17177-C	N.T.S

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
17177-HYD-XX-XX-DR-GE-0002	P01



KEY

- Backfilled Pond
- Existing Pond
- Topsoil
- Groundwater
- Glaciofluvial Sheet Deposits
- Salop Formation
- Cohesive Bands

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing is indicative only.

Potential Pathways

DERMAL CONTACT, INGESTION, INHALATION

LEACHING DISSOLUTION

DISSOLVED PHASE MIGRATION

VAPOUR/GAS

Potential on-site Sources of Contamination

- S1 Made Ground, associated with backfilled pond possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials and PAHs.
- S2 Ground gases (carbon dioxide and methane) from organic materials in the Made Ground within the backfilled pond.
- S3 Pesticides (organochlorine or organophosphates) spread across the farmland to the east and south west to aid the growth of corn.
- S4 Radon gas

Potential off-site Sources of Contamination

- S5 Hydrocarbon fuels from the unspecified tank adjacent to the north west including leakage from the Tank, general spillage, together with uncontrolled disposal and spillage from waste receptacles .

Potential Receptors

- R1 People (neighbours, site end users.
- R2 Development end use (buildings, utilities and landscaping).
- R3 Groundwater: Secondary A aquifer status of the Glaciofluvial Sheet Deposits.
- R4 Surface water: on-site pond.

Potential Pathways

- P1 Ingestion, skin contact, inhalation of dust and outdoor air by people.
- P2 Methane and carbon dioxide ingress via permeable soils or construction gaps
- P3 Petroleum hydrocarbon vapour or radon gas ingress via permeable soils and/or construction gaps.
- P4 Root uptake by plant.
- P5 Migration of contamination via leachate migration through the unsaturated zone in the Glaciofluvial Sheet Deposits.
- P6 Surface water via base flow from groundwater.

REV.						
P01	FIRST ISSUE					
	SD	28/10/20	MC	28/10/20	MC	28/10/20
REV.	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

Hydrock
Hawthorn Park
Holdenby Road
Spratton
Northampton NN6 8LD
TEL: 01604 842 888
E-Mail: northampton@hydrock.com
or visit www.hydrock.com

CLIENT
HARWORTH ESTATES PROPERTY GROUP LTD

PROJECT
CEFN PARK, WREXHAM

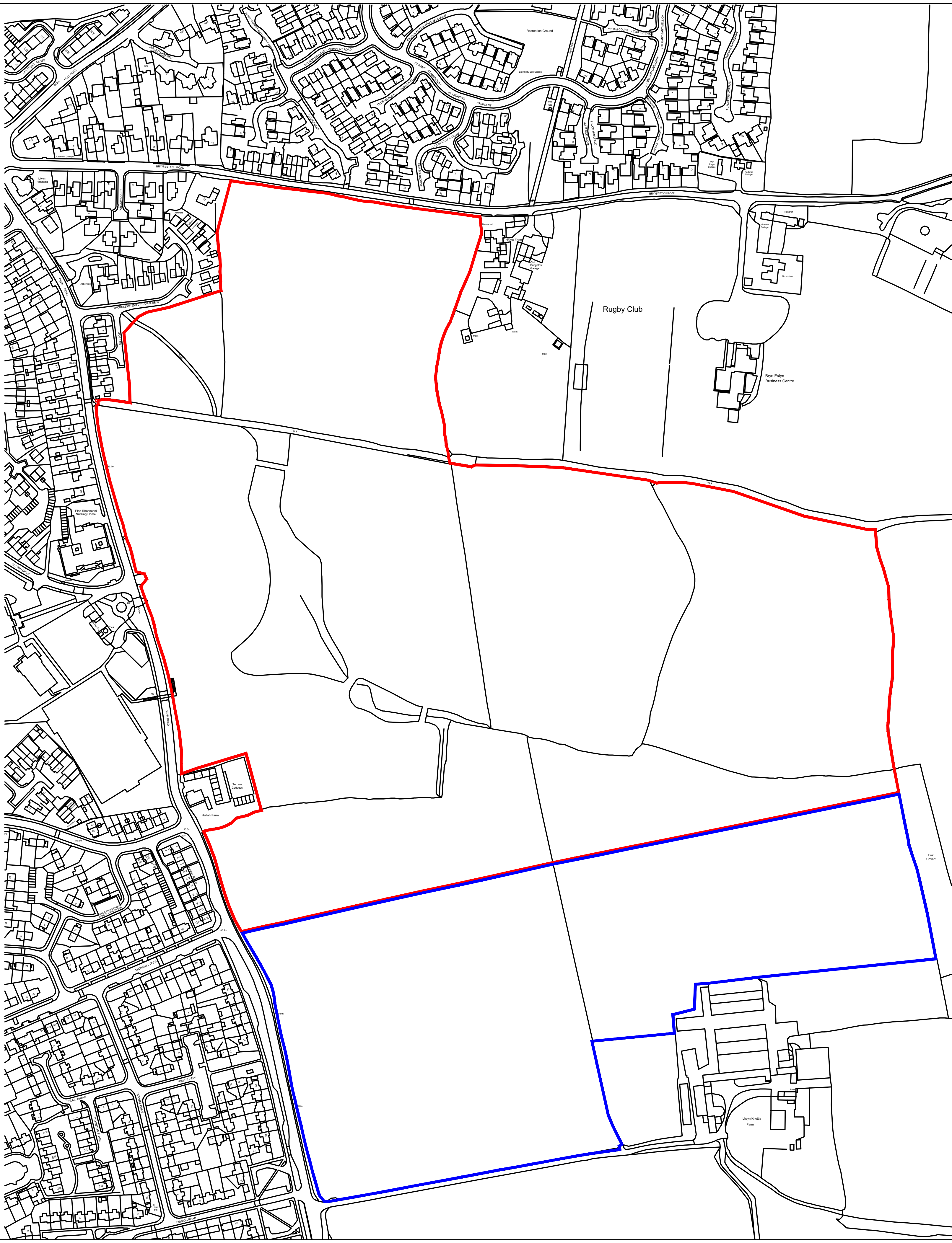
TITLE
Conceptual Site Model (indicative)

HYDROCK PROJECT NO.	SCALE @ A3
C-17177-C	Not to scale

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
17177-HYD-XX-XX-DR-GE-0003	P01

002/CFP/NOW/A3



Legend

Harworth Land - 70.83 acres

Countryside Homes - 29.12 acres

SITE NAME:- CEFN PARK - WREXHAM

TITLE:- LAND AREA PLAN

DEPT:- NORTH WEST REGION

DRAWN	JD	CHKD	SB
DATE	18/03/2020	DATE	18/03/2020

Harworth

Transforming Regenerating Revitalising

harworthgroup.com

Advantage House, Poplar Way, Catcliffe Rotherham, South Yorkshire, S60 5TR

© 2020 Harworth Group
The copyrights within this drawing belong to Harworth Group and the drawing may not be reproduced without prior written consent.

REPRODUCED FROM ORDNANCE SURVEY MAP DATA BY PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF H.M. STATIONERY OFFICE.
© CROWN COPYRIGHT 2020 ALL RIGHTS RESERVED
LICENCE No. 100030994

SCALE:- 1:4000

DRAWING No. 002/CFP/NOW/A3 | ACAD

LAYOUT:- LAYOUT 1 | A3

Appendix B

Field Reconnaissance Photographs

Desk Study Photograph 1	
Date: 13/10/20	
Direction Photograph Taken: Looking west	
Description: Suspected Japanese Knotweed on the western boundary.	

Desk Study Photograph 2	
Date: 13/10/20	
Direction Photograph Taken: Looking north	
Description: Mature trees adjacent to the existing public footpath in the northern section of the site.	

Desk Study Photograph 3	
Date: 13/10/20	
Direction Photograph Taken: Looking north	
Description: Suspected badger sett in the centre of the site.	

Desk Study Photograph 4	
Date: 13/10/20	
Direction Photograph Taken: Looking east	
Description: Smaller holes close to suspected badger sett.	

Desk Study Photograph 5	
Date: 13/10/20	
Direction Photograph Taken: Looking east.	
Description: Manhole cover in the eastern field.	

Desk Study Photograph 6	
Date: 13/10/20	
Direction Photograph Taken: Looking east	
Description: Rugby pitches to the east of the woodland.	

Desk Study Photograph 7	
Date: 13/10/20	
Direction Photograph Taken: Looking south	
Description: Eastern corn field.	

Desk Study Photograph 8	
Date: 13/10/20	
Direction Photograph Taken: Looking east	
Description: Topographical low point in the east of the site.	

Desk Study Photograph 9	
Date: 13/10/20	
Direction Photograph Taken: Looking east.	
Description: Suspected badger sett in the south east corner of the site.	

Desk Study Photograph 10	
Date: 13/10/20	
Direction Photograph Taken: Looking south	
Description: Brambles in the south east of the site.	

Desk Study Photograph 11	
Date: 13/10/20	
Direction Photograph Taken: Looking north	
Description: Pooling water in the south west field.	

Desk Study Photograph 12	
Date: 13/10/20	
Direction Photograph Taken: Looking north	
Description: Mature trees on the south west boundary.	

Desk Study Photograph 13	
Date: 13/10/20	
Direction Photograph Taken: Looking south	
Description: Overhead adjacent to the southern boundary.	

Desk Study Photograph 14	
Date: 13/10/20	
Direction Photograph Taken: Looking west.	
Description: Section of footbridge foundation on the west of the site.	

Desk Study Photograph 15	
Date: 13/10/20	
Direction Photograph Taken: Looking north	
Description: Pond in the centre of the woodland.	

Desk Study Photograph 16	
Date: 13/10/20	
Direction Photograph Taken: Looking east.	
Description: Mature trees adjacent to Hullah Farm.	

Desk Study Photograph 17	
Date: 13/10/20	
Direction Photograph Taken: Looking north	
Description: North western corn fields.	

Desk Study Photograph 18	
Date: 13/10/20	
Direction Photograph Taken: Looking south east	
Description: Access track across the north western corn field.	

Desk Study Photograph 19	
Date: 13/10/20	
Direction Photograph Taken: Looking north east	
Description: Hedgerows and mature trees in the south west of the site.	

Desk Study Photograph 20	
Date: 13/10/20	
Direction Photograph Taken: Looking east.	
Description: Sporadic mature trees across the centre of the south west of the site.	

Appendix C

Historical Ordnance Survey Maps

Groundsure

INSIGHTS

HISTORICAL MAP PACK LEGEND

COUNTY SERIES
1:1,2500

NATIONAL GRID
1:1,250 & 1:2,500

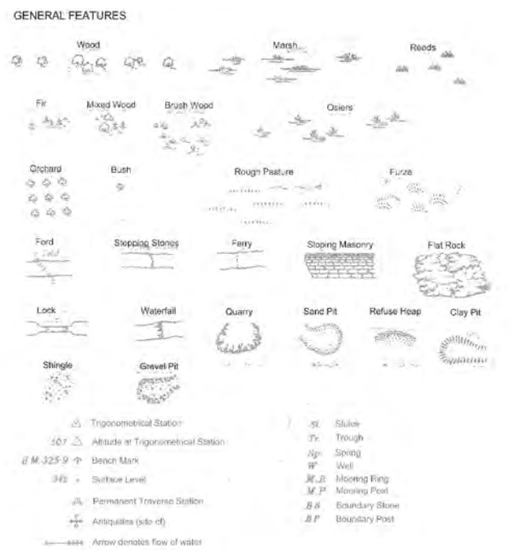
Information present on these legends is sourced from the same Ordnance Survey mapping as the maps used in this product.

If you have a query regarding any of the maps provided please contact Groundsure's technical helpline. We will endeavour to answer any queries you may have.

Technical Help
Tel 0800 028 0000

insight@groundsure.com
WWW.GROUNDSURE.COM

COUNTY SERIES 1:2,500



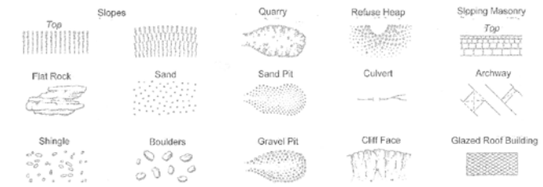
ABBREVIATIONS

Trigonometrical Station	Sluice
Altitude at Trigonometrical Station	Trough
Bench Mark	Spring
Surface Level	Well
Permanent Traverse Station	Mooring Ring
Antiquities (site of)	Mooring Post
Arrow denotes flow of water	Boundary Stone
	Boundary Post

NATIONAL GRID 1:2,500 & 1:1,250

GENERAL FEATURES

Non-coniferous Trees	Slopes	Antiquity (site of)
Coniferous Trees	Cliff	Culvert
Surveyed Trees	Cave Entrance	Direction of water flow
Orchard Trees	Rock	Electricity Pylon
Coppice, Osier	Boulders	ETL Electricity Transmission Line
Scrub	Sloping Masonry	Triangulation Station
Bracken	Roofed Building	Traverse Station (permanent)
Heath	Glasshouse	Bench Mark
Rough Grassland	Archway	Surface Level
Marsh, Saltings	Change of boundary morning	Revision Point (instrumentally fixed)
Reeds	see AREAS notes	Revision Point & Bench Mark coincident



BOUNDARIES

England & Wales

- County Boundary (geographical)
- County & Civil Parish Boundary coterminous
- Admin County or County Borough Boundary
- London Borough Boundary
- M B Bdy, U D Bdy, R D Bdy — County District Boundaries based on civil parish

England, Wales & Scotland

- Civil Parish Boundary
- Boro (or Burgh) Const & Ward Bdy / Co Const Bdy — Parly & Ward Boundaries based on civil parish
- Boro (or Burgh) Const & Ward Bdy / Co Const Bdy — Parly & Ward Boundaries not based on civil parish

Scotland

- * County Boundary (geographical)
- † " " "
- Co Cnl Bdy — * County Council Boundary
- Co Cnl Bdy — † " " "
- Co of City Bdy — * County of the City Boundary
- Co of City Bdy — † " " " " "
- Burgh Bdy — * Burgh Boundary
- Burgh Bdy — † " "
- Dist Bdy — * District Council Boundary
- Dist Bdy — † " " " "

* Not with parish † Coincident with parish

ABBREVIATIONS

B H Beer House	M P U Mail Pick-up
B M Bench Mark	M S Mile Stone
B P Boundary Post	N T National Trust
B S Boundary Stone	N T L Normal Tidal Limit
C Crane	N T S National Trust for Scotland
C H Club House	P Pillar, Pole or Post
Chy Chimney	P C Public Convenience
Cp Capstan	P C B Police Call Box
D Fn Drinking Fountain	P H Public House
Dk Dock	P O Post Office
El P Electricity Pillar or Post	Pp Pump
E T L Electricity Transmission Line	P T P Police Telephone Pillar
F A Fire Alarm	Resr Reservoir
F A P Fire Alarm Pillar	R H Road House
F B Filter Bed, Foot Bridge	rp Revision Point
F B M Fundamental Bench Mark	S Stone
F S Flagstaff	S B Signal Box
F Sta Fire Station	S L Signal Light
G P Guide Post	Sl Sluice
G V C Gas Valve Compound	S P Signal Post
H Hydrant or Hydraulic	Spr Spring
ha Hectares	S Sta Signal Station
L B Letter Box	T C B Telephone Call Box
L B Sta Lifeboat Station	T C P Telephone Call Post
L C Level Crossing	Tk Tank or Track
L G Loading Gauge	Tr Trough
L Ho Lighthouse	ts Traverse Station
L Twr Lighting Tower	W Well
m Metres	W B Weighbridge
M H W Mean High Water	Wd Pp Wind Pump
M H W S Mean High Water Springs	Wks Works
M L W Mean Low Water	Wr Pt Water Point
M L W S Mean Low Water Springs	Wr T Water Tap
M P Mile or Mooring Post	

Groundsure

INSIGHTS

HISTORICAL MAP PACK LEGEND

COUNTY SERIES & NATIONAL GRID
1:10,560 & 1:10,000

Information present on these legends is sourced from the same Ordnance Survey mapping as the maps used in this product.

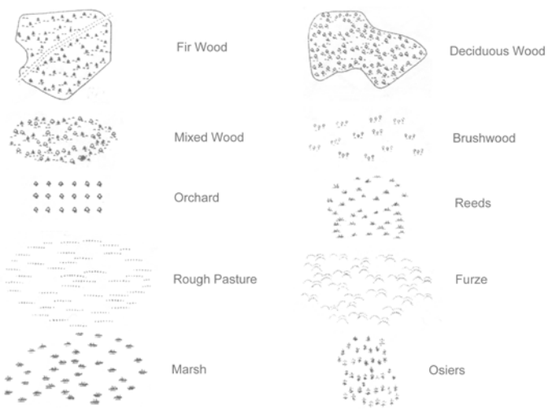
If you have a query regarding any of the maps provided please contact Groundsure's technical helpline. We will endeavour to answer any queries you may have.

Technical Help
Tel 0800 028 0000

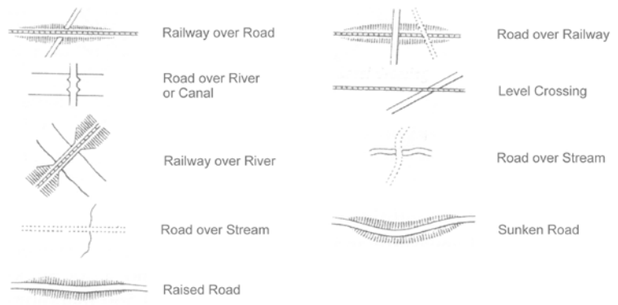
insight@groundsure.com
WWW.GROUNDSURE.COM

COUNTY SERIES 1:10,560

VEGETATION



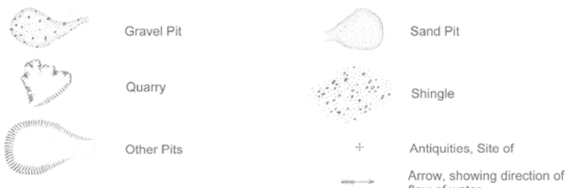
ROADS



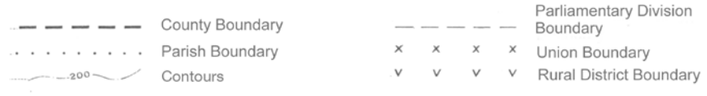
RAILWAYS



GENERAL FEATURES



BOUNDARIES



NATIONAL GRID 1:10,000 & 1:10,560

HEIGHTS (METRES)

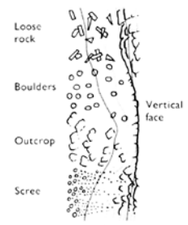
Values are given in metres above mean sea level at Newlyn.

Surface heights determined by: ground survey • 163m; air survey

Bench marks and their values are shown on large scale maps, and bench mark lists containing fuller and possibly later levelling information are obtainable from the Director General, Ordnance Survey.

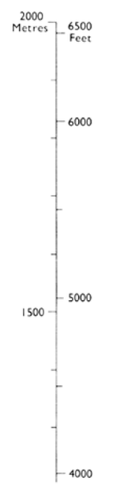
Contours are at 5 metres vertical interval.

ROCK FEATURES



CONVERSION SCALE

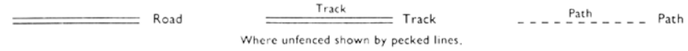
Metres - Feet



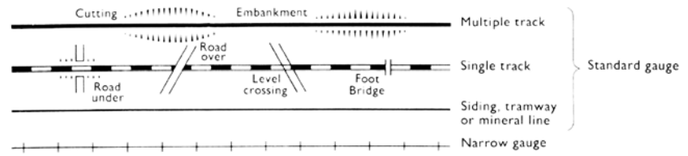
ABBREVIATIONS

BP,BS	Boundary Post or Stone	PO	Post Office
Ch	Church	PC	Public Convenience
CH	Club House	PH	Public House
F Sta	Fire Station	S	Stone
FB	Foot Bridge	Spr	Spring
Fn	Fountain	TCB	Telephone Call Box
GP	Guide Post	TCP	Telephone Call Post
MP,MS	Mile Post or Stone	TH	Town Hall
P	Pole or Post	W	Well
Pol Sta	Police Station	Y	Youth hostel

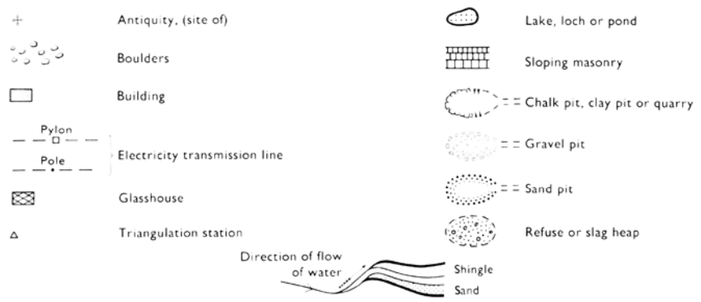
ROADS



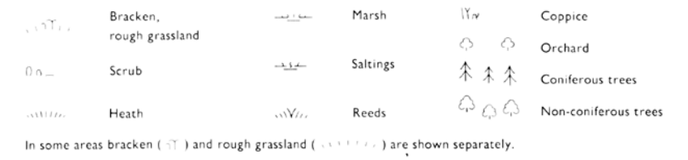
RAILWAYS



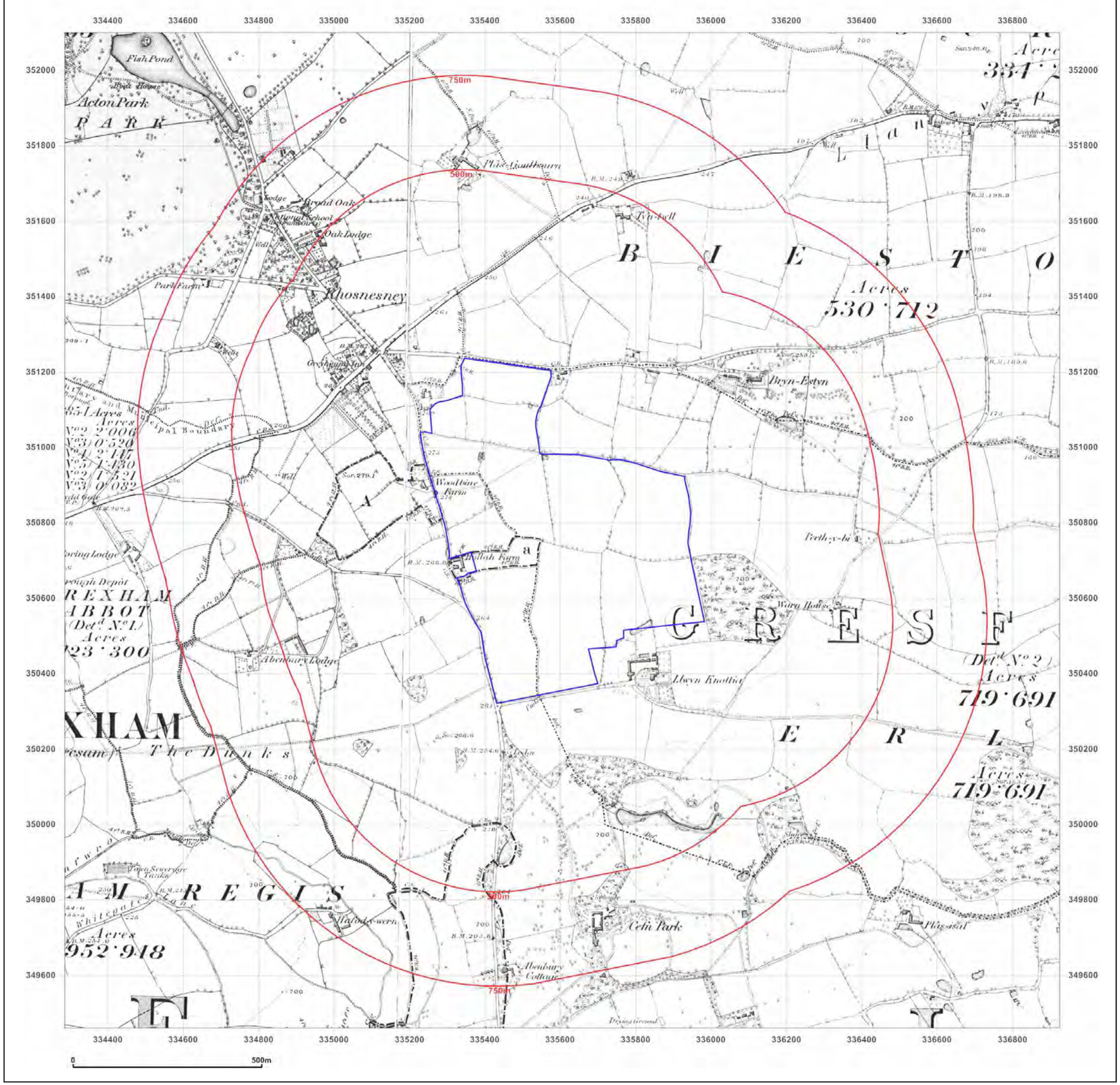
GENERAL FEATURES



VEGETATION



In some areas bracken ( ) and rough grassland ( ) are shown separately.



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

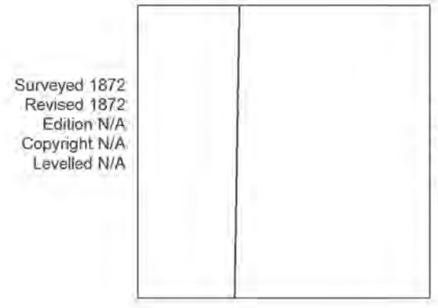
Map Name: County Series

Map date: **1872**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S



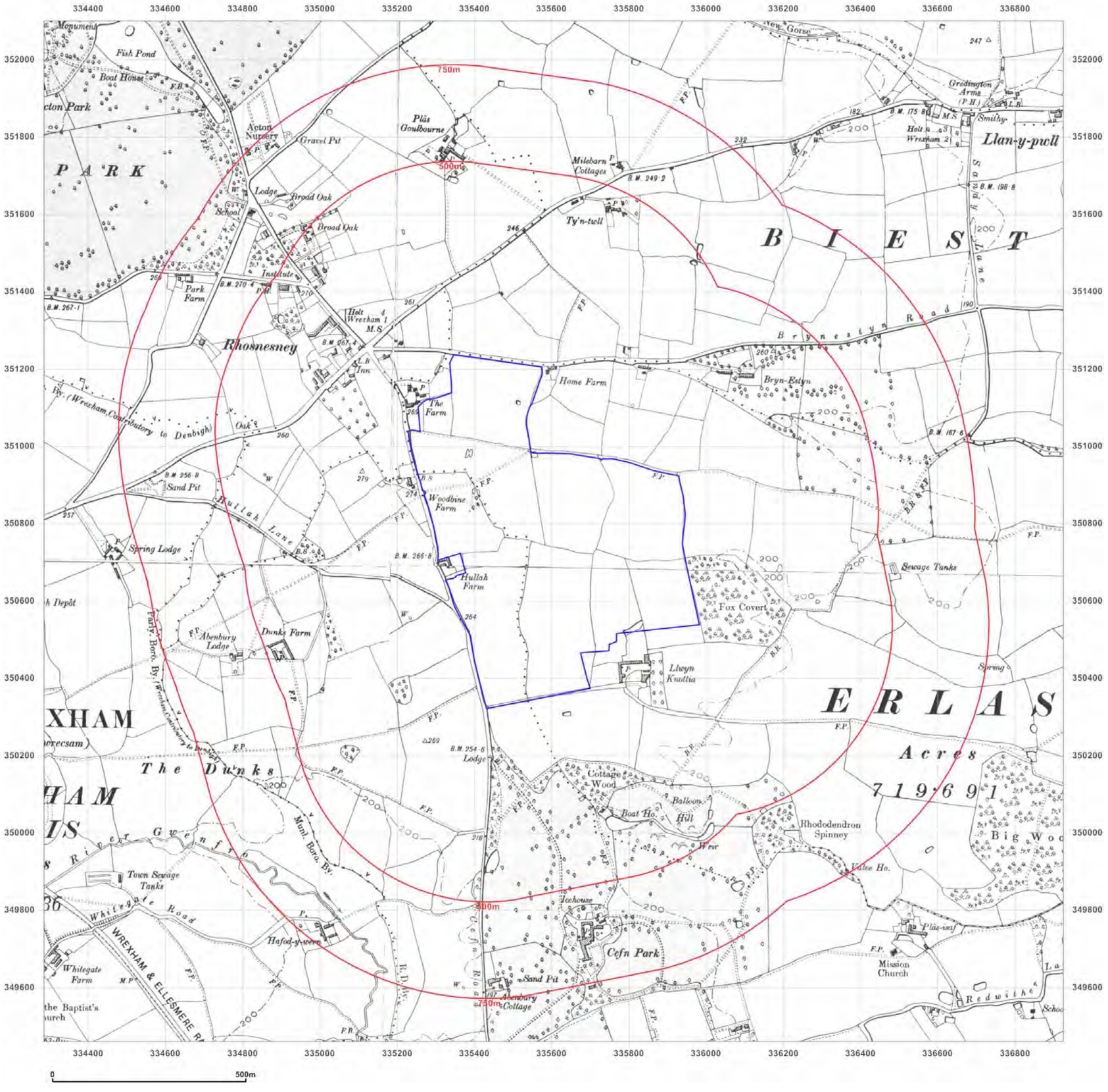
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: County Series

Map date: **1898-1900**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1877
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1900
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1871
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

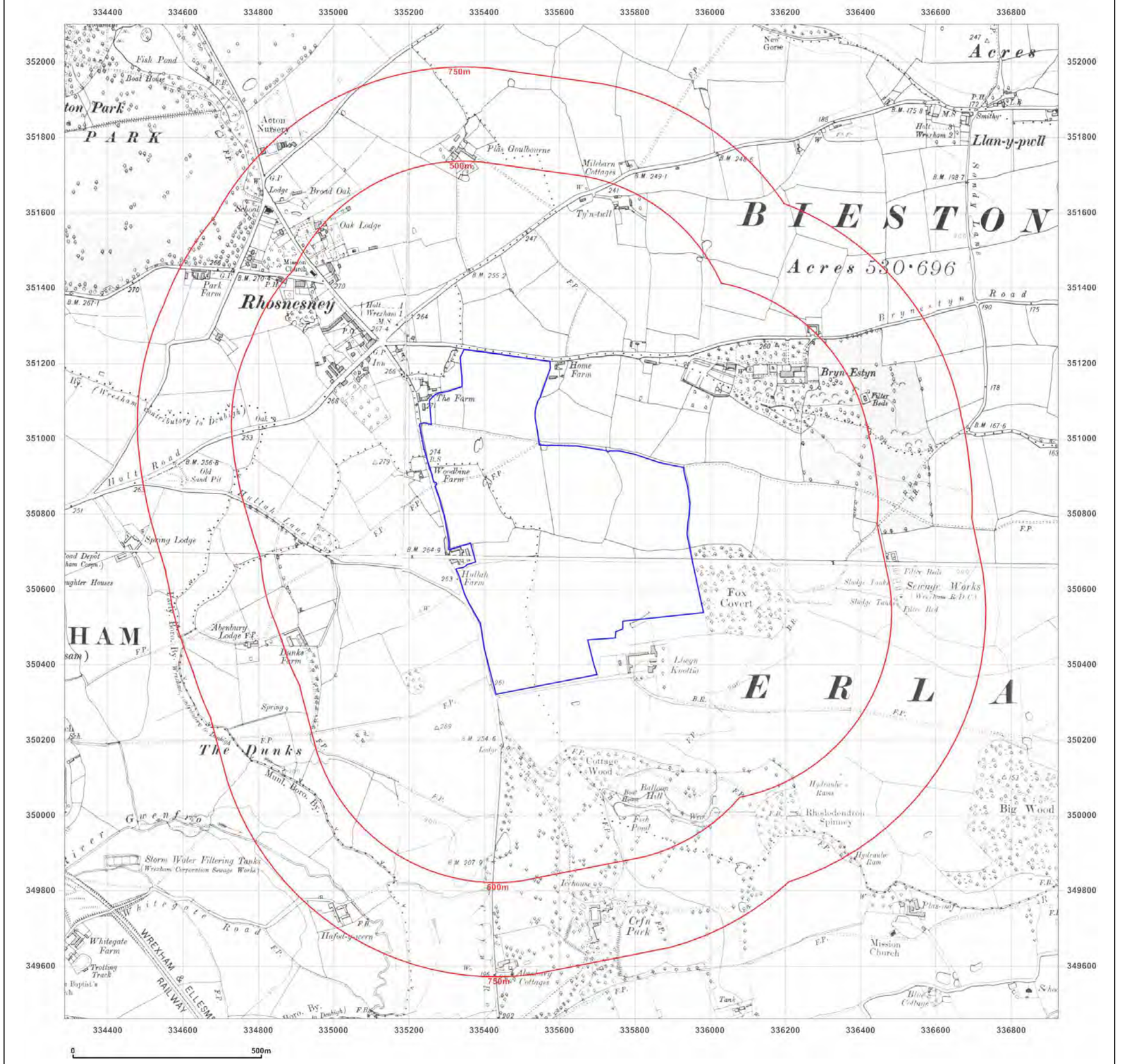
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: County Series
Map date: **1909-1914**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
S

Surveyed 1871
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1871
Revised 1914
Edition 1914
Copyright N/A
Levelled N/A

Surveyed 1871
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A

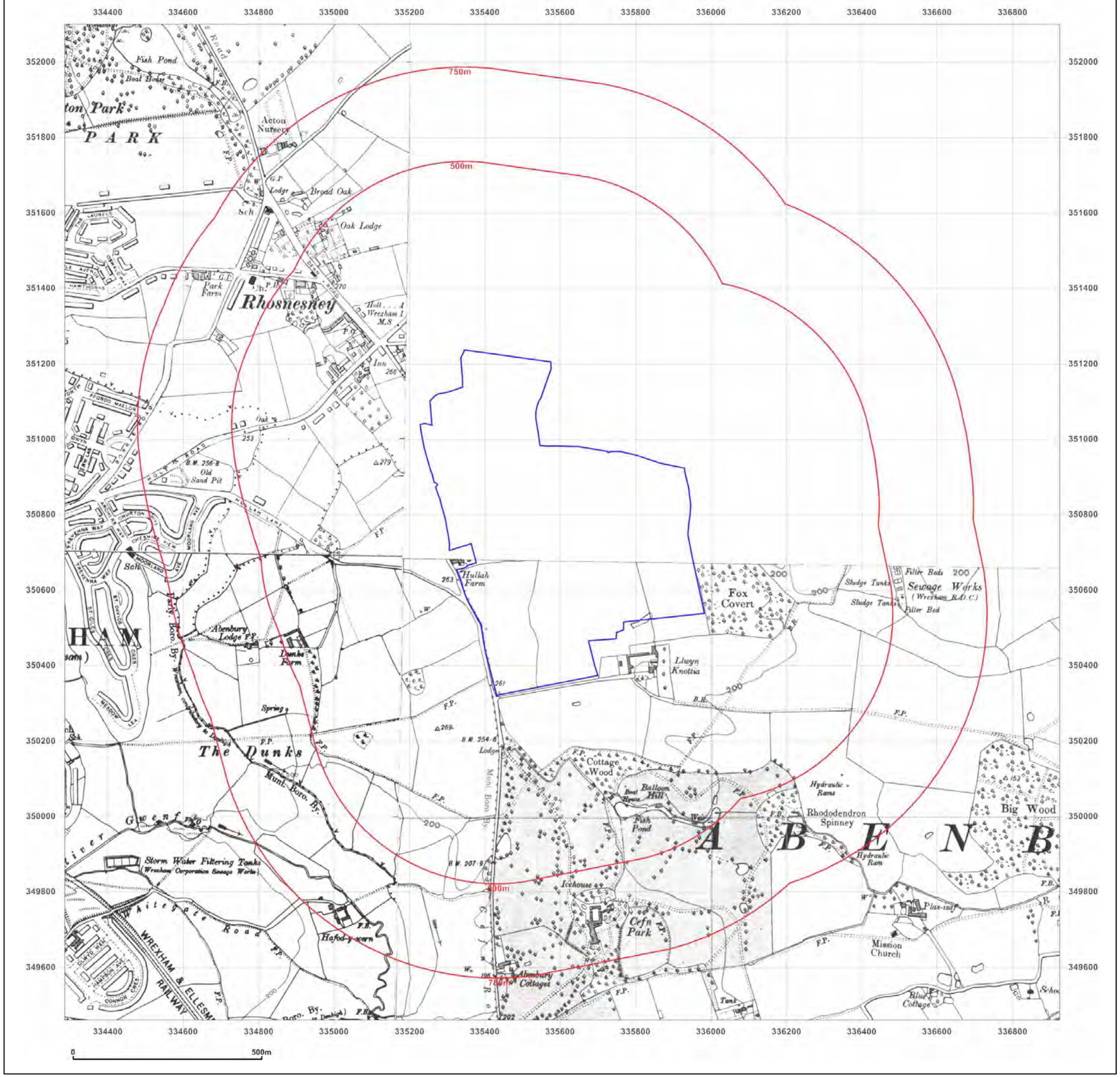
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1871
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1871
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

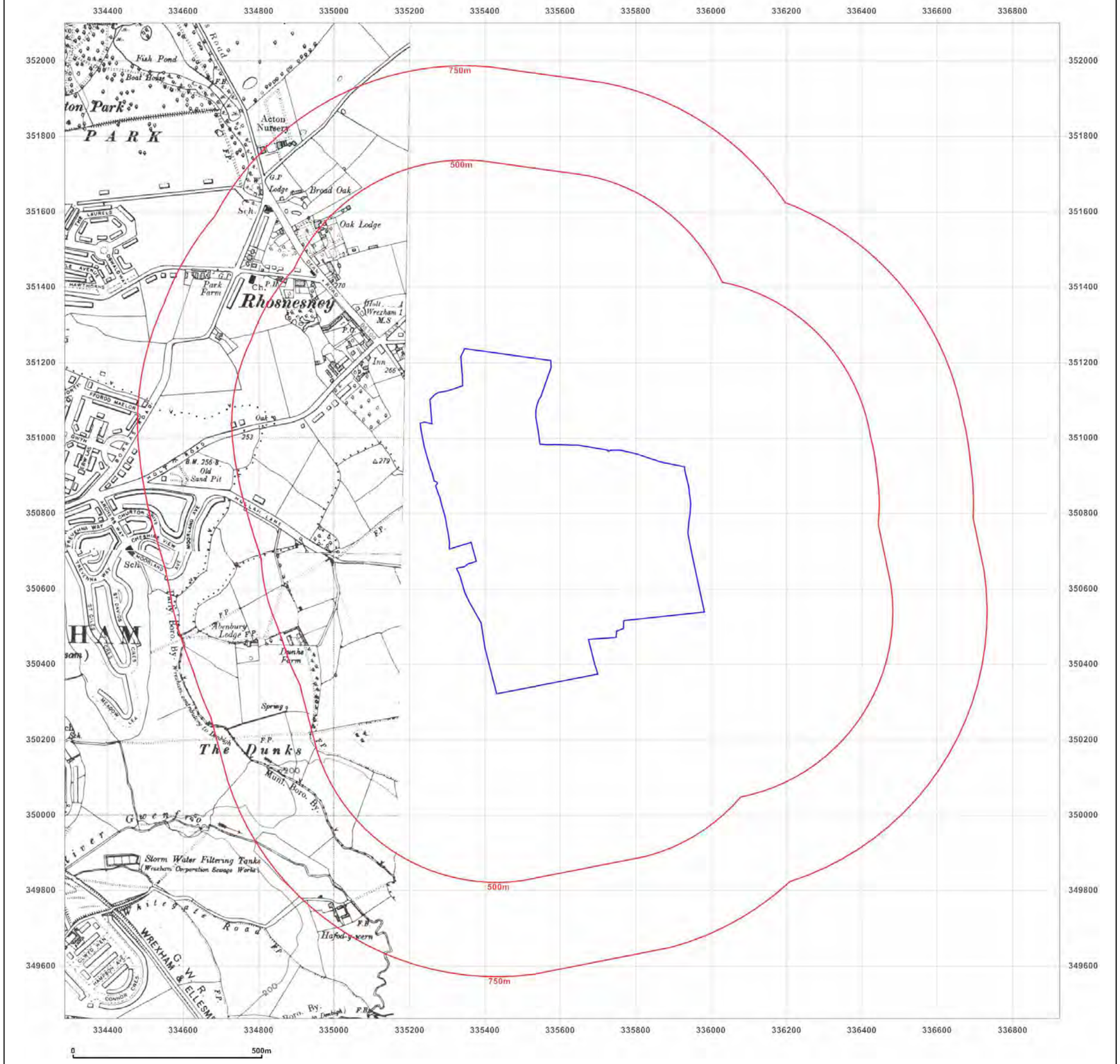
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

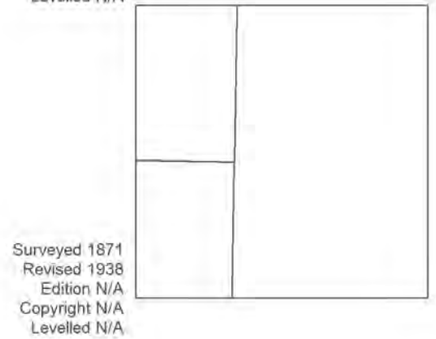
Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S



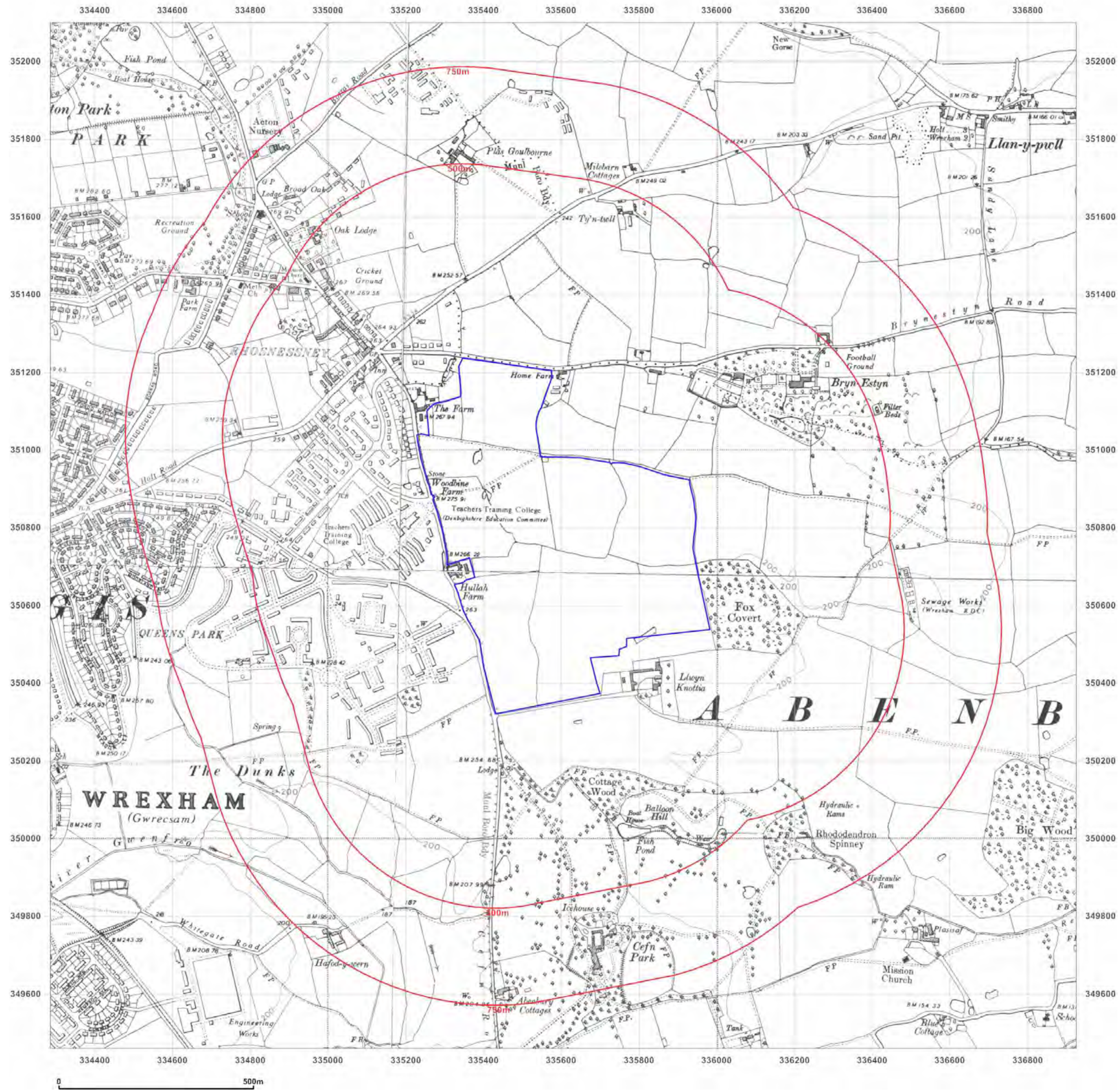
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

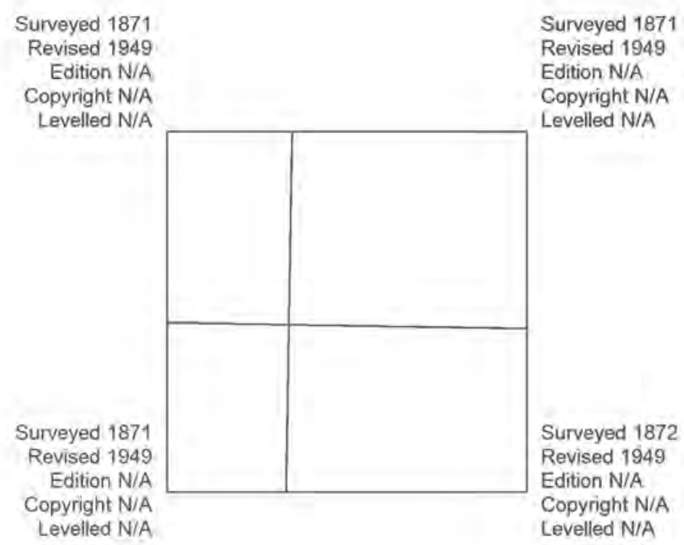
Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: County Series

Map date: **1949**

Scale: 1:10,560

Printed at: 1:10,560

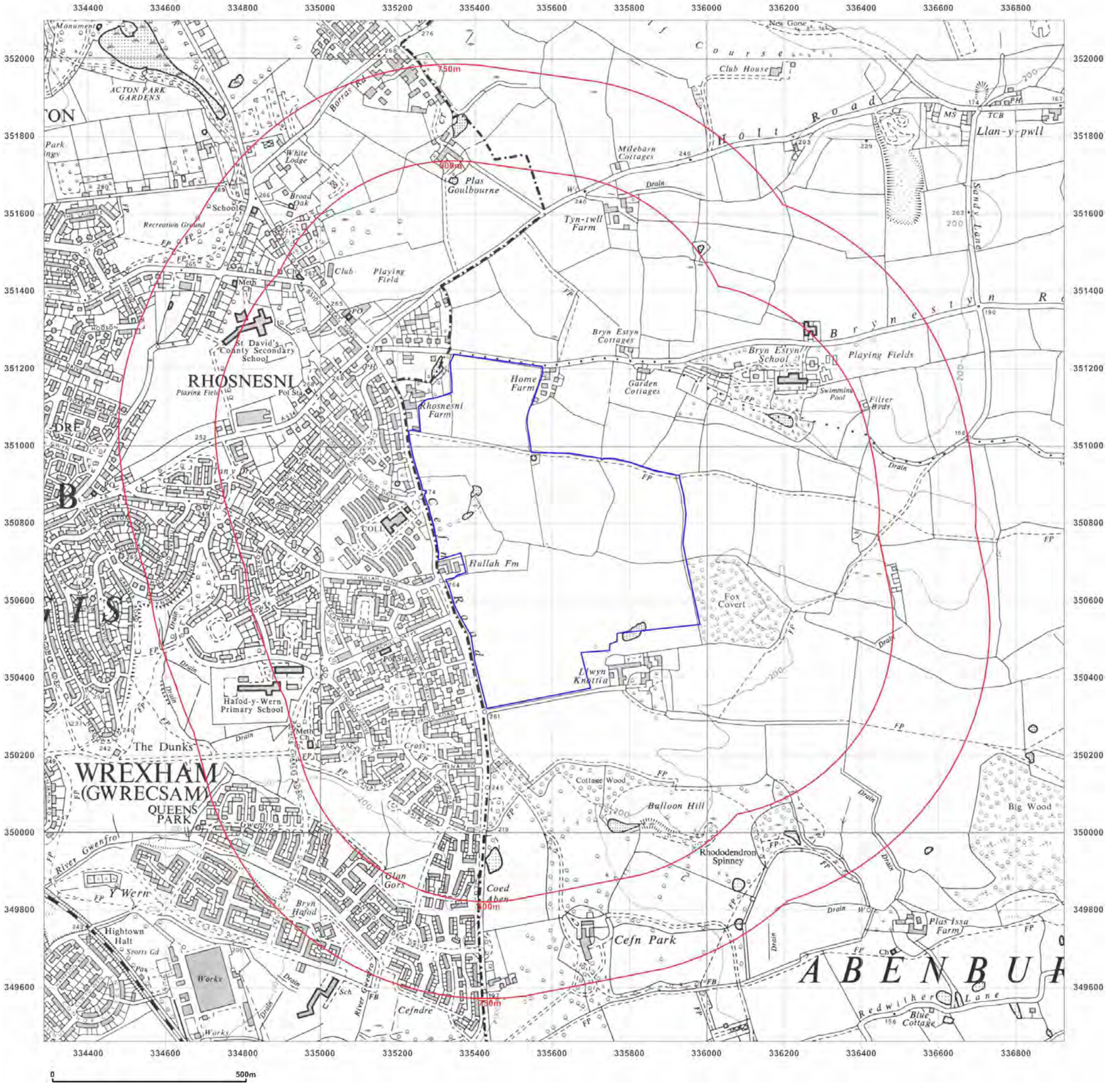


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: Provisional
Map date: **1960-1964**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
S

Surveyed 1964
Revised 1964
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1960
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1964
Revised 1964
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1964
Revised 1964
Edition N/A
Copyright N/A
Levelled N/A

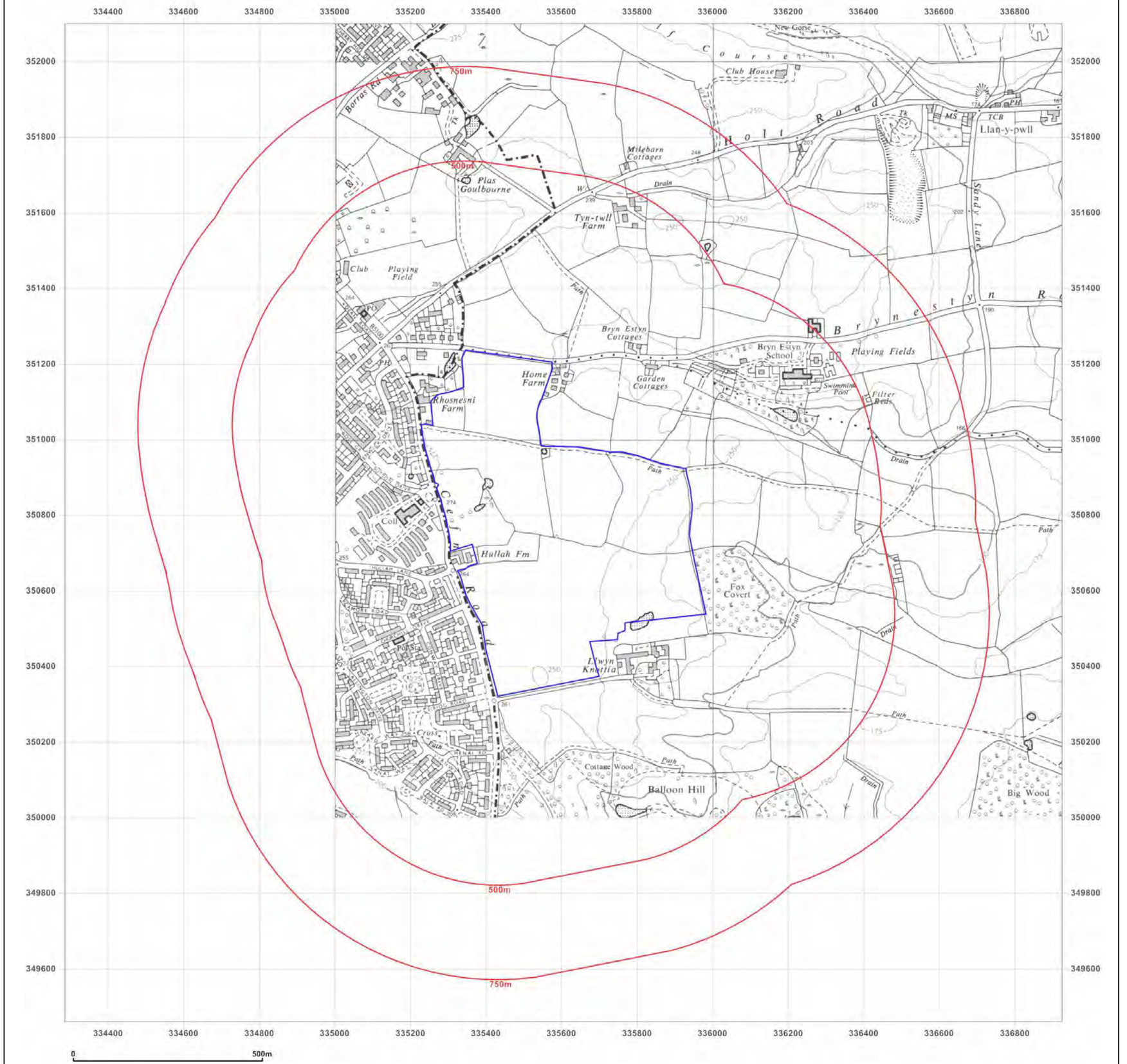
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: Provisional

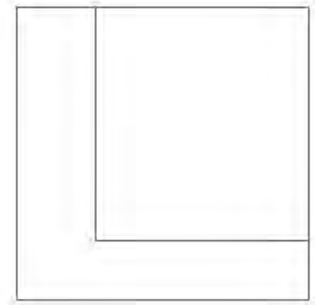
Map date: **1968**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1968
Revised 1968
Edition N/A
Copyright N/A
Levelled N/A



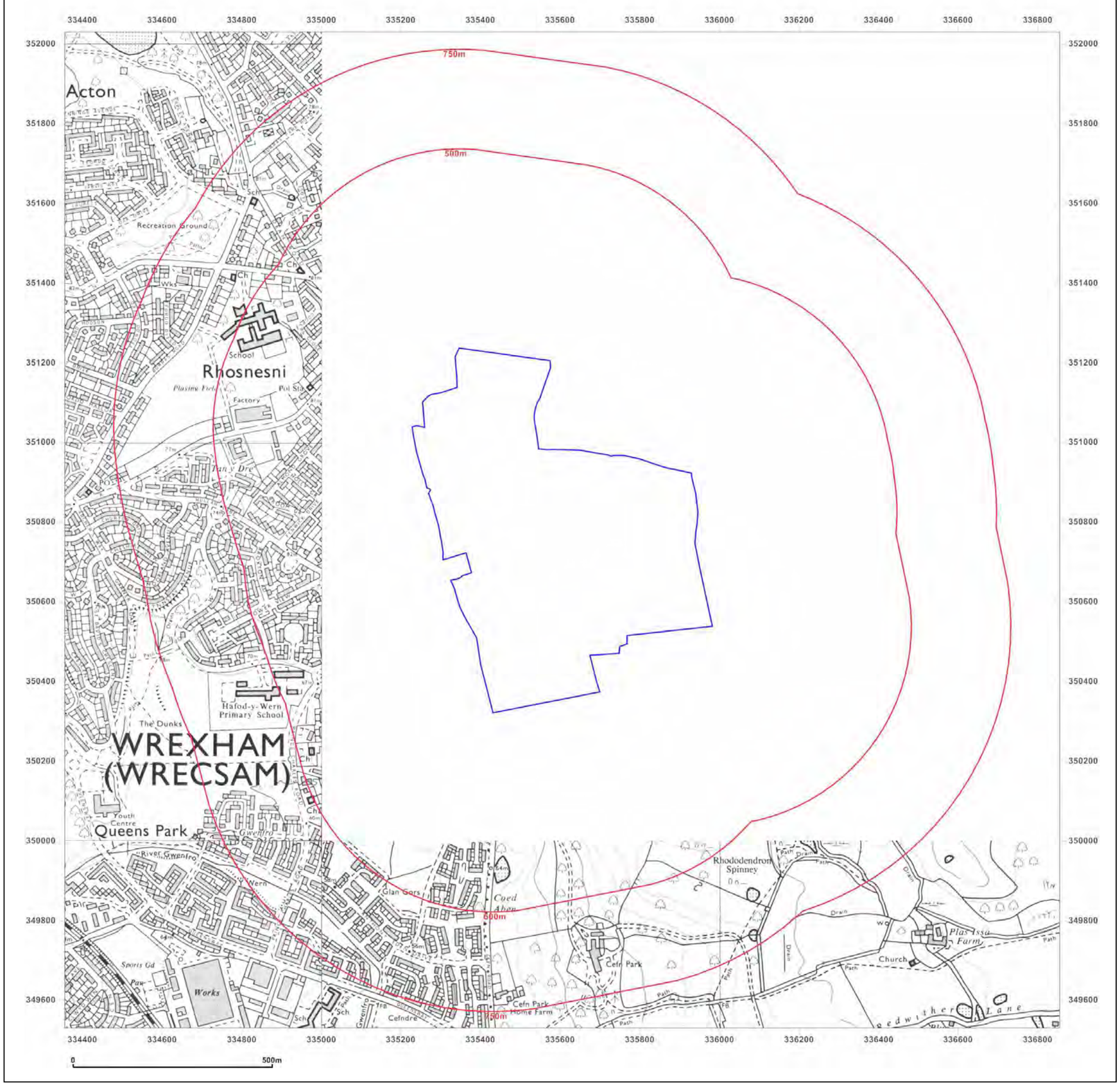
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

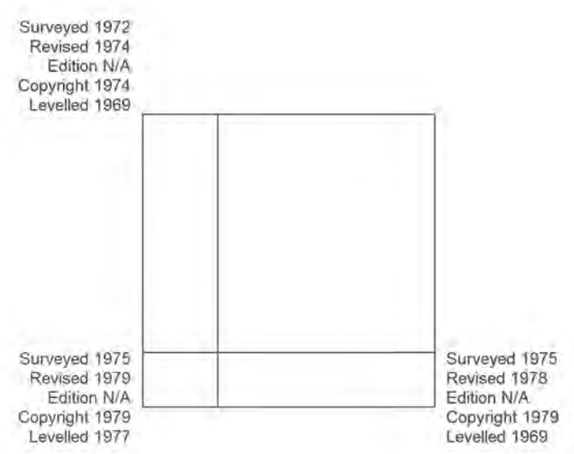
Map Name: National Grid

Map date: **1974-1979**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S



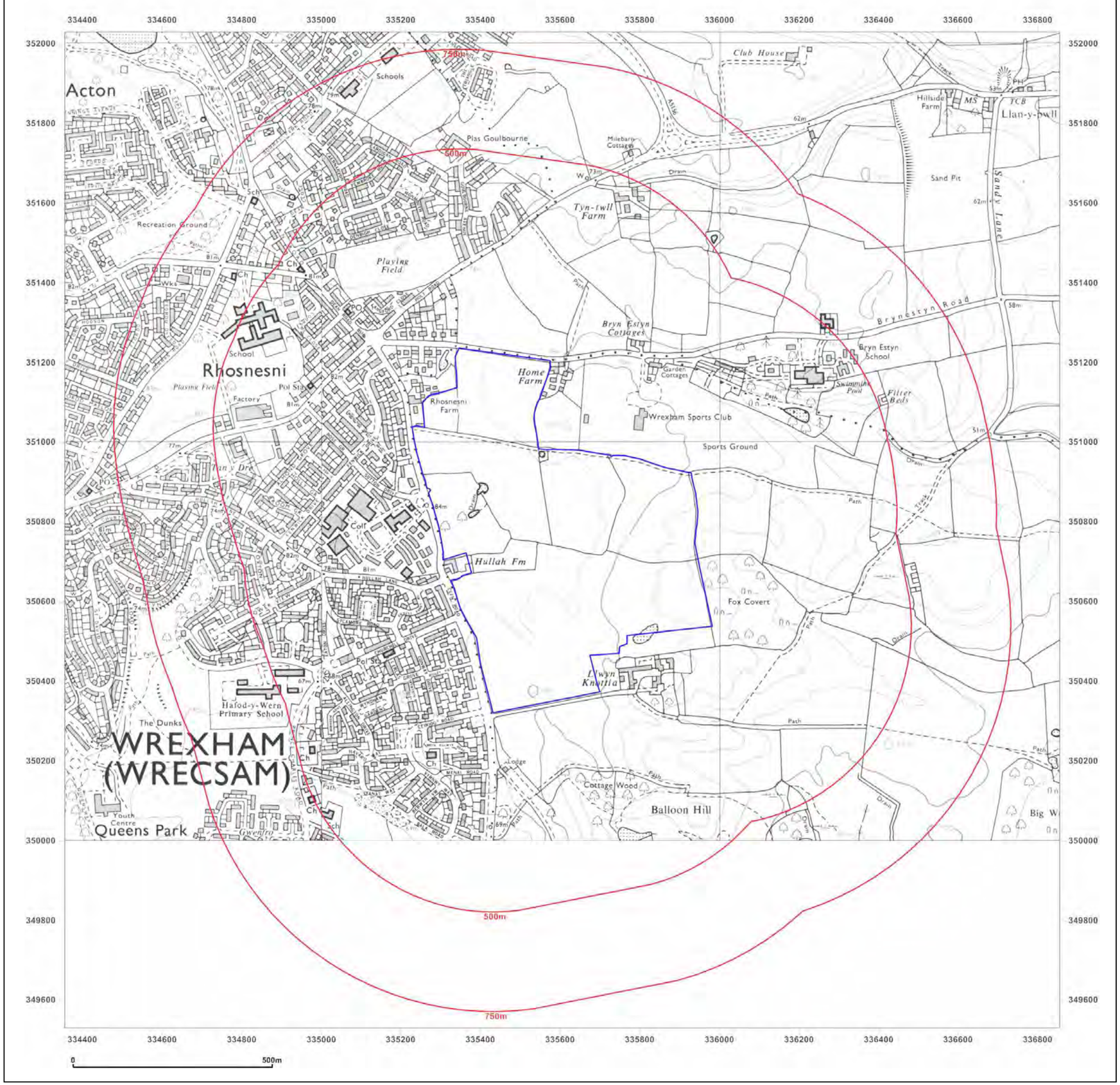
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: National Grid

Map date: **1980-1982**

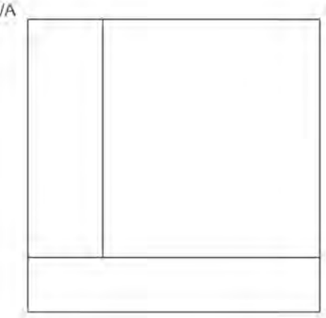
Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1980
Revised 1980
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1970
Revised 1982
Edition N/A
Copyright N/A
Levelled N/A



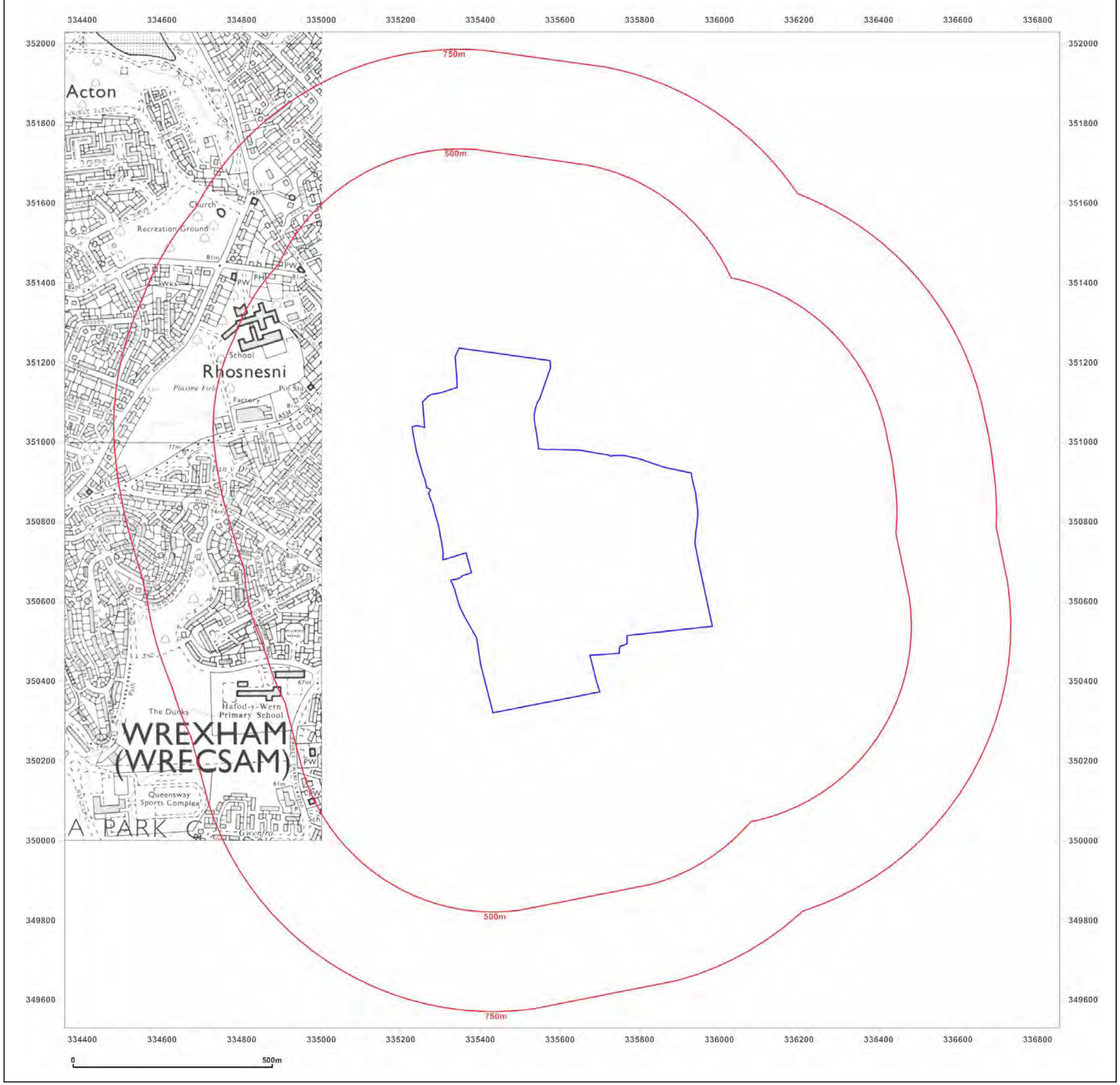
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: National Grid

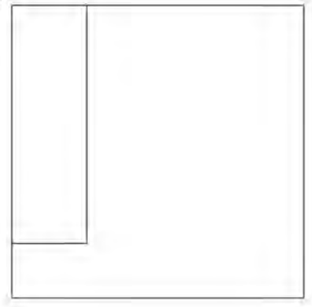
Map date: **1985**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1985
Revised 1985
Edition N/A
Copyright N/A
Levelled N/A



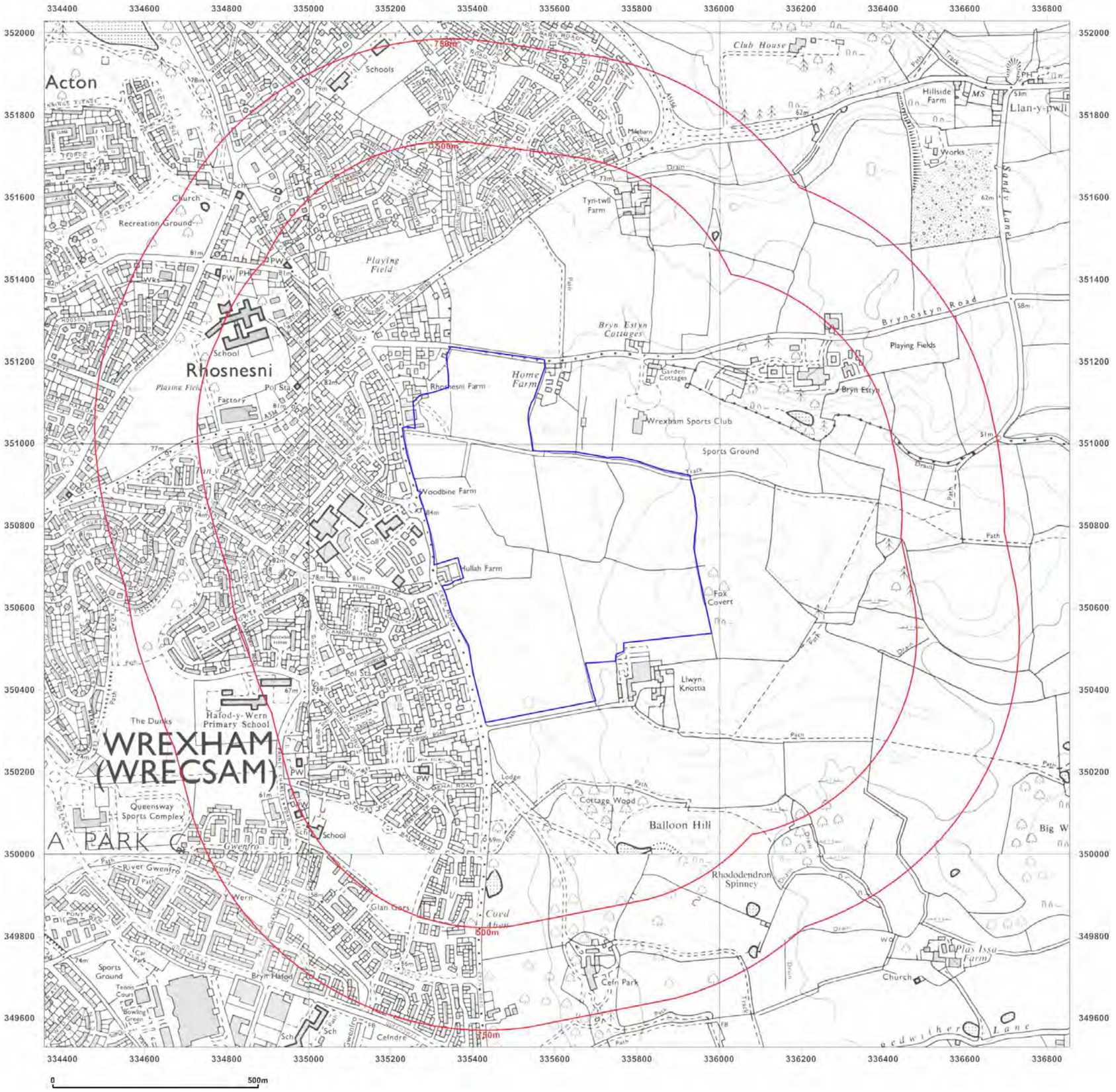
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: National Grid
Map date: **1989-1992**
Scale: 1:10,000
Printed at: 1:10,000

N
W E
S

Surveyed 1985
Revised 1989
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1990
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1987
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1983
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

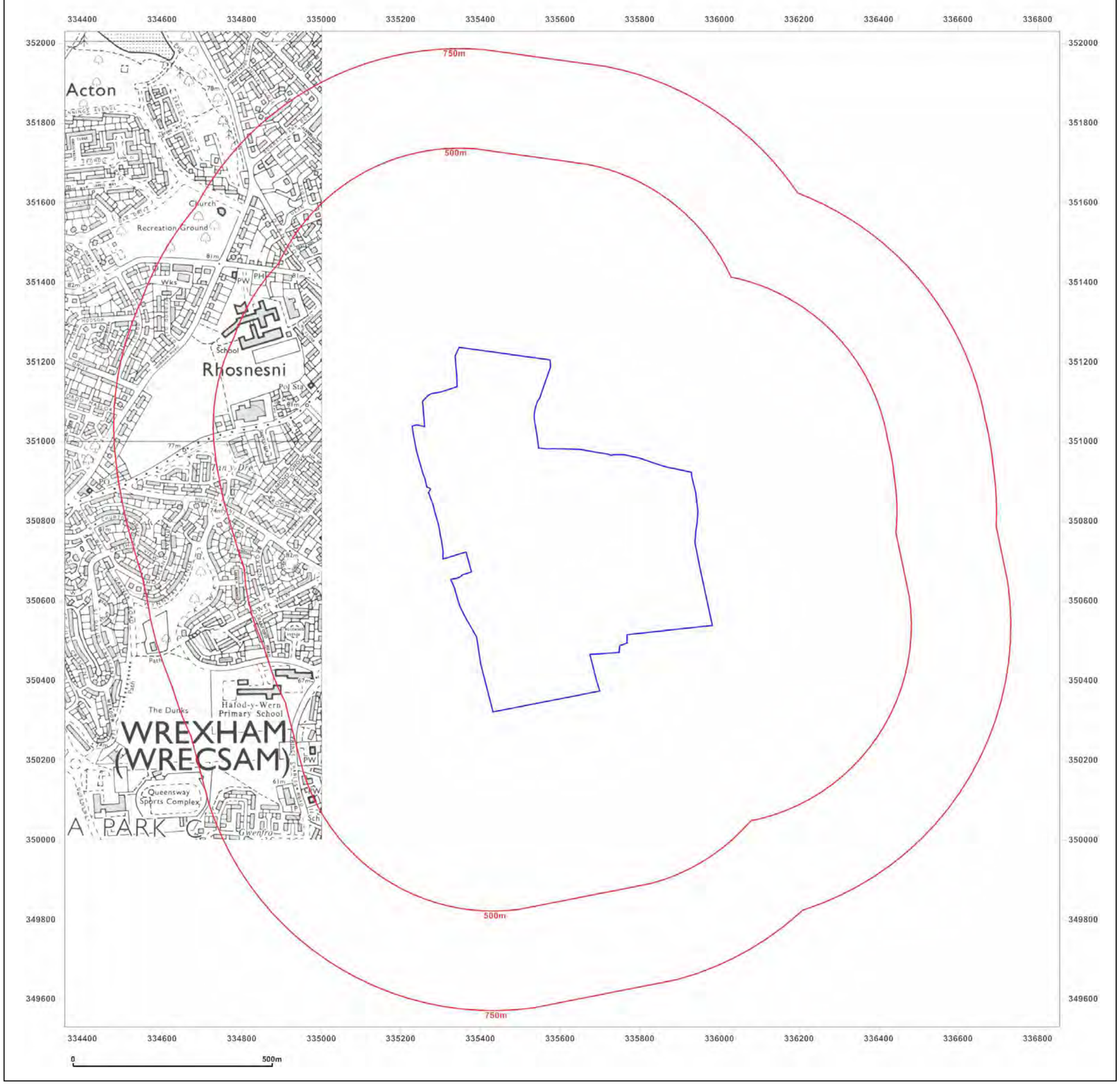
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

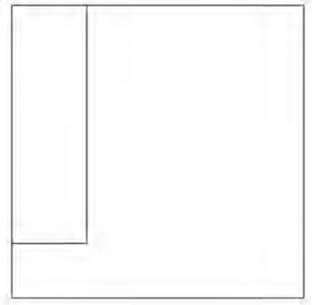
LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: National Grid
Map date: **1992**
Scale: 1:10,000
Printed at: 1:10,000

N
W E
S

Surveyed 1990
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A



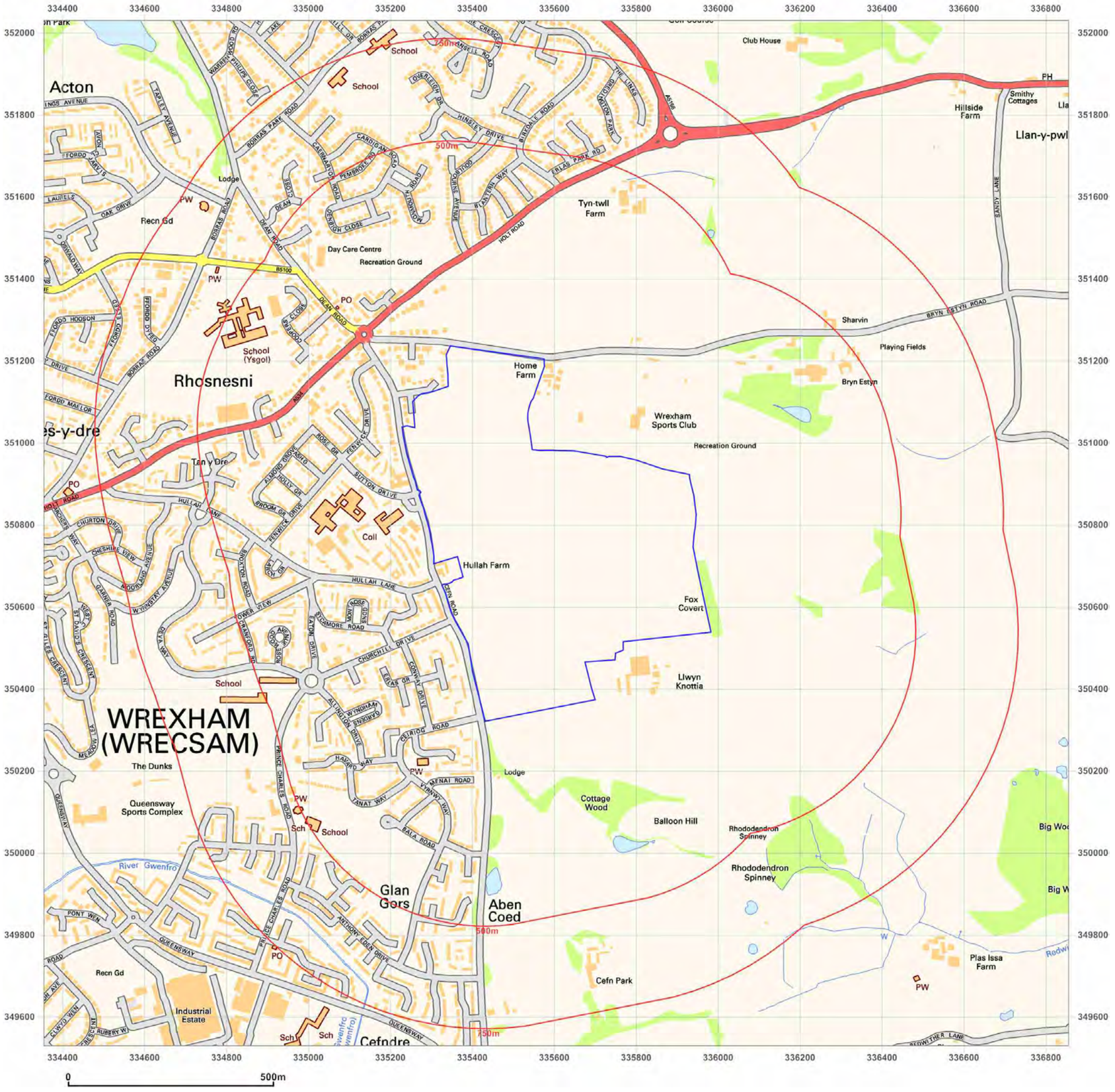
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: National Grid
Map date: **2001**
Scale: 1:10,000
Printed at: 1:10,000

N
W E
S



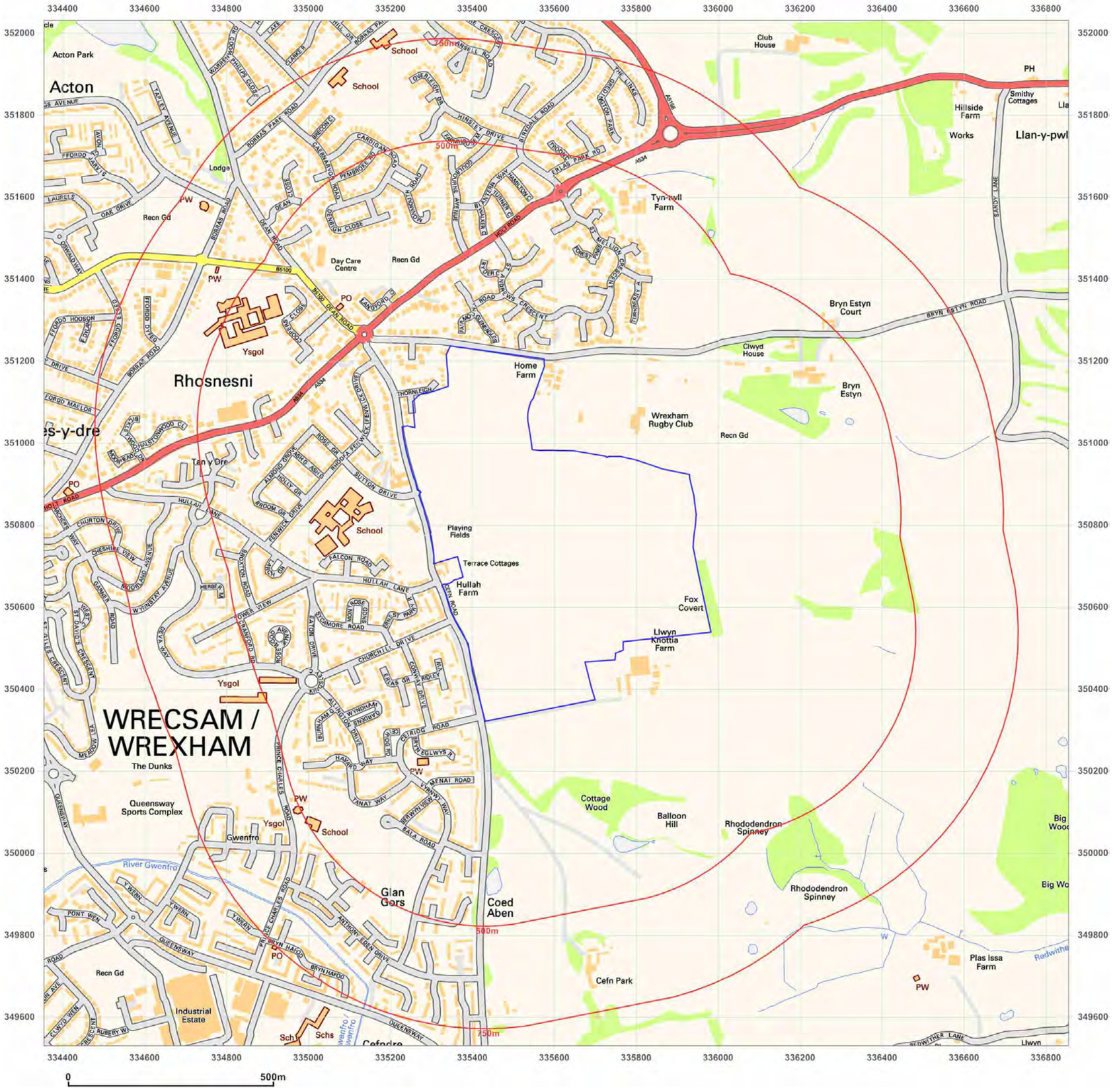
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: National Grid
Map date: **2010**
Scale: 1:10,000
Printed at: 1:10,000

N
W E
S



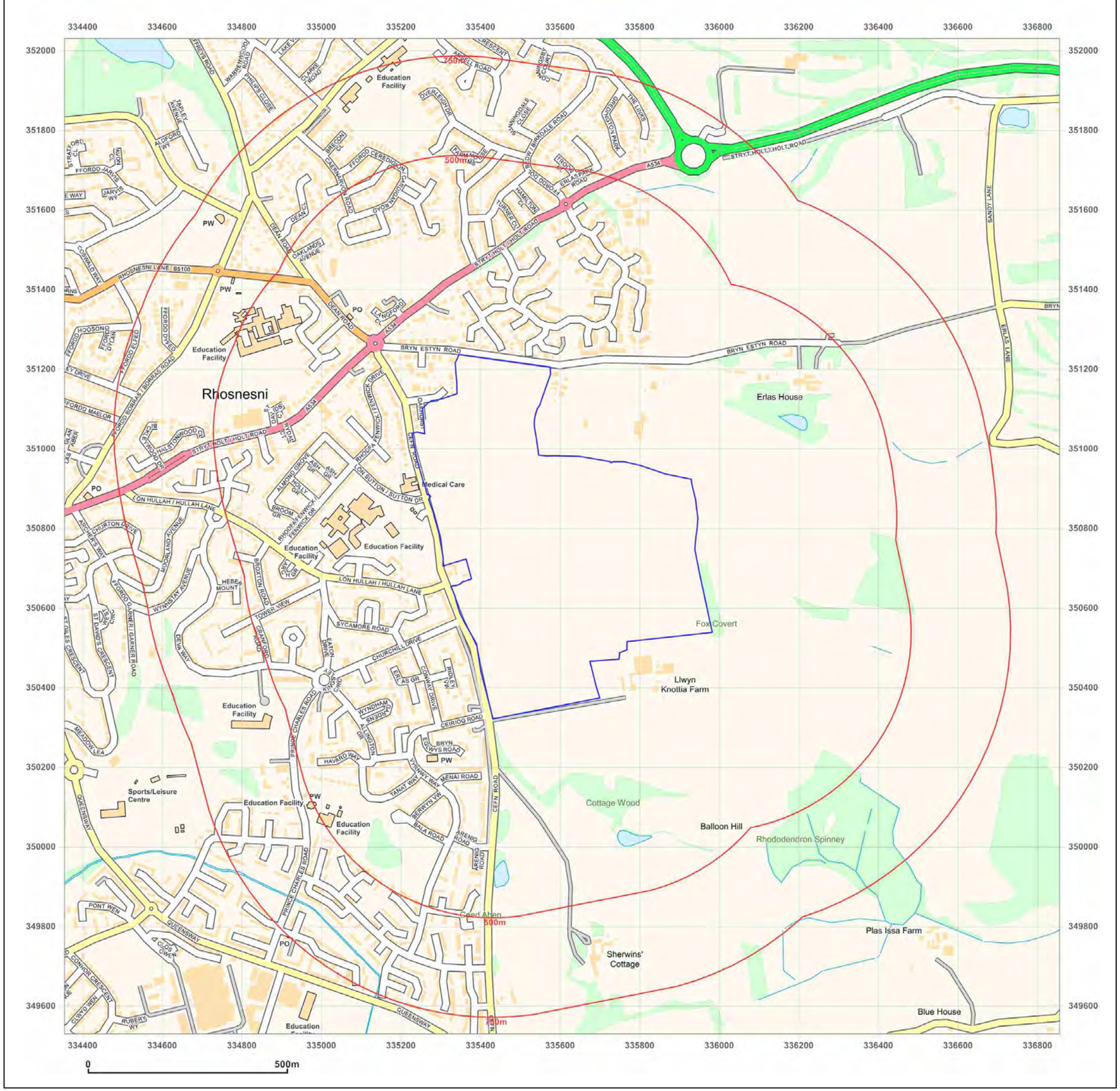
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Client Ref: PO02559
Report Ref: HYD-7149852
Grid Ref: 335604, 350779

Map Name: National Grid
Map date: 2020
Scale: 1:10,000
Printed at: 1:10,000

N
W E
S



Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 12 October 2020

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Appendix D

Desk Study Research Information

Groundsure Database Report

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

LAND AT ERLAS PARK, CEFN ROAD, WREXHAM, LL13 9TT

Order Details

Date: 12/10/2020

Your ref: PO02559

Our Ref: HYD-7149854

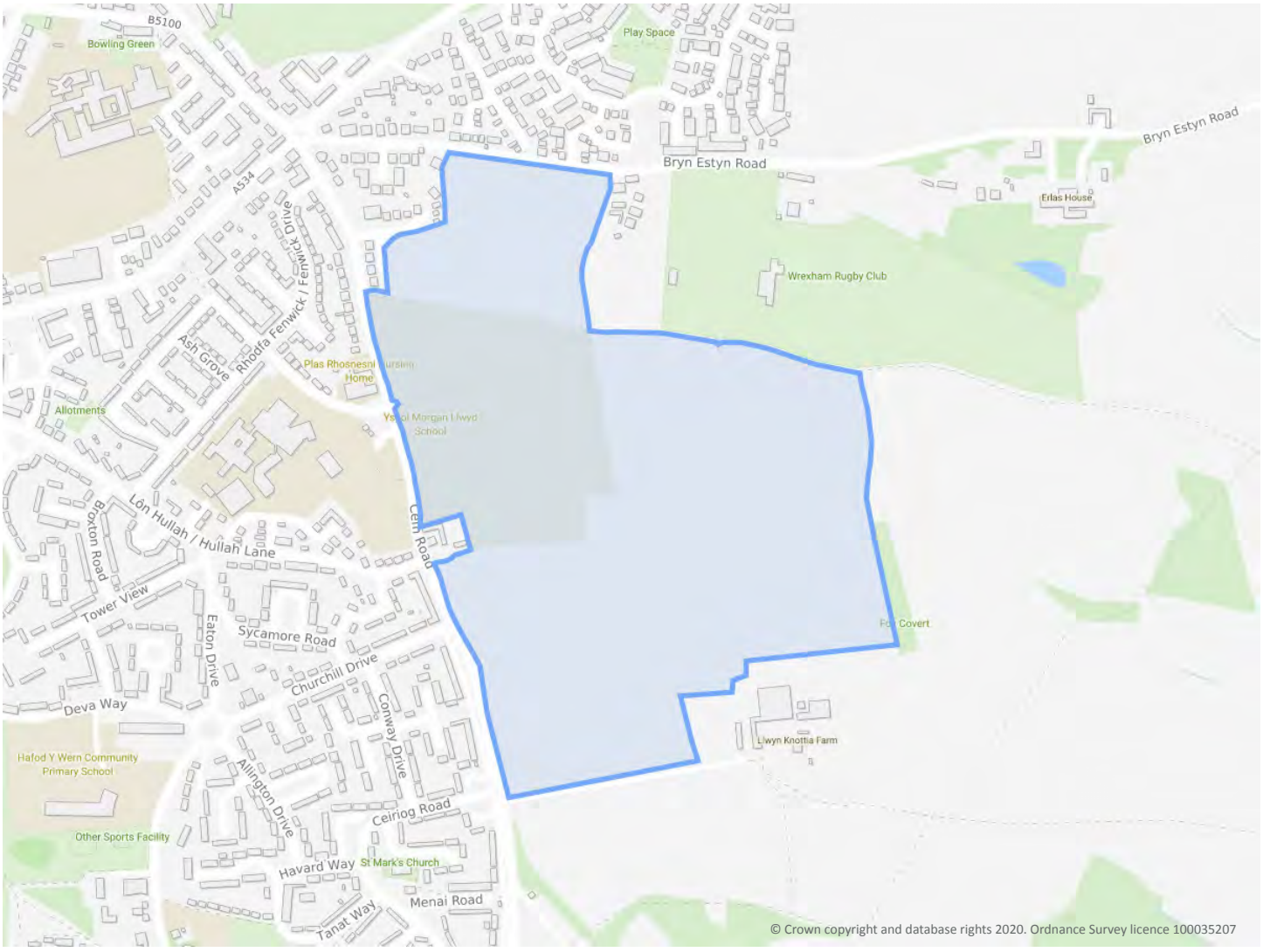
Client: Hydrock Consultants Ltd

Site Details

Location: 335636 350780

Area: 40.35 ha

Authority: Wrecsam - Wrexham County Borough Council



Summary of findings p. 2

OS MasterMap site plan N/A: >10ha

Aerial image p. 8

groundsure.com/insightuserguide

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

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	0	0	1	14	-
14	1.2	Historical tanks	1	1	3	2	-
15	1.3	Historical energy features	0	2	2	17	-
16	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	Historical garages	0	0	3	0	-
17	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
18	2.1	Historical industrial land uses	0	0	4	28	-
20	2.2	Historical tanks	1	1	3	5	-
20	2.3	Historical energy features	0	4	6	30	-
22	2.4	Historical petrol stations	0	0	0	0	-
22	2.5	Historical garages	0	0	5	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
24	3.1	Active or recent landfill	0	0	0	0	-
24	3.2	Historical landfill (BGS records)	0	0	0	0	-
25	3.3	Historical landfill (LA/mapping records)	0	0	0	1	-
25	3.4	Historical landfill (EA/NRW records)	0	0	0	1	-
25	3.5	Historical waste sites	0	0	0	0	-
26	3.6	Licensed waste sites	0	0	0	0	-
26	3.7	Waste exemptions	0	0	4	2	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
27	4.1	Recent industrial land uses	0	2	10	-	-
28	4.2	Current or recent petrol stations	0	0	1	0	-
29	4.3	Electricity cables	0	0	0	0	-
29	4.4	Gas pipelines	0	0	0	0	-
29	4.5	Sites determined as Contaminated Land	0	0	0	0	-

29	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
29	4.7	Regulated explosive sites	0	0	0	0	-
30	4.8	Hazardous substance storage/usage	0	0	0	0	-
30	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
30	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
30	**4.11**	**Licensed pollutant release (Part A(2)/B)**	0	0	1	0	-
31	4.12	Radioactive Substance Authorisations	0	0	0	0	-
31	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
31	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
31	4.15	Pollutant release to public sewer	0	0	0	0	-
31	4.16	List 1 Dangerous Substances	0	0	0	0	-
32	4.17	List 2 Dangerous Substances	0	0	0	0	-
32	**4.18**	**Pollution Incidents (EA/NRW)**	0	2	0	0	-
32	4.19	Pollution inventory substances	0	0	0	0	-
33	4.20	Pollution inventory waste transfers	0	0	0	0	-
33	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
34	**5.1**	**Superficial aquifer**	Identified (within 500m)				
36	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
38	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
39	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
40	5.5	Groundwater vulnerability- local information	None (within 0m)				
41	**5.6**	**Groundwater abstractions**	0	0	0	0	2
42	**5.7**	**Surface water abstractions**	0	0	0	0	1
43	5.8	Potable abstractions	0	0	0	0	0
43	**5.9**	**Source Protection Zones**	0	0	0	2	-
43	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
44	6.1	Water Network (OS MasterMap)	0	0	0	-	-

44	6.2	Surface water features	0	0	0	-	-
45	**6.3**	**WFD Surface water body catchments**	2	-	-	-	-
45	**6.4**	**WFD Surface water bodies**	0	0	0	-	-
46	**6.5**	**WFD Groundwater bodies**	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
47	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	None (within 50m)				
47	7.2	Historical Flood Events	0	0	0	-	-
47	7.3	Flood Defences	0	0	0	-	-
47	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
48	7.5	Flood Storage Areas	0	0	0	-	-
49	7.6	Flood Zone 2	None (within 50m)				
49	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
50	**8.1**	**Surface water flooding**	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding					
52	**9.1**	**Groundwater flooding**	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
53	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
54	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
54	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
54	10.4	Special Protection Areas (SPA)	0	0	0	0	0
54	10.5	National Nature Reserves (NNR)	0	0	0	0	0
55	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
55	**10.7**	**Designated Ancient Woodland**	0	0	1	2	24
56	10.8	Biosphere Reserves	0	0	0	0	0
56	10.9	Forest Parks	0	0	0	0	0
57	10.10	Marine Conservation Zones	0	0	0	0	0
57	10.11	Green Belt	0	0	0	0	0
57	10.12	Proposed Ramsar sites	0	0	0	0	0

57	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
57	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
58	10.15	Nitrate Sensitive Areas	0	0	0	0	0
58	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
59	**10.17**	**SSSI Impact Risk Zones**	1	-	-	-	-
60	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
61	11.1	World Heritage Sites	0	0	0	-	-
62	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
62	11.3	National Parks	0	0	0	-	-
62	**11.4**	**Listed Buildings**	0	0	2	-	-
63	11.5	Conservation Areas	0	0	0	-	-
63	11.6	Scheduled Ancient Monuments	0	0	0	-	-
63	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
64	**12.1**	**Agricultural Land Classification**	Grade 3b (within 250m)				
65	12.2	Open Access Land	0	0	0	-	-
65	12.3	Tree Felling Licences	0	0	0	-	-
65	12.4	Environmental Stewardship Schemes	0	0	0	-	-
66	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
67	13.1	Priority Habitat Inventory	0	0	0	-	-
67	13.2	Habitat Networks	0	0	0	-	-
67	13.3	Open Mosaic Habitat	0	0	0	-	-
67	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
68	**14.1**	**10k Availability**	Identified (within 500m)				
69	14.2	Artificial and made ground (10k)	0	0	0	0	-
70	**14.3**	**Superficial geology (10k)**	2	0	2	14	-

71	14.4	Landslip (10k)	0	0	0	0	-
72	14.5	Bedrock geology (10k)	1	0	1	2	-
73	14.6	Bedrock faults and other linear features (10k)	0	0	1	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
74	15.1	50k Availability	Identified (within 500m)				
75	15.2	Artificial and made ground (50k)	0	0	0	0	-
75	15.3	Artificial ground permeability (50k)	0	0	-	-	-
76	15.4	Superficial geology (50k)	2	0	1	4	-
77	15.5	Superficial permeability (50k)	Identified (within 50m)				
77	15.6	Landslip (50k)	0	0	0	0	-
77	15.7	Landslip permeability (50k)	None (within 50m)				
78	15.8	Bedrock geology (50k)	1	0	0	1	-
79	15.9	Bedrock permeability (50k)	Identified (within 50m)				
79	15.10	Bedrock faults and other linear features (50k)	0	0	1	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
80	16.1	BGS Boreholes	1	0	4	-	-
Page	Section	Natural ground subsidence					
82	17.1	Shrink swell clays	Very low (within 50m)				
83	17.2	Running sands	Very low (within 50m)				
84	17.3	Compressible deposits	Negligible (within 50m)				
85	17.4	Collapsible deposits	Very low (within 50m)				
86	17.5	Landslides	Very low (within 50m)				
87	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
88	18.1	Natural cavities	0	0	0	0	-
89	18.2	BritPits	0	0	0	0	-
89	18.3	Surface ground workings	12	7	0	-	-
90	18.4	Underground workings	0	0	0	0	0
90	18.5	Historical Mineral Planning Areas	0	0	0	0	-

90	18.6	Non-coal mining	0	0	0	0	0
90	18.7	Mining cavities	0	0	0	0	0
91	18.8	JPB mining areas	None (within 0m)				
91	**18.9**	**Coal mining**	Identified (within 0m)				
91	18.10	Brine areas	None (within 0m)				
91	18.11	Gypsum areas	None (within 0m)				
91	18.12	Tin mining	None (within 0m)				
92	18.13	Clay mining	None (within 0m)				

Page	Section	Radon					
93	**19.1**	**Radon**	Between 3% and 5% (within 0m)				

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
95	**20.1**	**BGS Estimated Background Soil Chemistry**	8	4	-	-	-
95	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
96	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
97	21.1	Underground railways (London)	0	0	0	-	-
97	21.2	Underground railways (Non-London)	0	0	0	-	-
97	21.3	Railway tunnels	0	0	0	-	-
97	21.4	Historical railway and tunnel features	0	0	0	-	-
97	21.5	Royal Mail tunnels	0	0	0	-	-
98	21.6	Historical railways	0	0	0	-	-
98	21.7	Railways	0	0	0	-	-
98	21.8	Crossrail 1	0	0	0	0	-
98	21.9	Crossrail 2	0	0	0	0	-
98	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 07/05/2017

Site Area: 40.35ha

Recent site history - 2013 aerial photograph



Capture Date: 09/06/2013

Site Area: 40.35ha

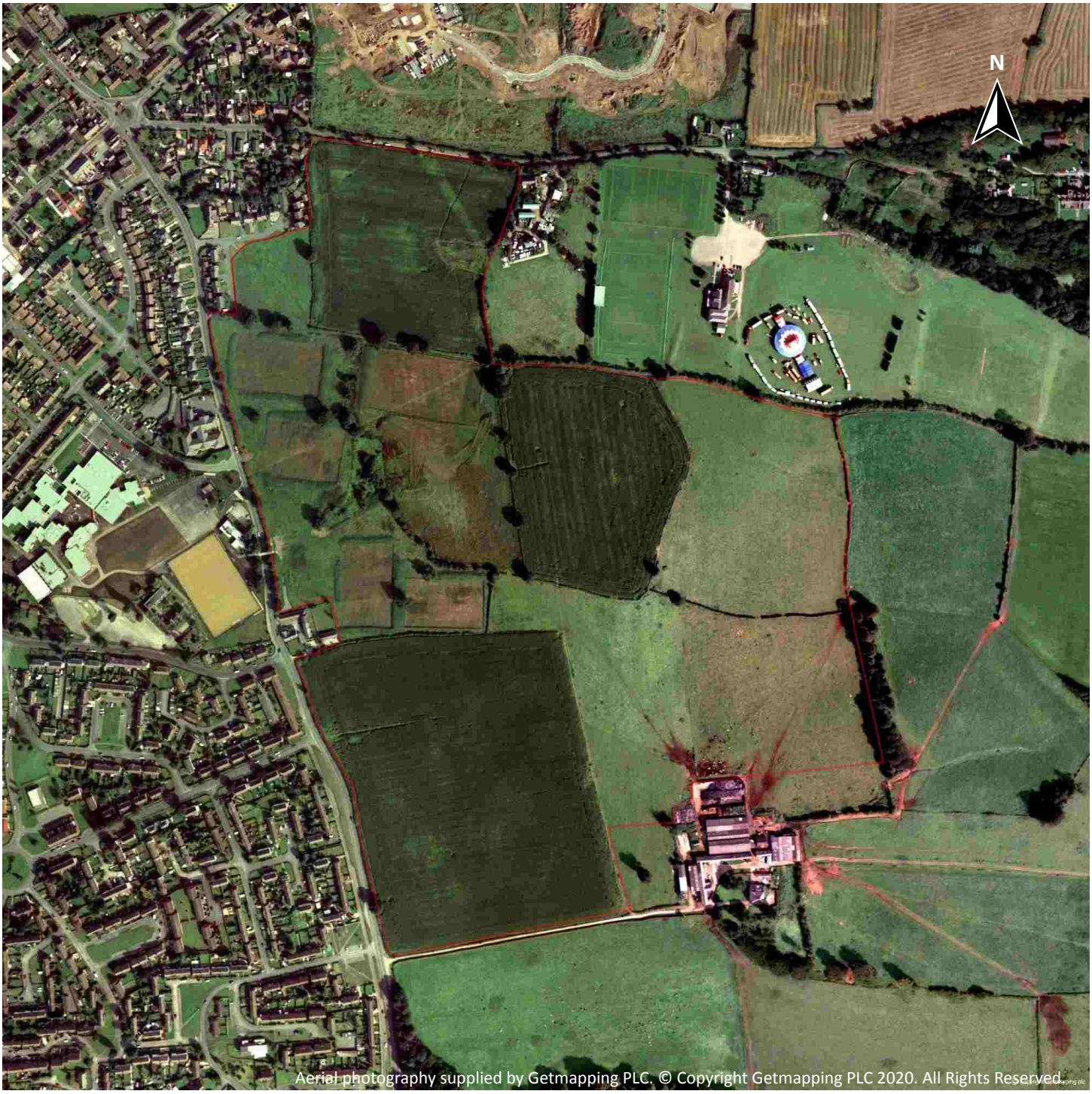
Recent site history - 2009 aerial photograph



Capture Date: 01/06/2009

Site Area: 40.35ha

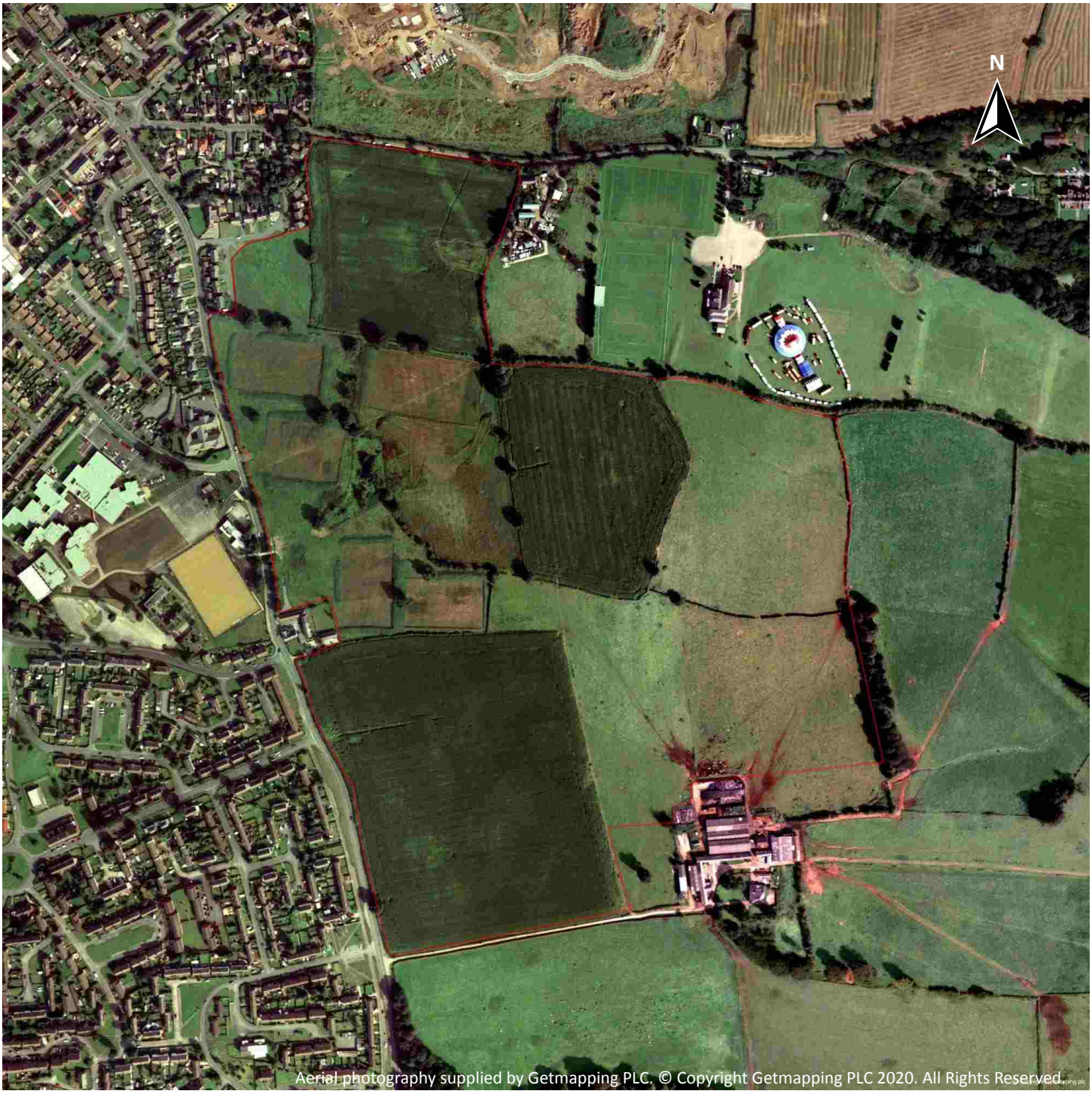
Recent site history - 2003 aerial photograph



Capture Date: 04/08/2003

Site Area: 40.35ha

Recent site history - 2000 aerial photograph



Capture Date: 04/09/2000

Site Area: 40.35ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

Historical garages

1.1 Historical industrial land uses

Records within 500m	15

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

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
7	176m SW	Police Station	1960 - 1992	921720

ID	Location	Land use	Dates present	Group ID
9	262m W	Police Station	1964 - 1992	920431
11	315m S	Boat House	1898	817440
C	343m W	Unspecified Factory	1974 - 1989	884900
12	343m SW	Refuse Heap	1982	828256
E	348m S	Boat House	1938 - 1949	877593
E	353m S	Boat House	1909	934431
F	367m S	Unspecified Pit	1960	897794
G	370m S	Unspecified Pit	1949	966839
G	373m S	Unspecified Pit	1938	879006
F	377m SE	Unspecified Pit	1992	979100
H	413m NW	Unspecified Pit	1909	913638
H	413m NW	Unspecified Pit	1938	856463
H	415m NW	Unspecified Pit	1938 - 1949	897366
18	500m E	Filter Beds	1960 - 1982	974186

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m **7**

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

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Unspecified Tank**	**1984**	**109608**
3	44m SE	Tanks	1992	104620
A	101m S	Unspecified Tank	1959	133725
A	101m S	Unspecified Tank	1958	143806

ID	Location	Land use	Dates present	Group ID
A	102m S	Unspecified Tank	1992	147425
C	416m W	Tanks	1958 - 1959	133835
16	470m NE	Unspecified Tank	1984 - 1990	127590

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**21**

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

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
2	43m W	Electricity Substation	1992	60386
4	49m W	Electricity Substation	1971 - 1992	69123
5	146m W	Electricity Substation	1985 - 1992	82582
6	149m W	Electricity Substation	1989 - 1992	66209
8	254m N	Gas Governor	1983 - 1984	81964
10	300m NW	Electricity Substation	1967 - 1984	84816
D	345m N	Electricity Substation	1988 - 1992	63952
D	352m N	Electricity Substation	1984	77998
13	414m W	Electricity Substation	1990	60387
14	418m NE	Electricity Substation	1987	60382
I	423m NW	Electricity Substation	1992	70981
I	425m NW	Electricity Substation	1988	73714
I	436m NW	Electricity Substation	1971	70431
I	436m NW	Electricity Substation	1984	73370
C	457m W	Electricity Substation	1993 - 1994	73122

ID	Location	Land use	Dates present	Group ID
J	457m W	Electricity Substation	1976 - 1993	69118
J	459m W	Electricity Substation	1990	75655
15	463m N	Electricity Substation	1984 - 1990	65313
K	474m SW	Electricity Substation	1968 - 1992	78043
K	478m SW	Electricity Substation	1989	60388
17	490m S	Electricity Substation	1968 - 1990	67771

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	**0**

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

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	**3**

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

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
B	200m W	Garage	1958	21815
B	201m W	Garage	1959 - 1984	26464
B	201m W	Garage	1983	24081

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m	0

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

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

2 Past land use - un-grouped



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

2.1 Historical industrial land uses

Records within 500m	32

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

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
E	176m SW	Police Station	1992	921720
E	176m SW	Police Station	1982	921720
E	176m SW	Police Station	1960	921720

ID	Location	Land Use	Date	Group ID
E	176m SW	Police Station	1968	921720
H	262m W	Police Station	1989	920431
H	262m W	Police Station	1992	920431
H	262m W	Police Station	1980	920431
H	262m W	Police Station	1974	920431
H	262m W	Police Station	1985	920431
H	262m W	Police Station	1964	920431
4	315m S	Boat House	1898	817440
J	343m W	Unspecified Factory	1989	884900
J	343m W	Unspecified Factory	1980	884900
J	343m W	Unspecified Factory	1974	884900
J	343m W	Unspecified Factory	1985	884900
5	343m SW	Refuse Heap	1982	828256
L	348m S	Boat House	1949	877593
L	350m S	Boat House	1938	877593
L	353m S	Boat House	1909	934431
M	367m S	Unspecified Pit	1960	897794
N	370m S	Unspecified Pit	1949	966839
N	373m S	Unspecified Pit	1938	879006
N	373m S	Unspecified Pit	1938	879006
M	377m SE	Unspecified Pit	1992	979100
O	413m NW	Unspecified Pit	1909	913638
O	413m NW	Unspecified Pit	1938	856463
O	413m NW	Unspecified Pit	1938	856463
O	415m NW	Unspecified Pit	1938	897366
O	415m NW	Unspecified Pit	1949	897366
V	500m E	Filter Beds	1982	974186
V	500m E	Filter Beds	1960	974186

ID	Location	Land Use	Date	Group ID
V	500m E	Filter Beds	1968	974186

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	10

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

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
1	**On site**	**Unspecified Tank**	**1984**	**109608**
3	44m SE	Tanks	1992	104620
B	101m S	Unspecified Tank	1959	133725
B	101m S	Unspecified Tank	1958	143806
B	102m S	Unspecified Tank	1992	147425
J	416m W	Tanks	1958	133835
J	417m W	Tanks	1959	133835
S	470m NE	Unspecified Tank	1984	127590
S	470m NE	Unspecified Tank	1988	127590
S	470m NE	Unspecified Tank	1990	127590

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	40

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

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
2	43m W	Electricity Substation	1992	60386
A	49m W	Electricity Substation	1985	69123
A	49m W	Electricity Substation	1987	69123
A	50m W	Electricity Substation	1971	69123
A	50m W	Electricity Substation	1992	69123
C	146m W	Electricity Substation	1985	82582
C	146m W	Electricity Substation	1987	82582
C	147m W	Electricity Substation	1992	82582
D	149m W	Electricity Substation	1992	66209
D	150m W	Electricity Substation	1989	66209
G	254m N	Gas Governor	1983	81964
G	254m N	Gas Governor	1984	81964
I	300m NW	Electricity Substation	1967	84816
I	300m NW	Electricity Substation	1984	84816
I	301m NW	Electricity Substation	1983	84816
K	345m N	Electricity Substation	1992	63952
K	346m N	Electricity Substation	1988	63952
K	352m N	Electricity Substation	1984	77998
6	414m W	Electricity Substation	1990	60387
7	418m NE	Electricity Substation	1987	60382
P	423m NW	Electricity Substation	1992	70981
P	425m NW	Electricity Substation	1988	73714
P	436m NW	Electricity Substation	1971	70431
P	436m NW	Electricity Substation	1984	73370
J	457m W	Electricity Substation	1994	73122
J	457m W	Electricity Substation	1993	73122
J	457m W	Electricity Substation	1993	73122
J	457m W	Electricity Substation	1994	73122

ID	Location	Land Use	Date	Group ID
Q	457m W	Electricity Substation	1976	69118
Q	457m W	Electricity Substation	1993	69118
Q	459m W	Electricity Substation	1990	75655
R	463m N	Electricity Substation	1984	65313
R	463m N	Electricity Substation	1988	65313
R	463m N	Electricity Substation	1990	65313
T	474m SW	Electricity Substation	1968	78043
T	475m SW	Electricity Substation	1992	78043
T	478m SW	Electricity Substation	1989	60388
U	490m S	Electricity Substation	1968	67771
U	491m S	Electricity Substation	1989	67771
U	491m S	Electricity Substation	1990	67771

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	**0**

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

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	**5**

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

Features are displayed on the Past land use - un-grouped map on **page 18**

ID	Location	Land Use	Date	Group ID
F	200m W	Garage	1958	21815

ID	Location	Land Use	Date	Group ID
F	201m W	Garage	1959	26464
F	201m W	Garage	1967	26464
F	201m W	Garage	1984	26464
F	201m W	Garage	1983	24081

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

3.1 Active or recent landfill

Records within 500m	0

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

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

3.2 Historical landfill (BGS records)

Records within 500m	0

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

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	1

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

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Site address	Source	Data type
3	332m SW	Refuse Tip	1968 mapping	Polygon

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

3.4 Historical landfill (EA/NRW records)

Records within 500m	1

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

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Details		
2	330m SW	Site Address: Bala Road Licence Holder Address: -	Waste Licence: - Site Reference: - Waste Type: Inert, Industrial, Commercial, Household, Special Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: Brexham Borough Council Licence Holder: Wrexham Rural District Council First Recorded 30/09/1966 Last Recorded: 30/04/1971

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

3.5 Historical waste sites

Records within 500m	0

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

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

3.6 Licensed waste sites

Records within 500m	0

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

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

3.7 Waste exemptions

Records within 500m	6

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

Features are displayed on the Waste and landfill map on **page 24**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	141m S	Cefn Park Wrexham LL139TT	NRW-WME010152	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
A	141m S	Cefn Park Wrexham LL139TT	NRW-WME010152	Disposing of waste exemption	On a farm	Burning waste in the open
A	141m S	Cefn Park Wrexham LL139TT	NRW-WME010152	Storing waste exemption	On a farm	Storage of waste in a secure place
A	141m S	Cefn Park Wrexham LL139TT	NRW-WME010152	Using waste exemption	On a farm	Spreading waste on agricultural land to confer benefit
1	257m SW	Alexander's Pharmacy, Alexander Pharmacy, 1 Churchill Drive, Wrexham, Wrecsam, LL139HH	NRW-WME023699	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
4	463m W	R L Davies & Son Ltd, Hafod Y Wern Primary School, Deva Way, Wrexham, LL139HD	NRW-WME023359	Using waste exemption	Not on a farm	Use of waste in construction

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

4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m	12

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Company	Address	Activity	Category
1	23m S	Floor Sealants Ltd	Hullah Farm Cefn Road, Abenbury, Wrexham, Clwyd, LL13 9TT	Construction Completion Services	Construction Services
2	43m W	Electricity Sub Station	Clwyd, LL13	Electrical Features	Infrastructure and Facilities
3	52m SW	Electricity Sub Station	Clwyd, LL13	Electrical Features	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
4	86m E	Mast	Clwyd, LL13	Telecommunications Features	Infrastructure and Facilities
5	102m S	Tank	Clwyd, LL13	Tanks (Generic)	Industrial Features
6	107m N	Business Centre	Clwyd, LL13	Business Parks and Industrial Estates	Industrial Features
7	146m W	Electricity Sub Station	Clwyd, LL13	Electrical Features	Infrastructure and Facilities
8	147m W	Electricity Sub Station	Clwyd, LL13	Electrical Features	Infrastructure and Facilities
9	150m NE	Electricity Sub Station	Clwyd, LL13	Electrical Features	Infrastructure and Facilities
10	211m W	J Car Sales W X M Ltd	24, Rose Grove, Wrexham, Clwyd, LL13 9DP	Secondhand Vehicles	Motoring
11	212m W	Computers R Us	18, Sycamore Road, Wrexham, Clwyd, LL13 9BH	Electrical Equipment Repair and Servicing	Repair and Servicing
B	226m W	Taurus Service Station Brooklands	194, Holt Road, Wrexham, Clwyd, LL13 9EB	Petrol and Fuel Stations	Road and Rail

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	**1**

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Company	Address	LPG	Status
B	241m NW	NISA	194, Holt Road, Llan-Y-Pwll, Wrexham, Wrexham, LL13 9EB	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

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

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

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

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

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

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

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

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

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

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

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

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

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

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

Records within 500m	1

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

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Address	Details	
B	227m W	Taurus Service Station (Brooklands), 194 Holt Road, Wrexham, LL13 9EB	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified. Date of enforcement: No Enforcement Notified. Comment: No Enforcement Notified.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

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

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

4.13 Licensed Discharges to controlled waters

Records within 500m	0

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

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

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

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

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

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

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

4.16 List 1 Dangerous Substances

Records within 500m	0

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

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

4.17 List 2 Dangerous Substances

Records within 500m	0

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

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

4.18 Pollution Incidents (EA/NRW)

Records within 500m	2

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

Features are displayed on the Current industrial land use map on **page 27**

ID	Location	Details	
A	19m E	Incident Date: 13/02/2017 Incident Identification: 1700733 Pollutant: - Pollutant Description: -	Water Impact: Other Land Impact: Category 3 (Minor) Air Impact: Other
A	19m E	Incident Date: 13/02/2017 Incident Identification: 1700733 Pollutant: - Pollutant Description: -	Water Impact: Other Land Impact: Category 3 (Minor) Air Impact: Other

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

4.19 Pollution inventory substances

Records within 500m	0

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

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

4.20 Pollution inventory waste transfers

Records within 500m	0

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

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

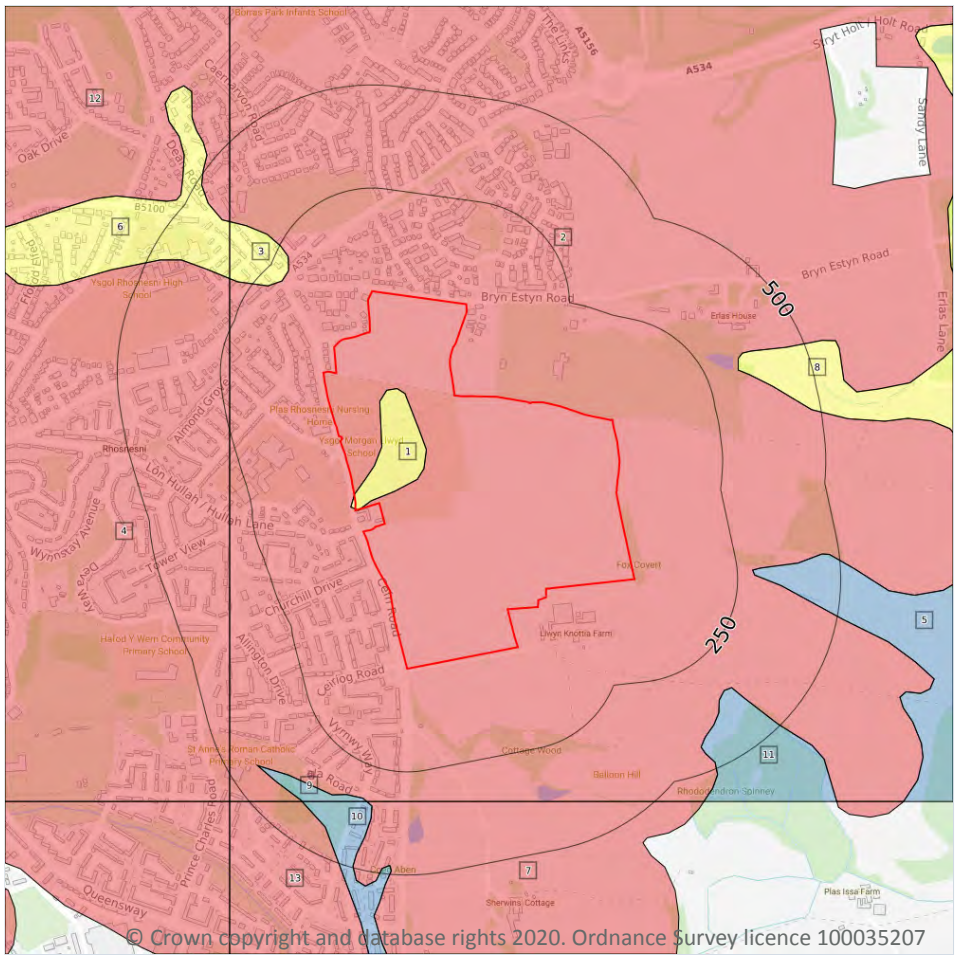
4.21 Pollution inventory radioactive waste

Records within 500m	0

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

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

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

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

5.1 Superficial aquifer

Records within 500m	13

Aquifer status of groundwater held within superficial geology.

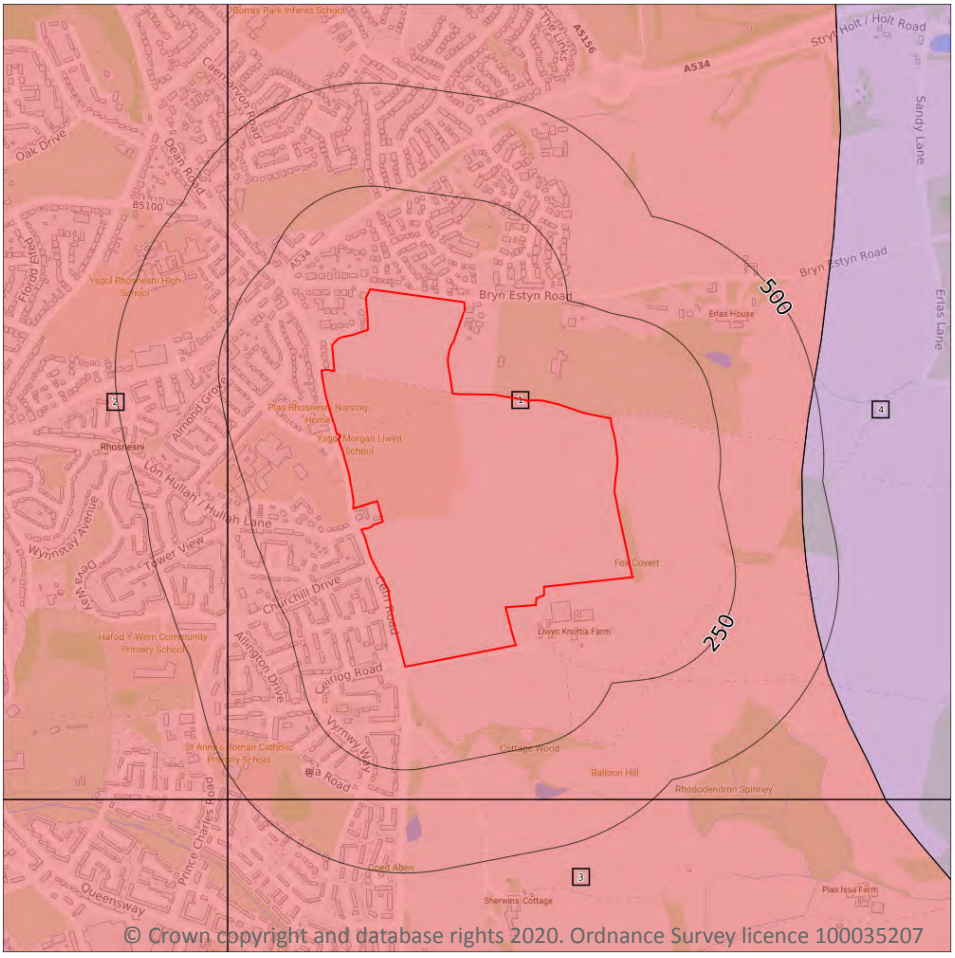
Features are displayed on the Hydrogeology map on **page 34**

ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	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

ID	Location	Designation	Description
3	203m NW	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	228m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	287m E	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
6	303m NW	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
7	322m S	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
8	328m E	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
9	332m S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
10	337m S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
11	347m SE	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
12	384m 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
13	411m SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

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

Bedrock aquifer



Site Outline

Search buffers in metres (m)

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

5.2 Bedrock aquifer

Records within 500m	4

Aquifer status of groundwater held within bedrock geology.

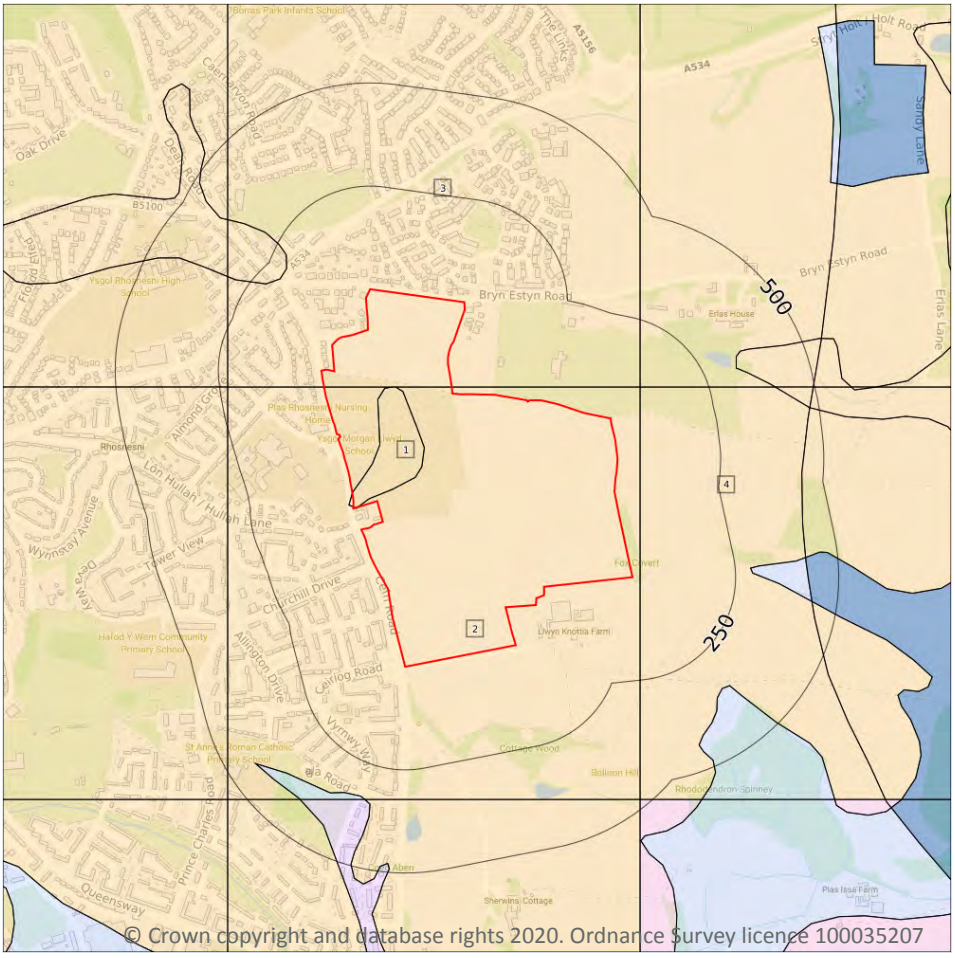
Features are displayed on the Bedrock aquifer map on **page 36**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
2	228m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

ID	Location	Designation	Description
3	322m S	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
4	422m E	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

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

Groundwater vulnerability



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

5.3 Groundwater vulnerability

Records within 50m	4

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

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

Features are displayed on the Groundwater vulnerability map on **page 38**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year**	**Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
2	**On site**	**Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year**	**Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
3	**On site**	**Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year**	**Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
4	18m E	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures

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

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**0**

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

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

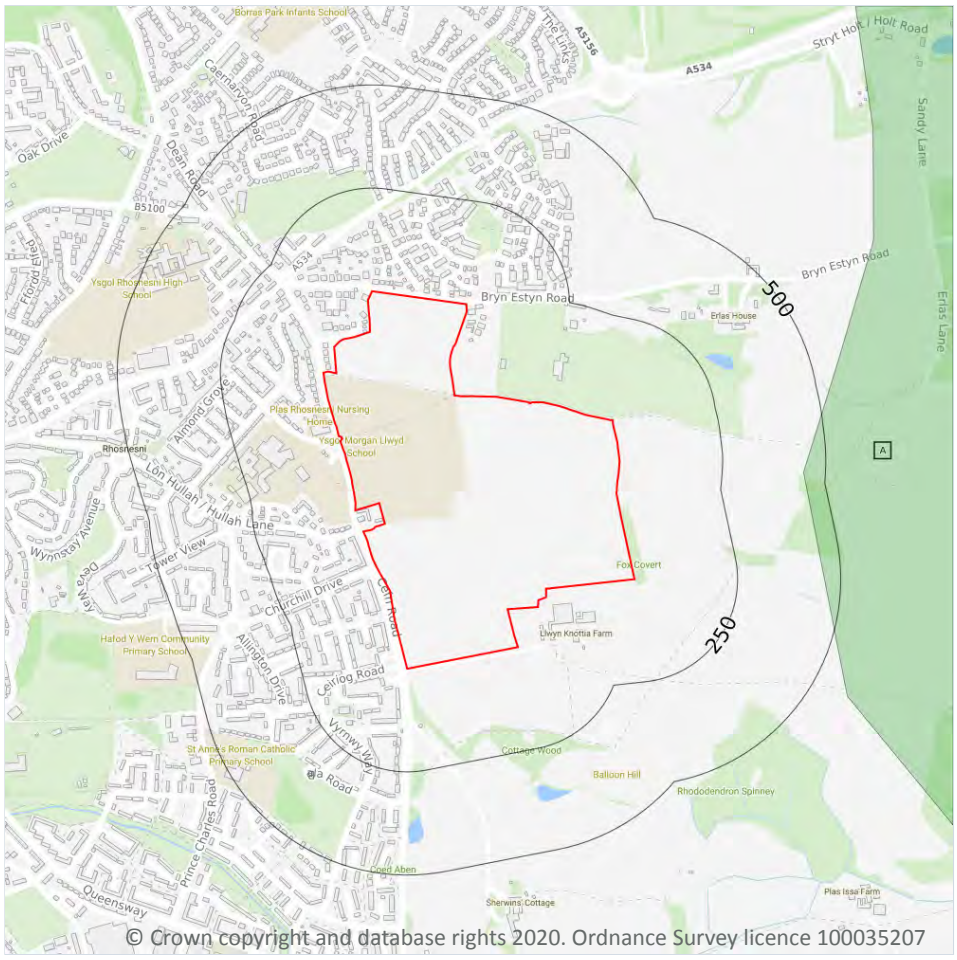
5.5 Groundwater vulnerability- local information

Records on site	0

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

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

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

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

5.6 Groundwater abstractions

Records within 2000m	2

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 41**

ID	Location	Details	
-	1483m NE	Status: Historical Licence No: 24/67/7/0197 Details: Mineral Washing Direct Source: EAW Groundwater Point: BOREHOLE Data Type: Point Name: Lafarge Tarmac Trading Limited Easting: 336870 Northing: 352070	Annual Volume (m^3): 195180 Max Daily Volume (m^3): 533.28 Original Application No: - Original Start Date: 25/08/1982 Expiry Date: - Issue No: 103 Version Start Date: 27/03/2014 Version End Date: -
-	1483m NE	Status: Active Licence No: 24/67/7/0197 Details: Mineral Washing - Low Direct Source: Carboniferous strata at Llan y Pwll, Wrexham Point: - Data Type: Point Name: - Easting: 336870 Northing: 352070	Annual Volume (m^3): 195,180 Max Daily Volume (m^3): 533.28 Original Application No: - Original Start Date: Mar 22 2019 12:00AM Expiry Date: - Issue No: - Version Start Date: - Version End Date: -

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

5.7 Surface water abstractions

Records within 2000m	**1**

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 41**

ID	Location	Details	
-	1829m E	Status: Historical Licence No: 24/67/7/0178 Details: Non-Evaporative Cooling Direct Source: EAW Surface Water Point: TRIBUTARY OF REDWITHER BROOK Data Type: Point Name: Caparo Wire Ltd Easting: 337810 Northing: 350500	Annual Volume (m^3): 9955.74 Max Daily Volume (m^3): 27.276 Original Application No: - Original Start Date: 12/05/1972 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2007 Version End Date: -

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

5.8 Potable abstractions

Records within 2000m	0

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

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

5.9 Source Protection Zones

Records within 500m	2

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 41**

ID	Location	Type	Description
A	446m E	3	Total catchment
A	448m E	3	Total catchment

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

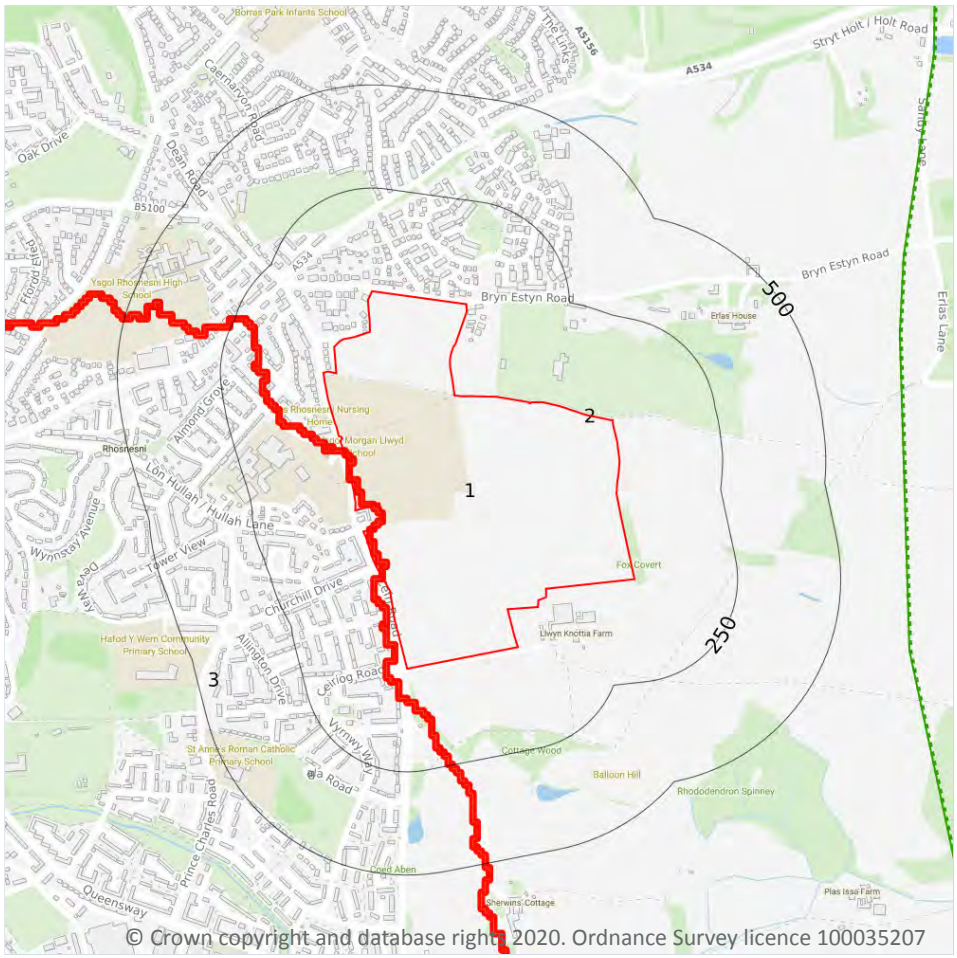
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

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

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

6 Hydrology



Site Outline

Search buffers in metres (m)

- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	0

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

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	0

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

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	2

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

Features are displayed on the Hydrology map on **page 44**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	**On site**	**River WB catchment**	**Clywedog - Dee to Gwenfro**	**GB111067052110**	**Clywedog - Dee**	**Dee**
3	**On site**	**River WB catchment**	**Gwenfro**	**GB111067051730**	**Clywedog - Dee**	**Dee**

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

6.4 WFD Surface water bodies

Records identified	2

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

Features are displayed on the Hydrology map on **page 44**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	658m SW	River	Gwenfro	GB111067051730	Moderate	Fail	Good	2016
-	1336m SW	River	Clywedog - Dee to Gwenfro	GB111067052110	Moderate	Fail	Moderate	2016

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

6.5 WFD Groundwater bodies

Records on site	1

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

Features are displayed on the Hydrology map on **page 44**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	**On site**	**Dee Carboniferous Coal Measures**	**GB41102G204800**	**Poor**	**Poor**	**Good**	**2016**

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

7 River and coastal flooding

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

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

7.2 Historical Flood Events

Records within 250m	0

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

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

7.3 Flood Defences

Records within 250m	0

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

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

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

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

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

7.5 Flood Storage Areas

Records within 250m	0

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

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

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

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

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

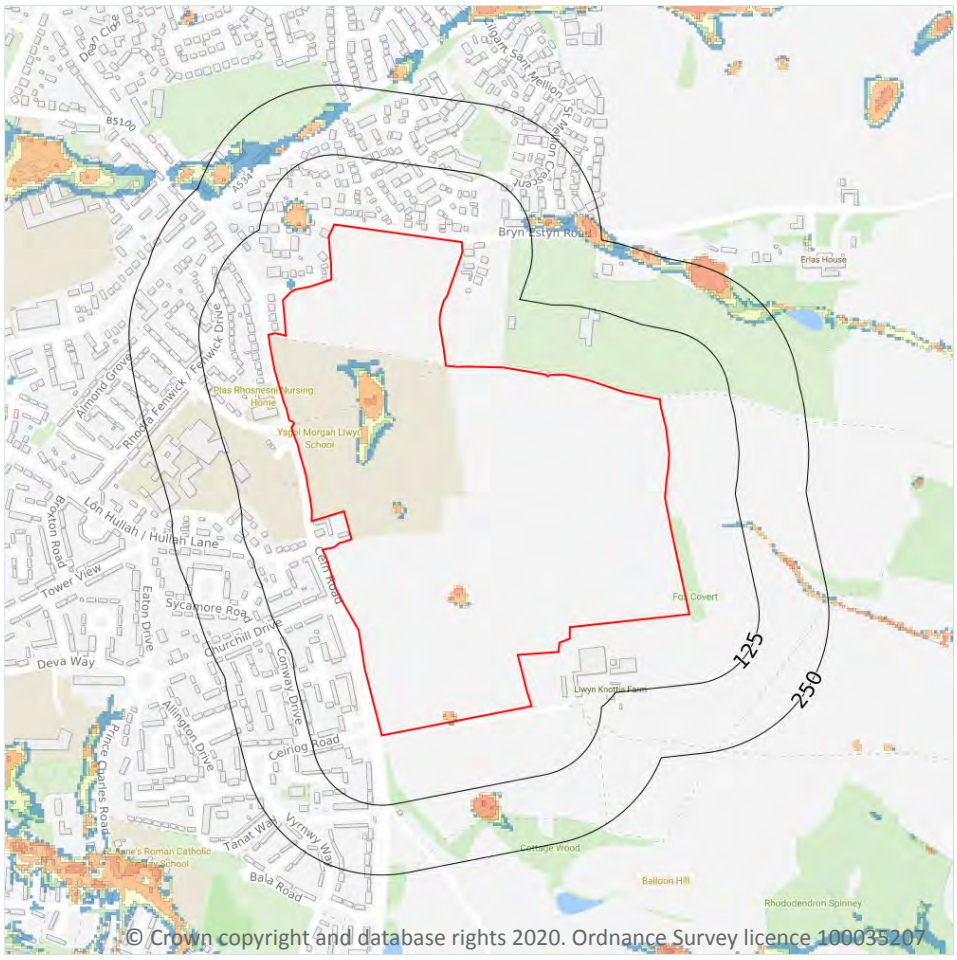
7.7 Flood Zone 3

Records within 50m	0

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

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

8 Surface water flooding



8.1 Surface water flooding

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

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

Features are displayed on the Surface water flooding map on **page 50**

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

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

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.3m and 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

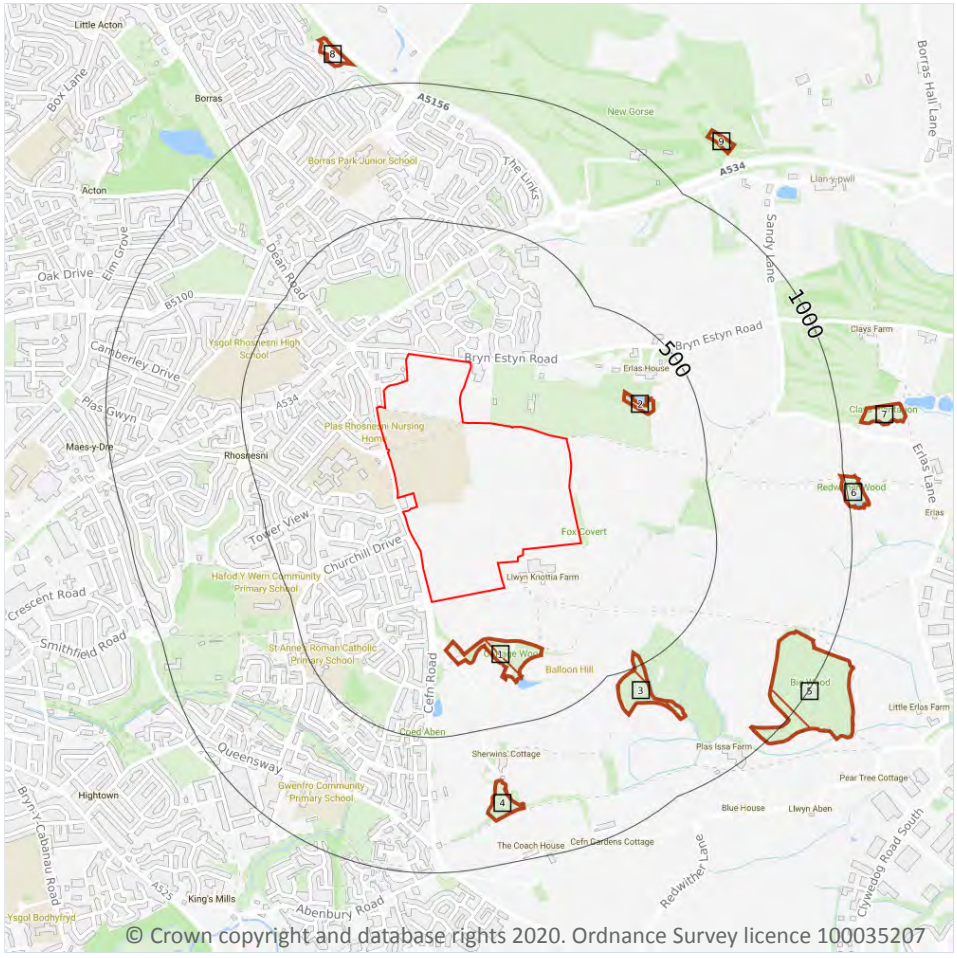
Highest risk on site	**Moderate**
Highest risk within 50m	**Moderate**

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

Features are displayed on the Groundwater flooding map on **page 52**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

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

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

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

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

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

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

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

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

10.4 Special Protection Areas (SPA)

Records within 2000m	0

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

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

10.5 National Nature Reserves (NNR)

Records within 2000m	0

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

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

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

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

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

10.7 Designated Ancient Woodland

Records within 2000m	27

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

Features are displayed on the Environmental designations map on **page 53**

ID	Location	Name	Woodland Type
1	159m S	Unknown	Ancient Semi Natural Woodland
2	255m NE	Unknown	Ancient Semi Natural Woodland
3	448m SE	Unknown	Ancient Semi Natural Woodland
4	695m S	Unknown	Ancient Semi Natural Woodland
5	815m SE	Unknown	Ancient Semi Natural Woodland
6	982m E	Unknown	Ancient Semi Natural Woodland
7	1080m E	Unknown	Restored Ancient Woodland Site
8	1090m N	Unknown	Ancient Semi Natural Woodland
9	1207m NE	Unknown	Ancient Semi Natural Woodland
-	1301m S	Unknown	Restored Ancient Woodland Site
-	1352m S	Unknown	Ancient Semi Natural Woodland
-	1378m S	Unknown	Restored Ancient Woodland Site
-	1394m S	Unknown	Ancient Semi Natural Woodland
-	1396m S	Unknown	Ancient Semi Natural Woodland
-	1429m S	Unknown	Ancient Semi Natural Woodland
-	1640m N	Unknown	Restored Ancient Woodland Site

ID	Location	Name	Woodland Type
-	1687m S	Unknown	Ancient Semi Natural Woodland
-	1698m E	Unknown	Restored Ancient Woodland Site
-	1703m E	Unknown	Restored Ancient Woodland Site
-	1805m SW	Unknown	Ancient Semi Natural Woodland
-	1846m S	Unknown	Restored Ancient Woodland Site
-	1868m N	Unknown	Restored Ancient Woodland Site
-	1884m SE	Unknown	Ancient Semi Natural Woodland
-	1884m N	Unknown	Restored Ancient Woodland Site
-	1891m SW	Unknown	Ancient Semi Natural Woodland
-	1899m S	Unknown	Ancient Semi Natural Woodland
-	1945m S	Unknown	Ancient Semi Natural Woodland

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

10.8 Biosphere Reserves

Records within 2000m	0

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

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

10.9 Forest Parks

Records within 2000m	0

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

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

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

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

10.11 Green Belt

Records within 2000m	0

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

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

10.12 Proposed Ramsar sites

Records within 2000m	0

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

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

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

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

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

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

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

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

This data is sourced from Natural England.

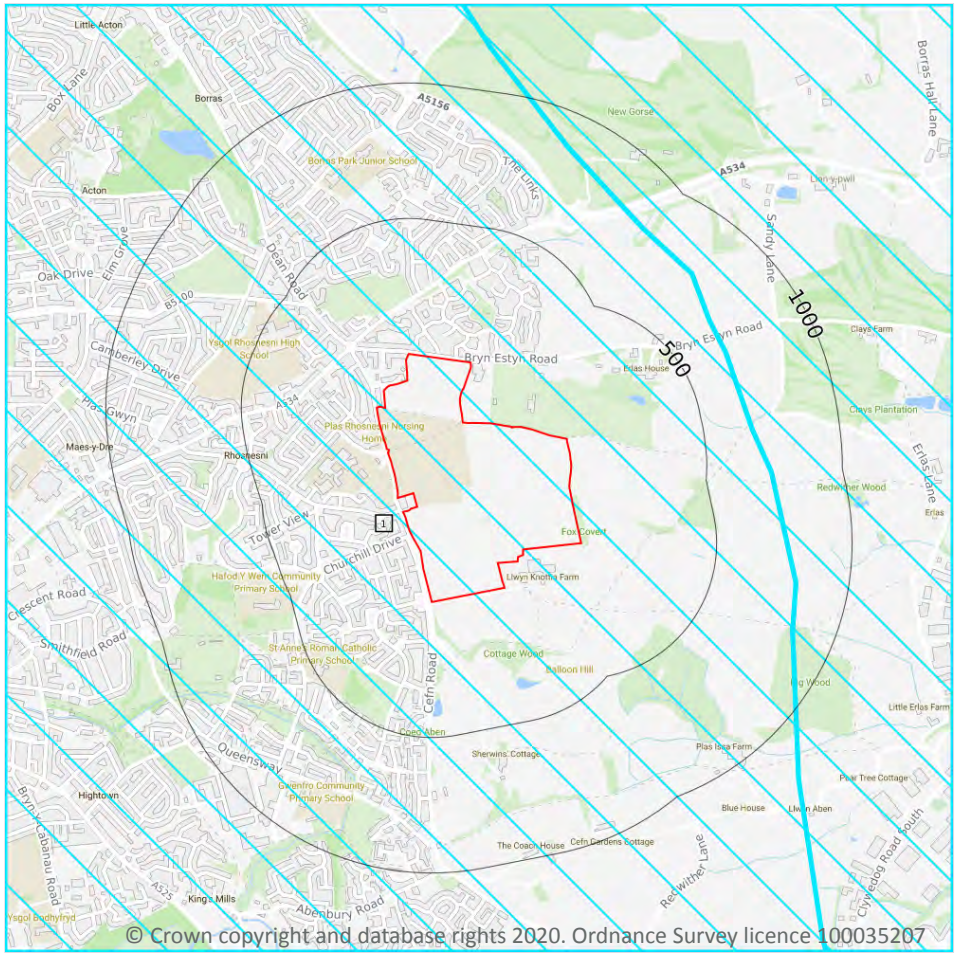
10.16 Nitrate Vulnerable Zones

Records within 2000m	0

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

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

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

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

Features are displayed on the SSSI Impact Zones and Units map on **page 59**

ID	Location	Type of developments requiring consultation
1	**On site**	**Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons > 4000m². Combustion - General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion**

This data is sourced from Natural England.

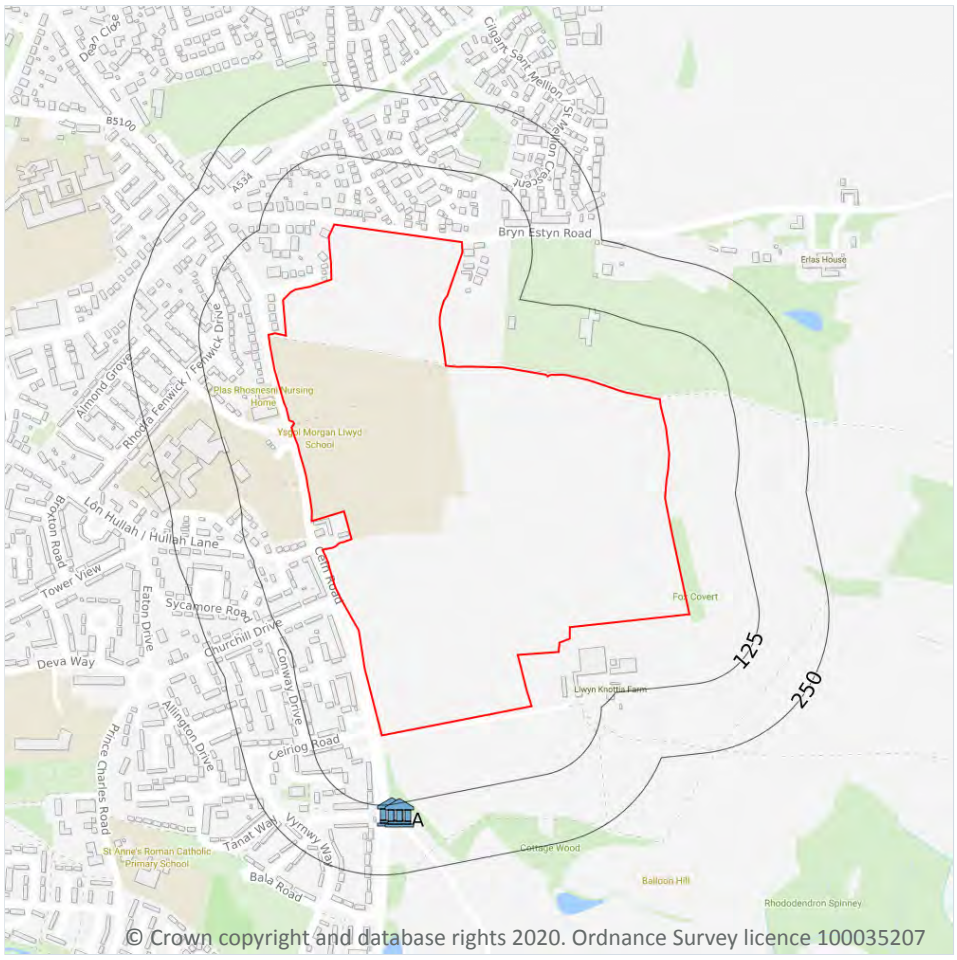
10.18 SSSI Units

Records within 2000m	0

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

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

11 Visual and cultural designations



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m	0

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

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

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

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

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

11.3 National Parks

Records within 250m	0

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

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

11.4 Listed Buildings

Records within 250m	2

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

Features are displayed on the Visual and cultural designations map on **page 61**

ID	Location	Name	Grade	Reference Number	Listed date
A	138m S	Gates And Gate-Piers At Cefn Park Lodge, Located To The East Side Of Cefn Road In Front Of The Private Drive To Cefn Park And Adjacent To Cefn Park Lodge. This Lodge Is One Of Two Which Formerly Served The Cefn Park Estate And The Only One To Retain Its Gates And Gate-Piers	II	17274	12/09/1996
A	141m S	Cefn Park Lodge, Located To The East Side Of Cefn Road On The Private Drive To Cefn Park, And Behind Decorative Iron Gates. The Lodge Is One Of Two On The Cefn Road Which Formerly Served The Cefn Park Estate	II	17273	12/09/1996

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

11.5 Conservation Areas

Records within 250m	0

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

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

11.6 Scheduled Ancient Monuments

Records within 250m	0

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

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

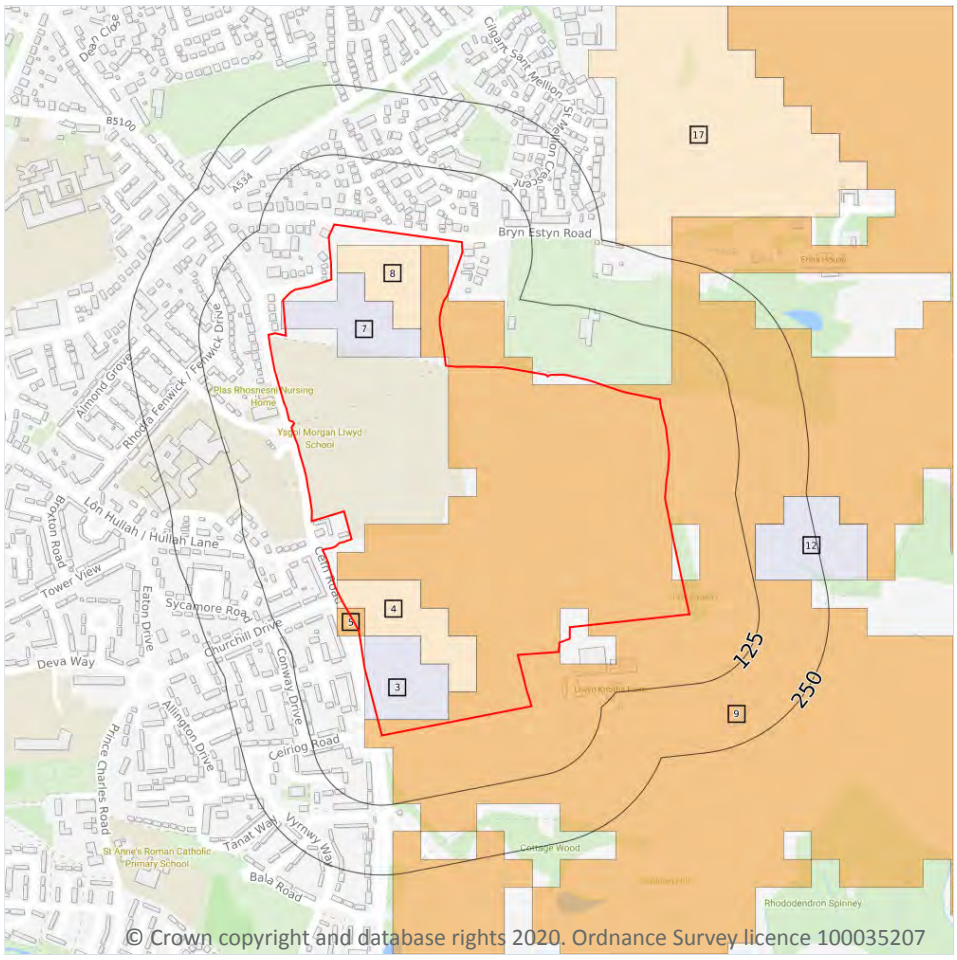
11.7 Registered Parks and Gardens

Records within 250m	0

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

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

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Timber felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	8

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

Features are displayed on the Agricultural designations map on **page 64**

ID	Location	Classification	Description
3	**On site**	**Grade 3b**	**Moderate quality agricultural land**
4	**On site**	**Grade 3a**	**Good to moderate quality agricultural land**
5	**On site**	**Grade 2**	**Good quality agricultural land**

ID	Location	Classification	Description
7	**On site**	**Grade 3b**	**Moderate quality agricultural land**
8	**On site**	**Grade 3a**	**Good to moderate quality agricultural land**
9	**On site**	**Grade 2**	**Good quality agricultural land**
12	129m E	Grade 3b	Moderate quality agricultural land
17	247m N	Grade 3a	Good to moderate quality agricultural land

This data is sourced from Natural Resources Wales.

12.2 Open Access Land

Records within 250m	**0**

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

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

12.3 Tree Felling Licences

Records within 250m	**0**

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

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	**0**

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

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

This data is sourced from Natural England.

13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m	0

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

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

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

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

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

This data is sourced from Natural England.

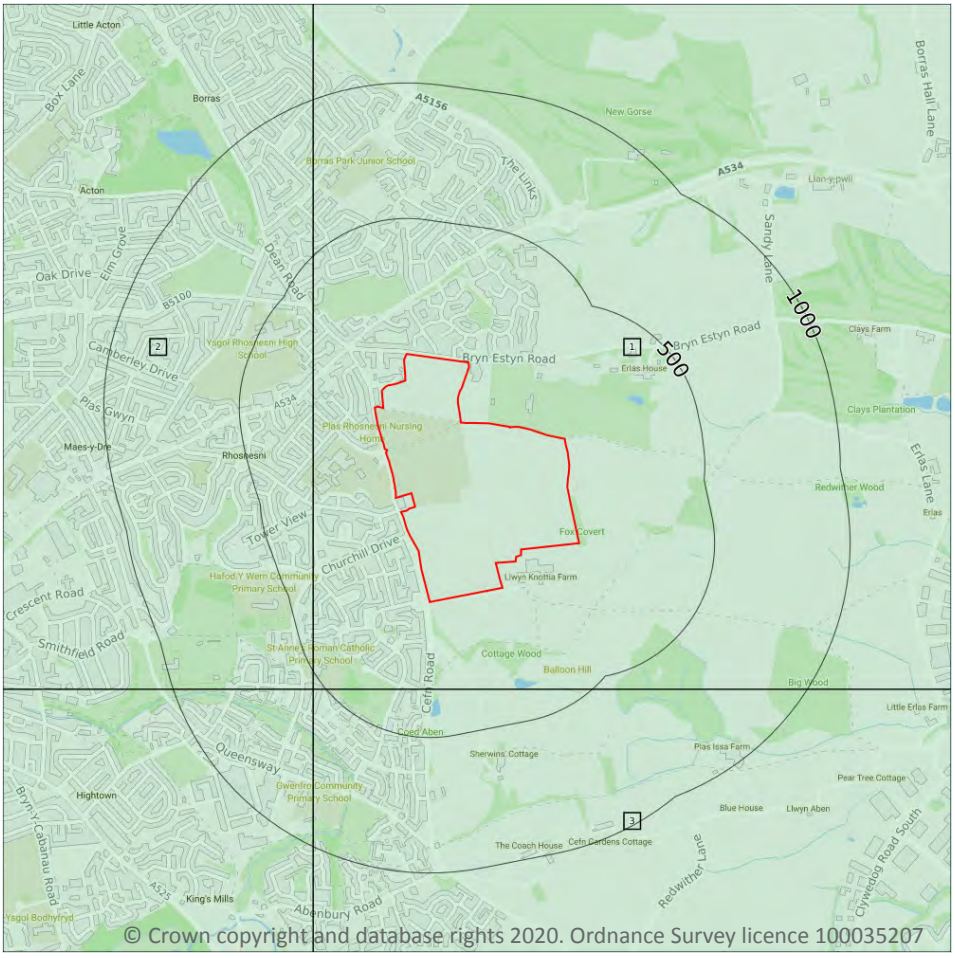
13.4 Limestone Pavement Orders

Records within 250m	0

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

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m	3

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

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 68**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**SJ35SE**
2	228m W	Full	Full	Full	Full	SJ35SW
3	322m S	Full	Full	Full	No coverage	SJ34NE

This data is sourced from the British Geological Survey.

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

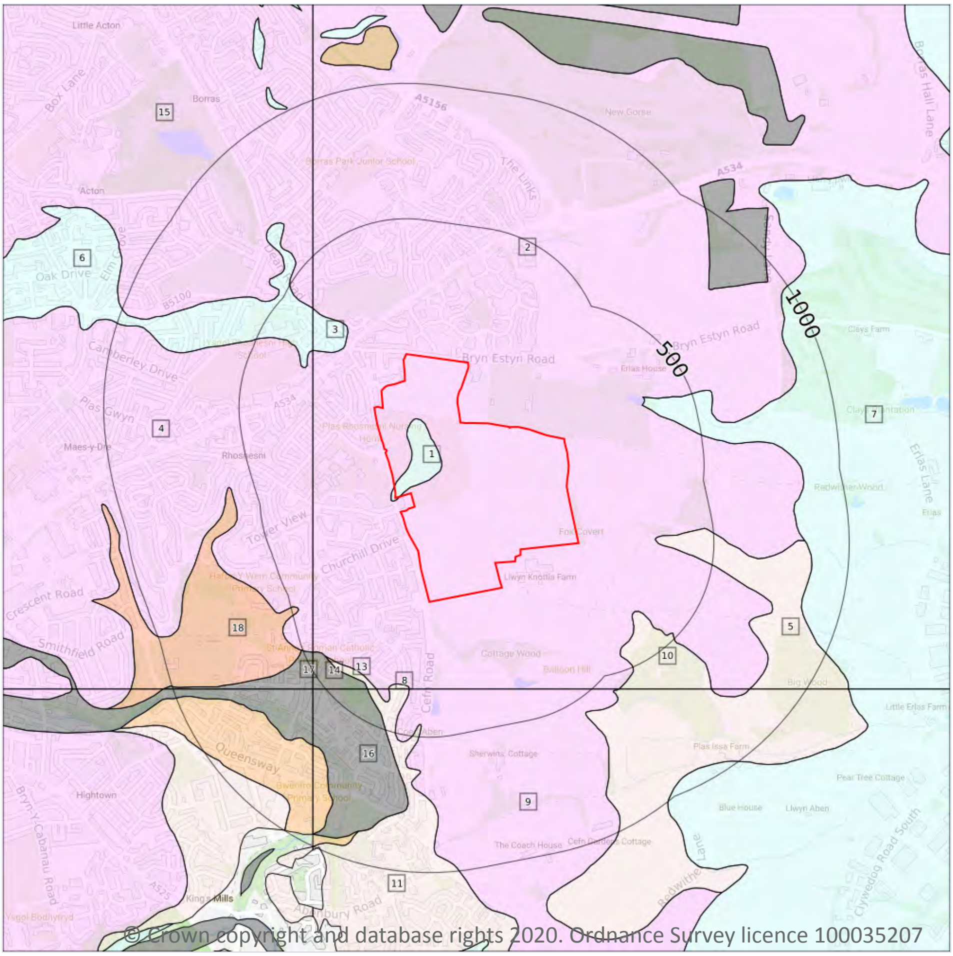
14.2 Artificial and made ground (10k)

Records within 500m	0

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

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline
Search buffers in metres (m)

Landslip (10k)

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

14.3 Superficial geology (10k)

Records within 500m	18

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

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 70**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILL-DMTN**	**Till - Diamicton**	**Diamicton**
2	**On site**	**GFDU-XSV**	**Glaciofluvial Deposits - Sand And Gravel**	**Sand And Gravel**
3	211m NW	TILL-DMTN	Till - Diamicton	Diamicton
4	228m W	GFDU-XSV	Glaciofluvial Deposits - Sand And Gravel	Sand And Gravel

ID	Location	LEX Code	Description	Rock description
5	285m E	GLLD-C	Glaciolacustrine Deposits - Clay	Clay
6	290m W	TILL-DMTN	Till - Diamicton	Diamicton
7	314m NE	TILL-DMTN	Till - Diamicton	Diamicton
8	320m S	GLLD-C	Glaciolacustrine Deposits - Clay	Clay
9	322m S	GFDU-XSV	Glaciofluvial Deposits - Sand And Gravel	Sand And Gravel
10	327m SE	GLLD-C	Glaciolacustrine Deposits - Clay	Clay
11	330m S	GLLD-C	Glaciolacustrine Deposits - Clay	Clay
12	355m SW	GFDU-XSV	Glaciofluvial Deposits - Sand And Gravel	Sand And Gravel
13	364m SW	GLLD-C	Glaciolacustrine Deposits - Clay	Clay
14	383m SW	ALV-C	Alluvium - Clay (unlithified Deposits Coding Scheme)	Clay
15	385m NW	GFDU-XSV	Glaciofluvial Deposits - Sand And Gravel	Sand And Gravel
16	395m SW	ALV-C	Alluvium - Clay (unlithified Deposits Coding Scheme)	Clay
17	469m SW	ALV-C	Alluvium - Clay (unlithified Deposits Coding Scheme)	Clay
18	476m W	ALF-XSV	Alluvial Fan Deposits - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

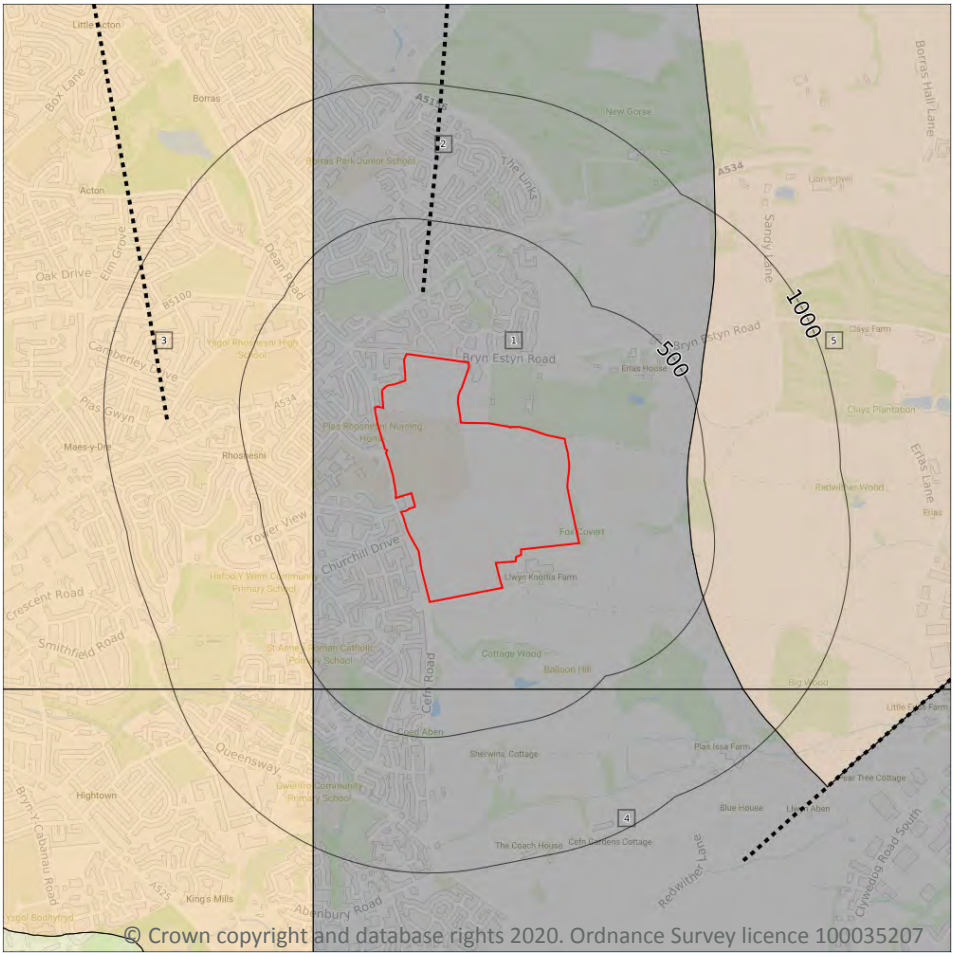
14.4 Landslip (10k)

Records within 500m	**0**

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

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

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

14.5 Bedrock geology (10k)

Records within 500m **4**

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

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 72**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**SAL-MDST**	**Salop Formation - Mudstone**	**Cisuralian Epoch - Westphalian D Sub-age**
3	228m W	SAL-MDSC	Salop Formation - Mudstone, Sandstone And Conglomerate	Cisuralian Epoch - Westphalian D Sub-age

ID	Location	LEX Code	Description	Rock age
4	322m S	SAL-CYCCM	Salop Formation - Sedimentary Rock Cycles, Coal Measure Type	Cisuralian Epoch - Westphalian D Sub-age
5	413m E	KNSF-SDST	Kinnerton Sandstone Formation - Sandstone	Early Triassic Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	**1**

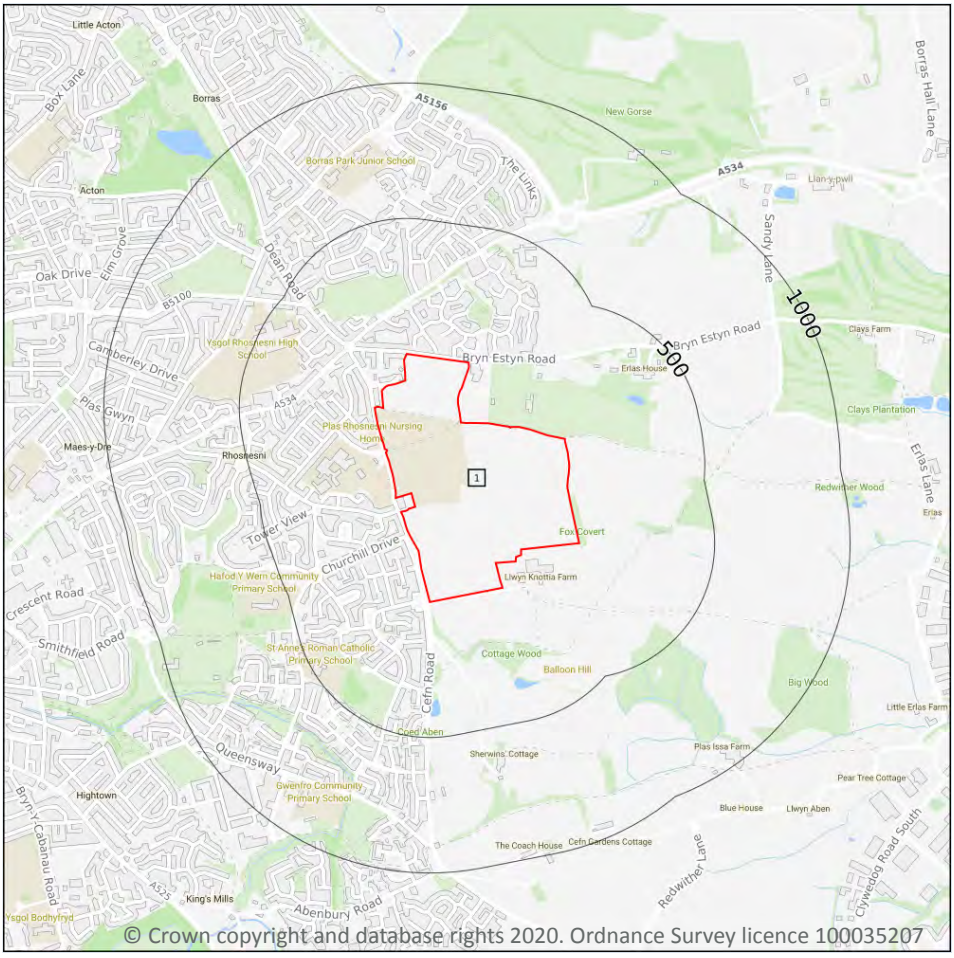
Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 72**

ID	Location	Category	Description
2	221m N	FAULT	Normal fault, inferred

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

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

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 74**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW121_wrexham_v4**

This data is sourced from the British Geological Survey.

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

15.2 Artificial and made ground (50k)

Records within 500m	0

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

This data is sourced from the British Geological Survey.

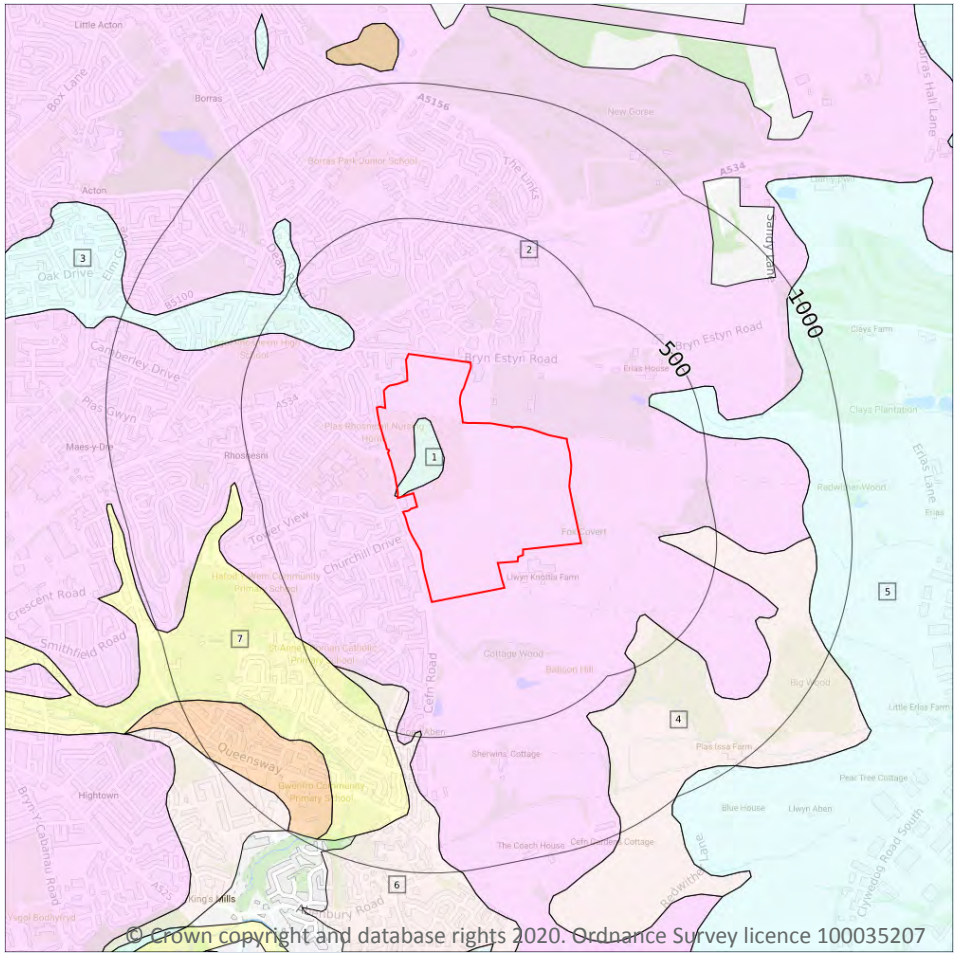
15.3 Artificial ground permeability (50k)

Records within 50m	0

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

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

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

15.4 Superficial geology (50k)

Records within 500m **7**

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

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 76**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**TILL, DEVENSIAN**	**DIAMICTON**
2	**On site**	**GFSDD-XSV**	**GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN**	**SAND AND GRAVEL**
3	203m NW	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

ID	Location	LEX Code	Description	Rock description
4	287m E	GLLDD-XCZ	GLACIOLACUSTRINE DEPOSITS, DEVENSIAN	CLAY AND SILT
5	328m E	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
6	332m S	GLLDD-XCZ	GLACIOLACUSTRINE DEPOSITS, DEVENSIAN	CLAY AND SILT
7	410m SW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m **2**

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

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**High**	**Low**
On site	**Intergranular**	**Very High**	**High**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m **0**

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

This data is sourced from the British Geological Survey.

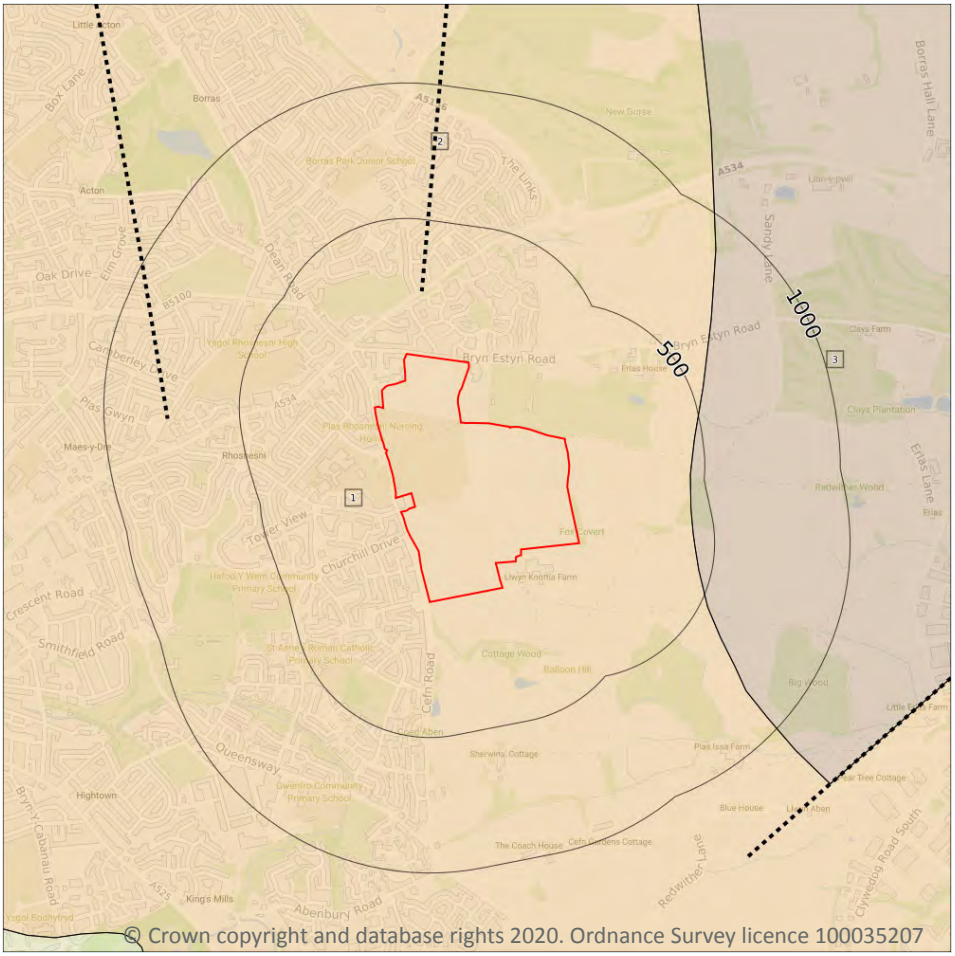
15.7 Landslip permeability (50k)

Records within 50m **0**

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

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



© Crown copyright and database rights 2020. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

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

15.8 Bedrock geology (50k)

Records within 500m **2**

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

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 78**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**SAL-MDSC**	**SALOP FORMATION - MUDSTONE, SANDSTONE AND CONGLOMERATE**	**WESTPHALIAN**
3	422m E	KNSF-SDST	KINNERTON SANDSTONE FORMATION - SANDSTONE	-

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

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

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

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	1

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

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 78**

ID	Location	Category	Description
2	236m N	FAULT	Fault, inferred, displacement unknown

This data is sourced from the British Geological Survey.

16 Boreholes



16.1 BGS Boreholes

Records within 250m	5

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

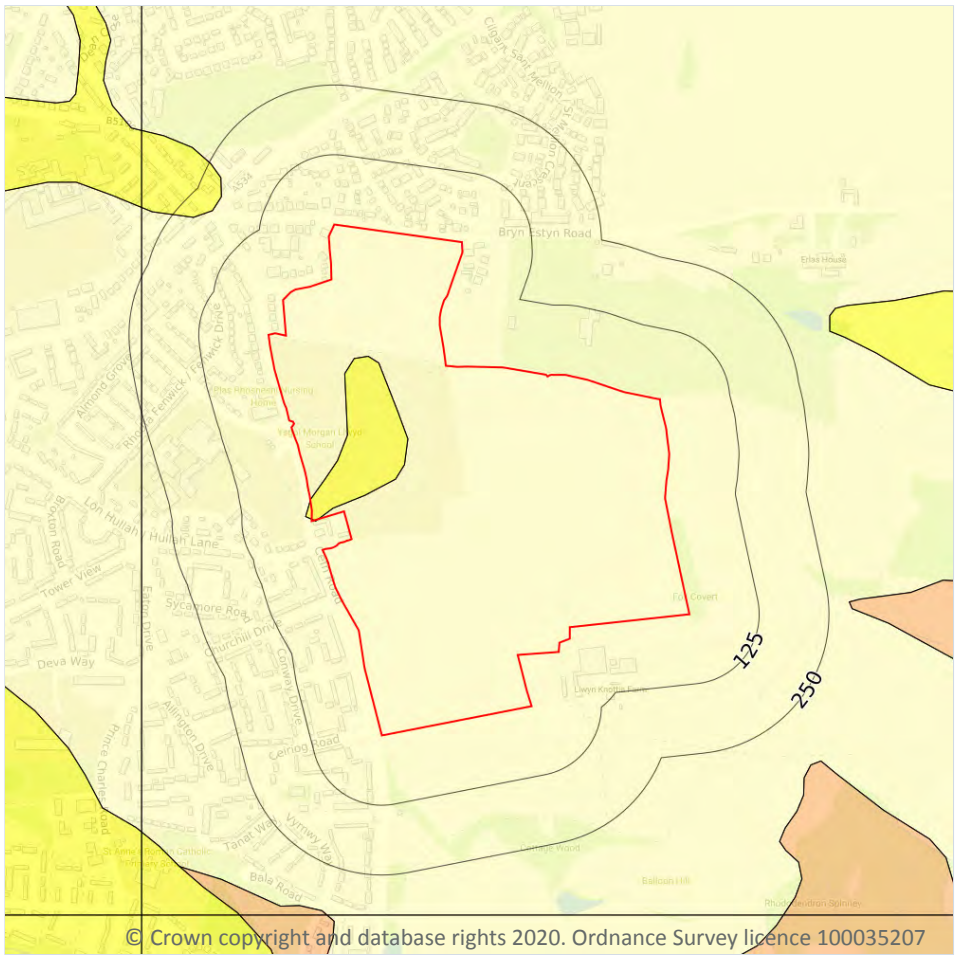
Features are displayed on the Boreholes map on **page 80**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	**On site**	**335960 350590**	**ABENBURY, FOX COVERT**	**25.0**	**N**	**154636**
2	110m NE	335630 351300	WREXHAM 1	10.75	N	154812
3	135m NE	335670 351300	WREXHAM 2/2A	9.0	N	154813

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	172m NE	335710 351310	WREXHAM 3	8.5	N	154814
5	220m NE	335730 351360	WREXHAM 4	9.5	N	154815

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

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

17.1 Shrink swell clays

Records within 50m	2

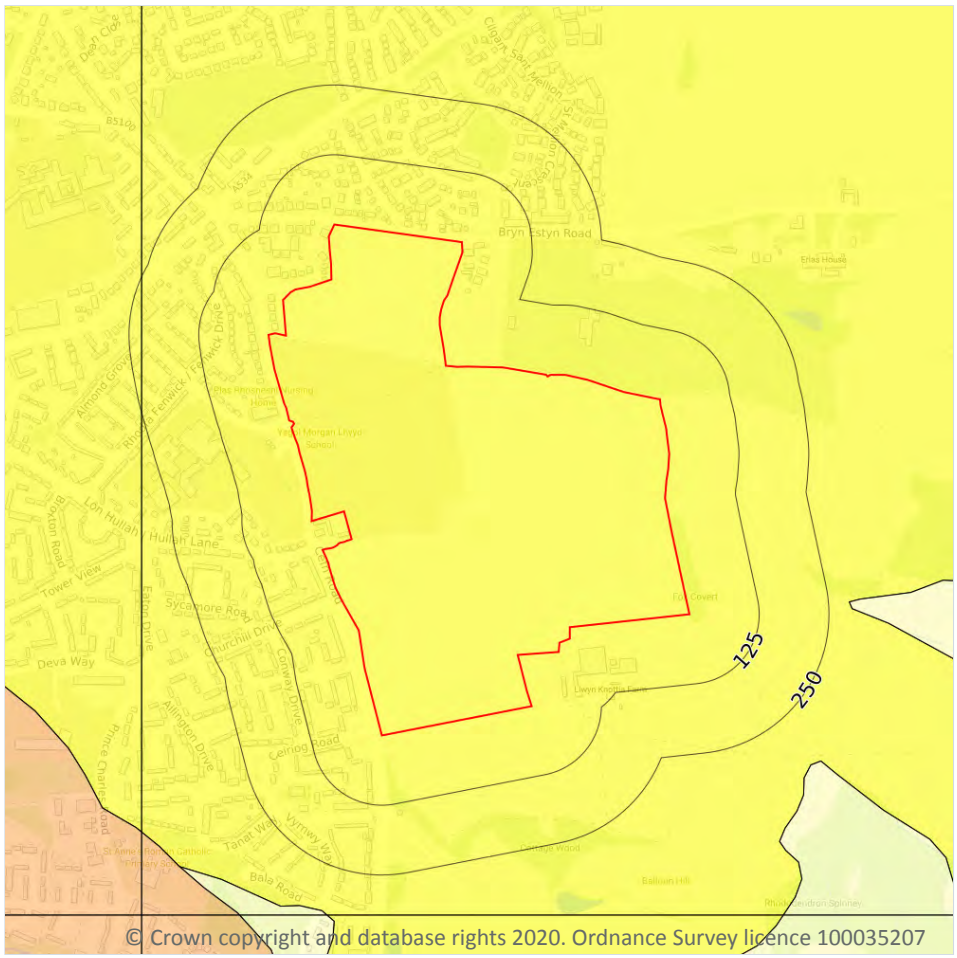
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and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

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 82**

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

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

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

17.2 Running sands

Records within 50m	1

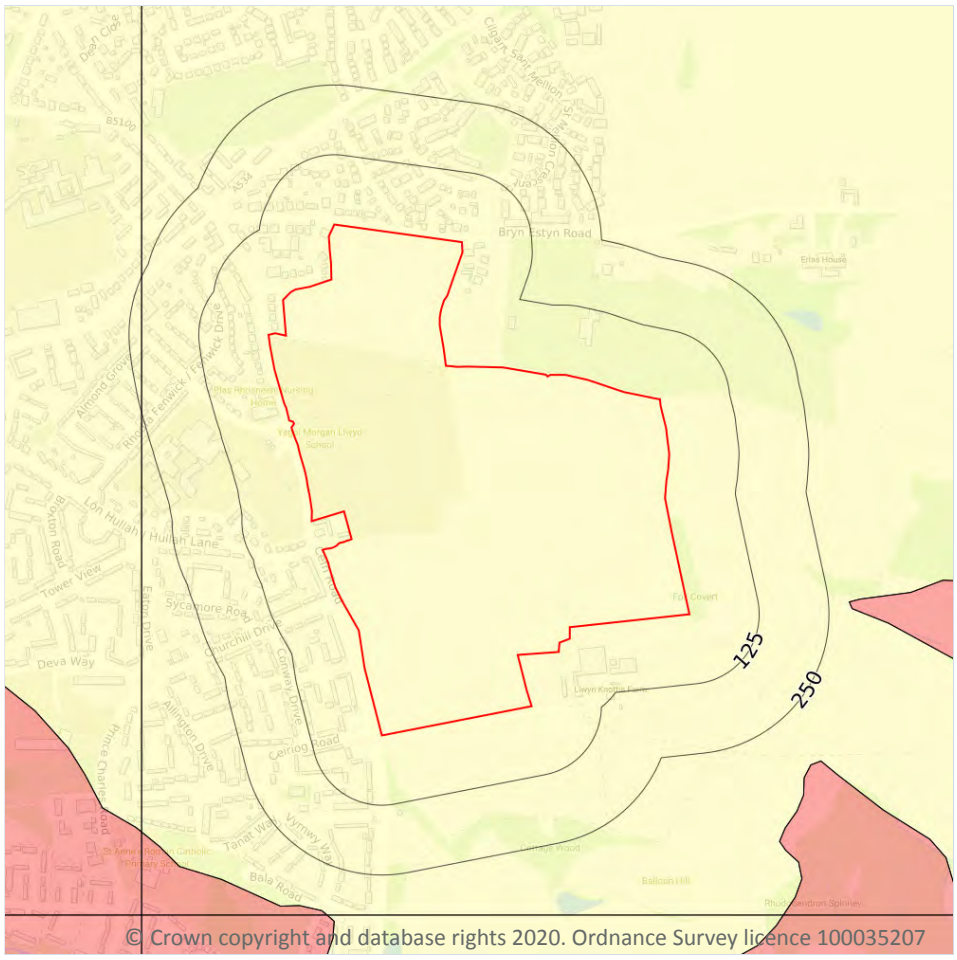
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 83**

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

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

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

17.3 Compressible deposits

Records within 50m	1

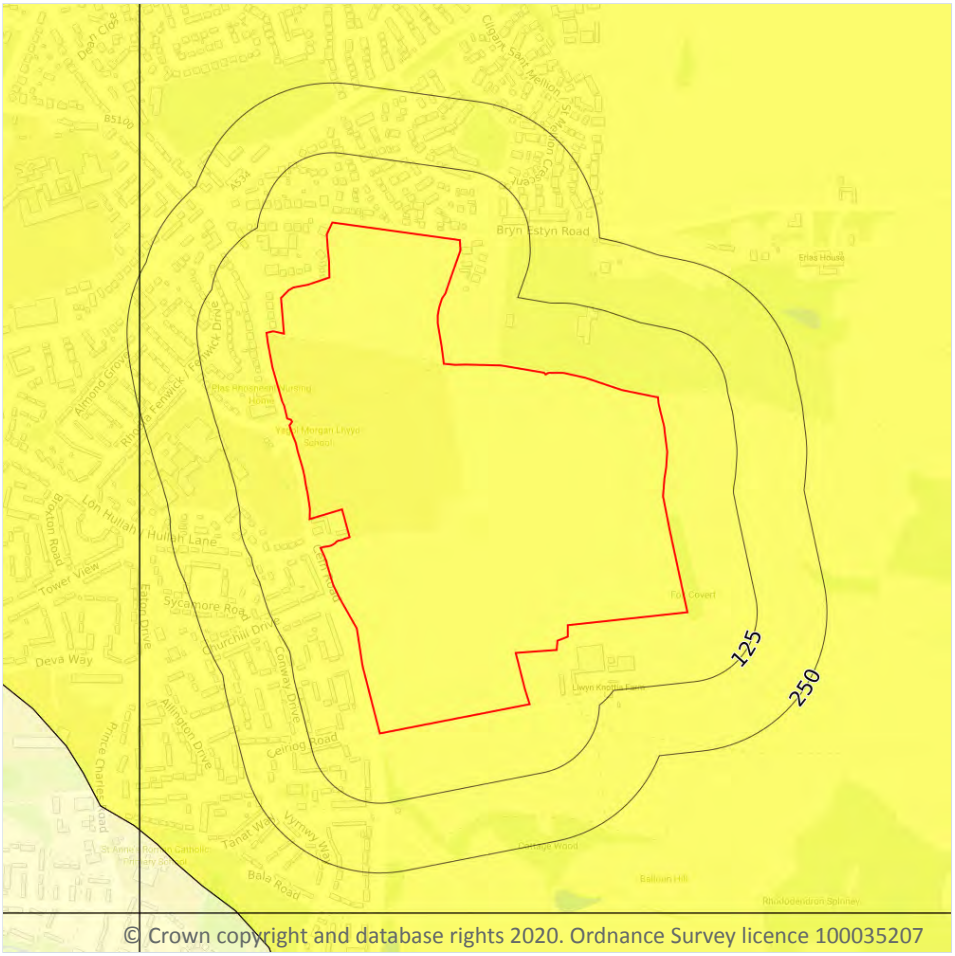
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 84**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



17.4 Collapsible deposits

Records within 50m	1

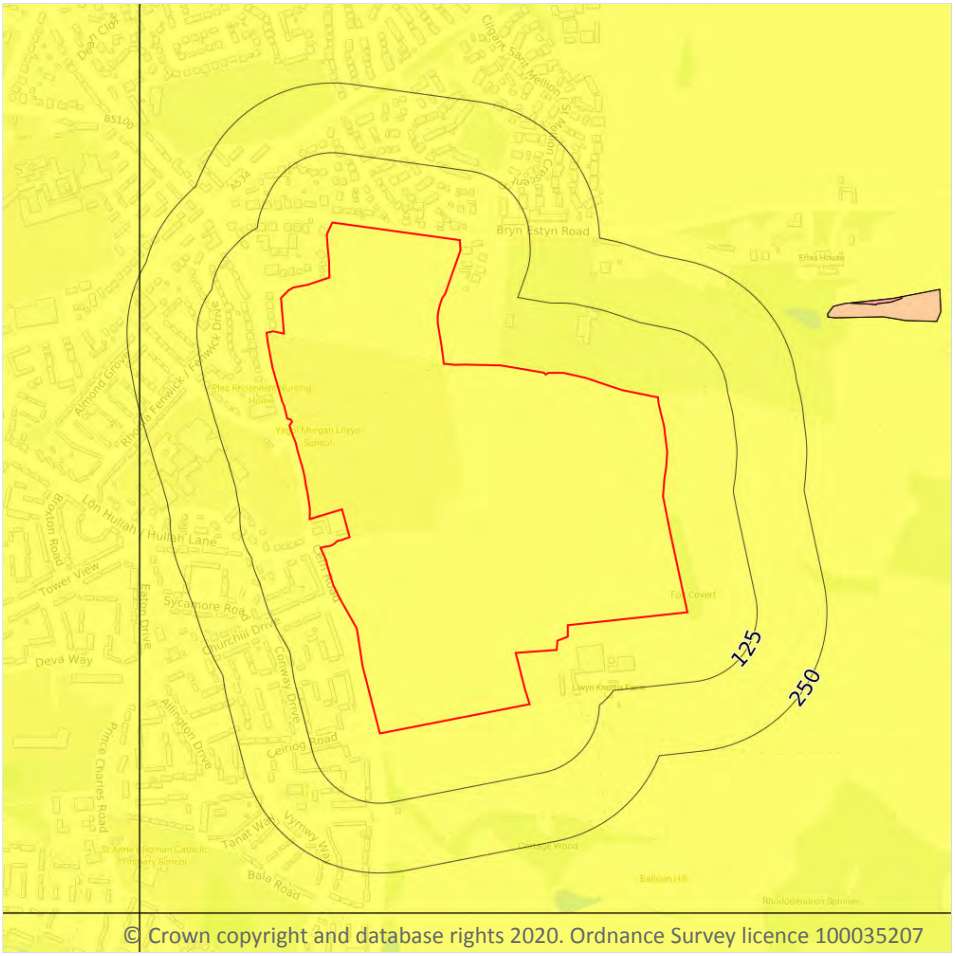
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 85**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

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

17.5 Landslides

Records within 50m	1

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

Features are displayed on the Natural ground subsidence - Landslides map on **page 86**

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

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

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

17.6 Ground dissolution of soluble rocks

Records within 50m	1

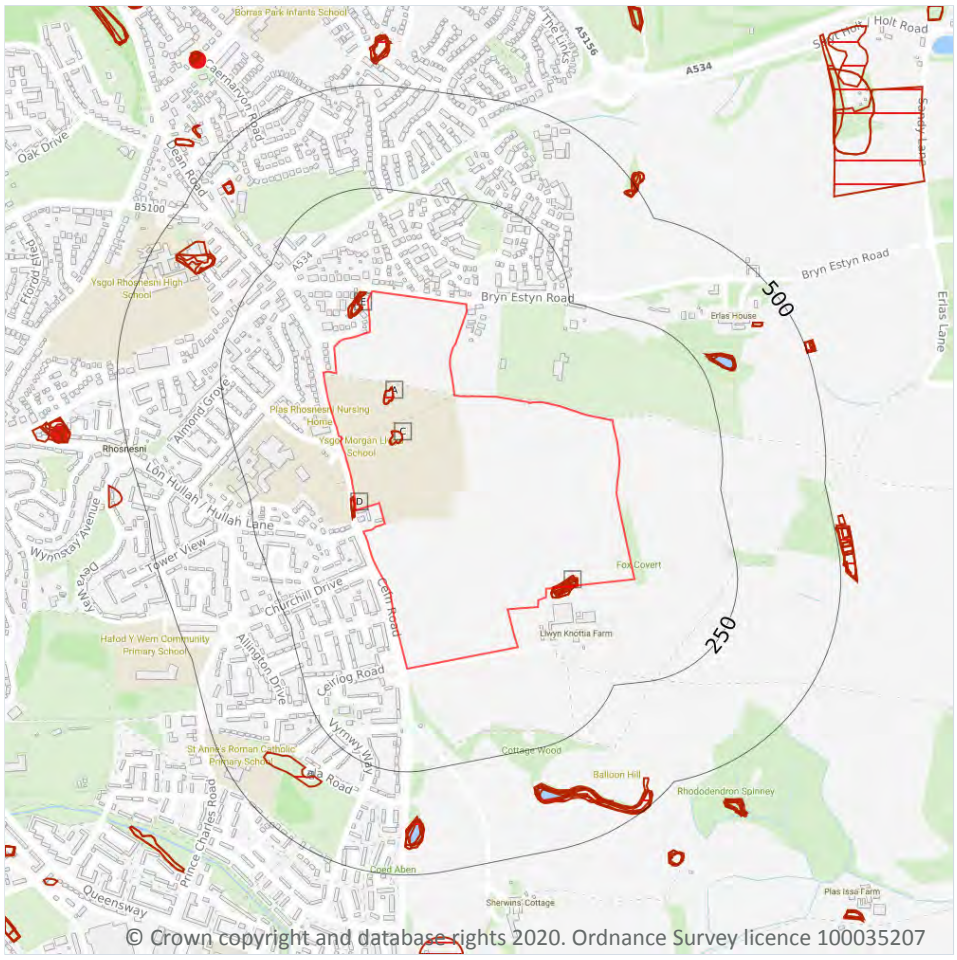
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 87**

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

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

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

Non Coal Mining

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

18.1 Natural cavities

Records within 500m	0

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

This data is sourced from Peter Brett Associates (PBA).

18.2 BritPits

Records within 500m	0

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

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	19

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 88**

ID	Location	Land Use	Year of mapping	Mapping scale
A	**On site**	**Pond**	**1949**	**1:10560**
A	**On site**	**Pond**	**1914**	**1:10560**
B	**On site**	**Pond**	**1949**	**1:10560**
B	**On site**	**Pond**	**1872**	**1:10560**
B	**On site**	**Pond**	**1982**	**1:10000**
B	**On site**	**Pond**	**1960**	**1:10560**
B	**On site**	**Pond**	**1968**	**1:10560**
B	**On site**	**Pond**	**1938**	**1:10560**
B	**On site**	**Pond**	**1909**	**1:10560**
B	**On site**	**Pond**	**1898**	**1:10560**
C	**On site**	**Pond**	**1968**	**1:10560**
C	**On site**	**Pond**	**1982**	**1:10000**
D	2m W	Pond	1872	1:10560
D	3m W	Pond	1914	1:10560
E	12m NW	Pond	1914	1:10560
E	14m NW	Pond	1949	1:10560
E	19m W	Pond	1982	1:10000

ID	Location	Land Use	Year of mapping	Mapping scale
E	20m W	Pond	1960	1:10560
E	20m W	Pond	1968	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

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

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

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

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

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

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

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

This data is sourced from Peter Brett Associates (PBA).

18.8 JPB mining areas

Records on site	0

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

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	1

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

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

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

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

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

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

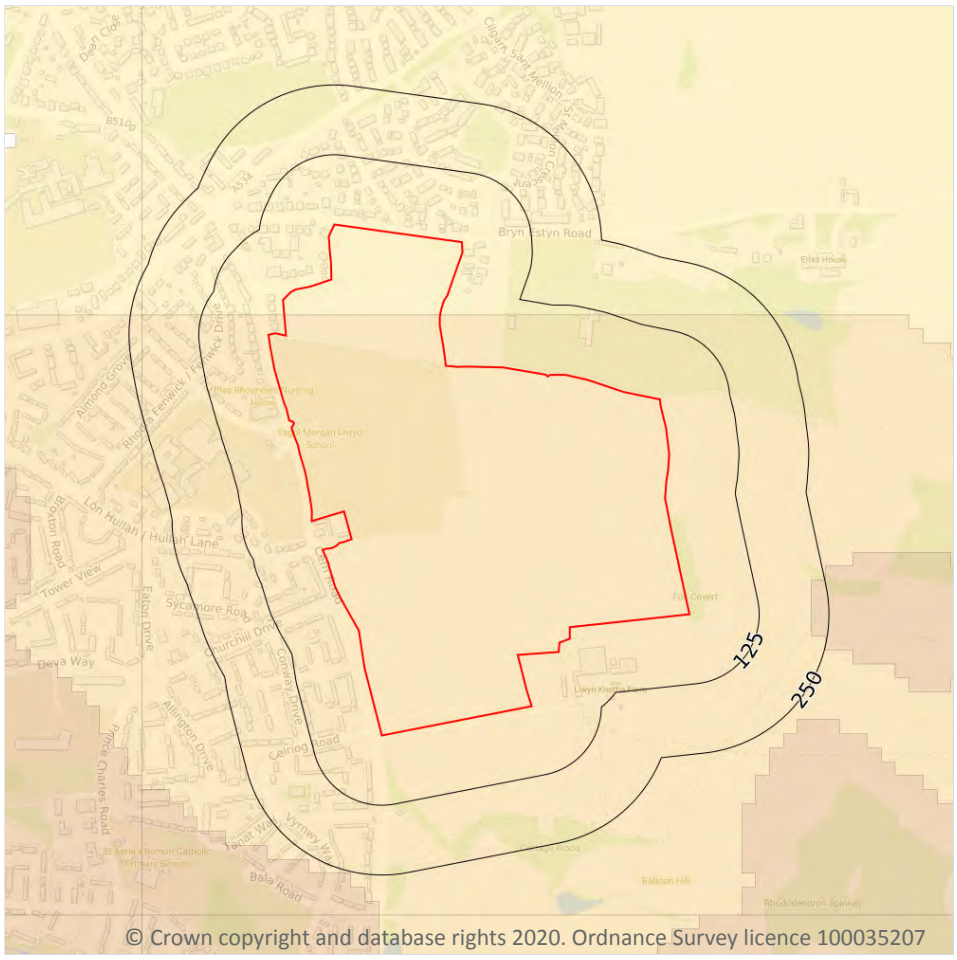
18.13 Clay mining

Records on site	0

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

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

19 Radon



Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	2

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

Features are displayed on the Radon map on **page 93**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Between 1% and 3%**	**None**
On site	**Between 3% and 5%**	**Basic**

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

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	12

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

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
19m E	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
19m E	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
43m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
43m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city

between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

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

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

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

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

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

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

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

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

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

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

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

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

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

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

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

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

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

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

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

This data is sourced from HS2 ltd.

Data providers

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

Terms and conditions

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

BGS Archive Records

SJ 35 SE 22 3596 5059 Fox Covert, Abenbury, Wrexham 1" AO. 121 **Block B**

Surface level (+68.3 m) +224 ft
Water not struck
Shell and auger 8-in (203 mm) diameter
March 1977

Overburden 0.2 m
Mineral 24.8 m+

British Geological Survey

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy	0.2	0.2
Glacial Sand and Gravel	Pebbly sand, fine and clayey at the top becoming gravelly at 11.0 m Gravel: fine and coarse, subangular to subrounded quartzite and volcanics with quartz, sandstone, some chert, limestone, other sediments and coal Sand: fine and medium with a trace of coarse, coarsens with depth	24.8+	25.0

GRADING

Mean for deposit *percentages*			Depth below surface (m)	*percentages*						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}$–$\frac{1}{4}$	$+\frac{1}{4}$–1	+1–4	+4–16	+16–64	+64
8	83	9	0.2 1.0	16	72	10	2	0	0	0
			1.0 3.0	18	74	8	0	0	0	0
			3.0 5.0	20	76	4	0	0	0	0
			5.0–7.0	10	64	26	0	0	0	0
			7.0–9.0	5	62	33	0	0	0	0
			9.0–11.0	3	56	41	0	0	0	0
			11.0–13.0	6	9	35	8	17	25	0
			13.0–15.0	3	54	43	0	0	0	0
			15.0–17.0	2	37	58	3	0	0	0
			17.0–19.0	4	26	66	3	1	0	0
			19.0 21.0	5	21	30	7	21	16	0
			21.0–22.0	4	19	51	8	12	6	0
			22.0–23.0	3	14	40	8	18	17	0
			23.0 25.0	8	30	50	3	2	7	0
			Mean	8	45	35	3	4	5	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 mm fraction						
	Quartz	Quartzite	Sandstone	Limestone	Other sediments	Igneous	Chert, flint
11.0–13.0	20	34	14	3	2	26	1
17.0–25.0	6	49	14	–	2	24	5

IGS 1536 (1159) 2000 1/76 Institute of Geological Sciences Sheet 1 of 2

Borehole Reg No: SJ35 SE 22
Temp borehole No: SJ35 SE 5
Nat Grid Ref: 3596 5059
Locality: FOX COVERT ABENBURY WREXHAM
Surface level: m O.D.(ft O.D.)
Drilled by: STRATA SURVEYS LTD
Drill type: SHELL
Hole diameter: 8"
Depth(s) bailed: 1·5 TO 25·0m.
Date started:
Date finished:
Recorded by: A.R. CLAYTON.

Classification of ground	Thickness m	Nature
MINERAL	25·0	GLACIAL SAND AND GRAVEL.

Remarks

Explanation
▽ Groundwater depth first encountered
a▼ Morning water level
p▼ Evening water level
Casing depth
Borehole depth
W Water sample
U, sample; solid ornament shows fraction recovered
• Spot disturbed sample
Bulk sample
S.P.T. Standard Penetration Test

Geological Classification	Description of Strata	Depth to base m	Thickness m	Sampling	Sample Nos	Water Level	Drilling and Casing progress
	SAND, 0·2m OF SOIL AT TOP SAND: FINE WITH SOME MEDIUM, SLIGHTLY SILTY, MAINLY SUBROUNDED NO COAL PRESENT, NO OBSERVABLE GRAVEL. [G0/585/F15]	1·0	1·0	C	CL 263		
	AS ABOVE BUT SAMPLE BAILED.	3·0	2·0		CL 264		WATER ADDED AT 1·5m
		5·0	2·0		CL 265		
		7·0	2·0		CL 266		
		9·0	2·0		CL 267		
		11·0	2·0		CL 268		
	SANDY GRAVEL GRAVEL: FINE WITH MEDIUM, SUB-ANGULAR TO SUBROUNDED, QUARTZITE, SANDSTONE, QUARTZ, MUDSTONE WITH LIMESTONE & IGNEOUS. SAND: MEDIUM WITH COARSE & TRACES OF FINE. CONSTITUENTS AS GRAVEL. GREYISH BROWN. [G 20/570/F10].	13·0	2·0		CL 269		
	SAND IDENTICAL TO 0·0–11·0m SAMPLES.	15·0	2·0		CL270		
		17·0	2·0		CL271		
		19·0	2·0		CL272		

Borehole Reg No: SJ 35 SE 22
Temp. borehole No: SJ 35 SE 5

Sheet 2 of 2

Geological Classification	Description of Strata BF 19.0	Depth to Base m	Thickness m	Sampling	Sample Nos	Water level	Drilling and Casing progress
	PEBBLY SAND : CHARACTERISTICS AS ABOVE [G10/S80/F10]	21.0	2.0		CL 273		
	SANDY GRAVEL WITH OCCASIONAL THIN CLAY BANDS IN UPPER 1METRE. GRAVEL: FINE AND COARSE WITH SOME COBBLES, MAINLY QUARTZ, SANDSTONE, QUARTZITE & IGNEOUS, SOME LIME-STONE & IGNEOUS. UPTO 15% COAL SAND: MEDIUM WITH COARSE, IDENTICAL IN COMPOSITION TO GRAVEL. DARK GREY. UPTO 15% COAL.	22.0	1.0		CL 274		
	CLAY: RED-BROWN WITH PSEUDOBRECC-IATED TEXTURE. OCCASIONAL FINE PEBBLES OF QUARTZITE, IGNEOUS ETC.	23.0	1.0		CL 275		
	SAND: FINE, SOME MEDIUM, SLIGHTLY SILTY, MAINLY SUBROUNDED, NO COAL PRESENT. NO GRAVEL SEEN. [G0/S85/F15]	25.0	2.0		CL 276		
	BOREHOLE COMPLETED AT 25.0 m.						

British Geological Survey

SJ35SE 197

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site WREXHAM

Job No. 226/99

Client COOPER ASSOCIATES.

Borehole **2A**

Date 23/11/99 - 23/11/99

O.D. Level

Page 1 of 2

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
23			0.20	TOPSOIL. (0.20)						
				Brown clayey SAND AND GRAVEL. (0.90)				B1	0.50	
								B2	1.00	
			1.10	Firm brown stoney CLAY. (0.40)				U3	1.20 - 1.65	
			1.50					B4	1.20 - 1.65	
				Medium dens ebrown SAND AND GRAVEL. (1.90)				N5	2.20 - 2.65	21
								B6	3.00	
								N7	3.20 - 3.65	16
			3.40	Medium dense brown SAND AND GRAVEL with small clay bands. (0.70)						
			4.10					B8	4.00	
				Medium dense brown SAND AND GRAVEL. (4.90)				N9	4.20 - 4.65	17
								B10	5.00	
								N11	5.20 - 5.65	20
								B12	6.00	
								N13	6.20 - 6.65	15
								B14	7.00	
								N15	7.20 - 7.65	16
								B16	8.00	

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ⧖ - Water entry ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
DRY								

Remarks

EXCAVATE TO CLEAR SERVICES.
50MM MONITORING WELL INSTALLED TO BASE.

British Geological Survey

85355E 197

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site WREXHAM | Job No. 226/99

Client COOPER ASSOCIATES. | Borehole 2A

Date 23/11/99 - 23/11/99 | O.D. Level | Page 2 of 2

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			8.00	(Continued) Medium dense brown SAND AND GRAVEL. (4.90)				N17	8.20 - 8.65	16
23		9.00	9.00	Base of Borehole				B18	9.00	

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
DRY								

Remarks

EXCAVATE TO CLEAR SERVICES.
50MM MONITORING WELL INSTALLED TO BASE.

British Geological Survey

Zetica UXB Risk Maps

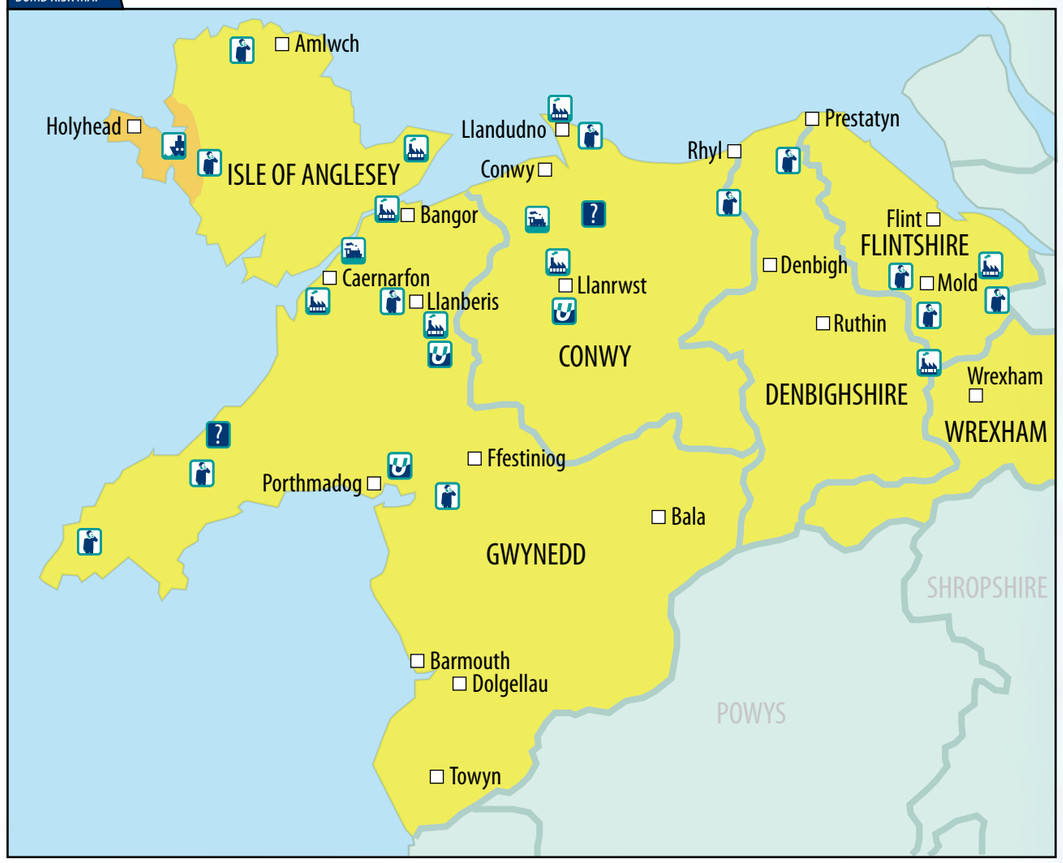
REGIONAL UNEXPLODED BOMB RISK

ISLE OF ANGLESEY

DENSITY OF BOMBS PER BOROUGH

Borough	High explosive	Anti-personnel	Incendiary
Holyhead	24	0	0
Rhyl	2	0	0
Prestatyn	3	0	0
Flint	53	0	0
Porthmadog	0	0	0

BOMB RISK MAP



OTHER WWII TARGETS
- military
- transport
- utilities
- industry
- docks
- other

BOMB TONNAGE
- >1000
- >500
- >100
- > 0
- unverified

BOMB RISK
- high
- moderate
- low

The information in this regional UXB risk map is derived from a number of sources and should be read in conjunction with the "Users' Guide" (printed overleaf). Zetica cannot guarantee the accuracy or completeness of the information or data.

This map covers regions of coast with beaches, estuaries and alike. Further consideration of the bomb risk is required in these areas. The often inaccessible nature and changing ground conditions (e.g. movement of silt that may contain ordnance) means that historical bombing records for these areas are often poor or inaccurate and further assessment of the bomb risk may be required as part of a site specific study.

A FOUR-STEP PROCESS

Risk assessment and method statement from a qualified explosive ordnance clearance (EOC) operative.

Surface geophysical survey to allow shallow groundwork.

MAGCONE detects UXBs and obstructions on piling layout to the no-risk depth.

Detected UXBs can be dealt with by our EOC engineers and a Clearance Certificate issued for the site.

For more details on this and related services, telephone: +44 (0) 1993 886682 or visit our website: www.zetica.com

zetica

BOMB MAP USERS' GUIDE

Sources of information and explanation of bomb risk

Why?

Unexploded bombs (UXB) still present a risk to construction projects long after the end of the Second World War (WWII). UXBs often entered the ground unnoticed at high velocity and penetrated to a depth of several metres. Here they remain – vulnerable to disturbances from construction work. Beyond the depth of shallow excavation work, the greatest risk is to piling, drilling and probing crews. A piling rig could repeatedly hit a UXBs with considerable force before the crew realises an obstruction has been impacted. It could then be up to 72 hours before the detonator activates.

Who?

The responsibility for avoiding UXB risk usually lies with construction companies or house builders particularly those who are redeveloping urban sites. In addition, project engineering or environmental consultants are expected to advise their clients of a site's history. Other interested parties include those organisations whose employees are physically at most risk from intrusive works, normally piling companies, drillers or probing operators.

How?

UXB risk should be assessed for every site, but especially those in known heavily bombed areas or those situated near war-time strategic installations that were priority targets for enemy aircraft, for example, airfields. Zetica's regional bomb risk map is therefore a first point of reference from which the relative, potential abundance of UXBs can be judged. Consultants then advise their clients that an ordnance-risk desk study is required, which they may obtain from external sources. Construction companies or house builders who assess their own risk could choose to come direct to Zetica.

When?

Do not wait for the piling or drilling company to be on site before thinking about UXB risk – it will inevitably cause delays and higher costs. Request the regional bomb risk map from Zetica as soon as a site is being considered, and then use it to help you or your clients to decide if an ordnance-risk desk study is required.

Where?

Maps can be obtained for any county in England, Scotland, Wales or Northern Ireland – or for any London borough. They can help determine the areas that were most heavily bombed – but no part of the country should be considered 100% safe from UXB risk. Even remote rural areas can have a high risk if, for example, they were locations for decoy airfields or beacons that were lit to fool enemy pilots into thinking they had located a burning city that had been successfully hit by others in the raid.

How to use this regional map

This map is designed to give you an indication of the potential risk from UXBs in your area. If you are conducting work that involves excavation, piling or other disturbance of the ground, then you should use the map to identify the category of risk for your site.

The risk boundaries are a guide, compiled from data based on the political areas for which records are held; being just outside a high-risk area does not mean there is no UXB risk. You should use the map to assist in your decision of whether to investigate the UXB risk further.

Information on the regional risk remaining from UXBs in the UK

Zetica has built the largest UXB database of its kind in the UK. It includes a unique digital library of bomb census data, and maps showing key strategic points and bombing densities from the First and Second World Wars. The main sources of information include records from central government (Public Records Office), the Ministry of Defence, and the German Luftwaffe.

Using information from this database, Zetica has published maps of UXB risk on a regional, county and borough scale. The maps indicate relative degrees of UXB risk based on available records for bombing densities and known targeted areas for regions within the UK. The risk is broken down into individual boroughs, towns or cities. The data are based on the historical boroughs and are then overlaid onto the modern map. It is important to note that more-detailed research may be required for individual sites, particularly where proximity to a potential WWII target means the local risk may be higher.

High risk

Areas designated as high risk are those that show a high density of bombing hits (50+ bombs per 1000 acres) and abundant potential WWII targets. In high-risk regions, further action to mitigate UXB risk is considered essential.

Moderate risk

Moderate-risk regions are those that show a bomb density of between 11 and 50 bombs per 1000 acres and that may contain potential WWII targets. Action to mitigate the risk is considered essential, albeit more likely that a reduced scope of work is required compared with that needed for high-risk regions.

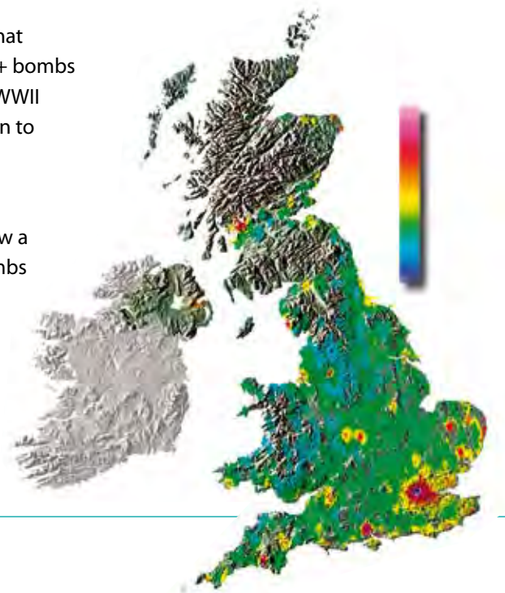
Low risk

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

Other WWII targets

Other regions with the risk of UXBs are key strategic points as defined by the government during WWII as representing potential enemy targets. Where these exist outside areas mapped as high, moderate or low risk, a site-specific assessment of the UXB risk may be required.

Relative UXB risk across UK



What to do if…

…you have a site that has a potential UXB risk

In the absence of current legislation requiring you to address the risk from UXBs, your responsibilities under health and safety legislation and regulations such as construction design and management require that you address all identified risks. The first stage is to request further advice from a professional adviser such as Zetica, or to gain more site-specific information by commissioning an ordnance-risk desk study. Then a strategy to deal with the risk can be established that is tailored to your proposed work.

…you find a suspect item or require advice

If during site works you find a suspect (ordnance-related) item, it is very important that you do not touch or move it (even if it has already been moved by an excavator). If it is clearly ordnance related, then dial 999 and ask for the police. Ensure that the area around the item is kept as clear as possible without placing yourself at risk. If you are unsure and do not wish to cause undue alarm, or you just require some advice, then you can call Zetica. We have experienced qualified UXB specialists on hand who can offer support and advice during any site works.

More-detailed procedures should be established in advance if you are in an area where the risk of finding a UXB is shown to be significant (moderate to high).

Site-specific desktop studies

Zetica is able to provide high-quality, site-specific UXB risk information for any residential, industrial or commercial property in the UK. These desktop studies provide details of the bombing density within an area and for the site itself, in order to indicate the risks of UXBs still being present. A risk assessment is provided to facilitate informed decision making on whether any further risk mitigation measures are required.

Coal Authority ‘Consultants Coal Mining Report’

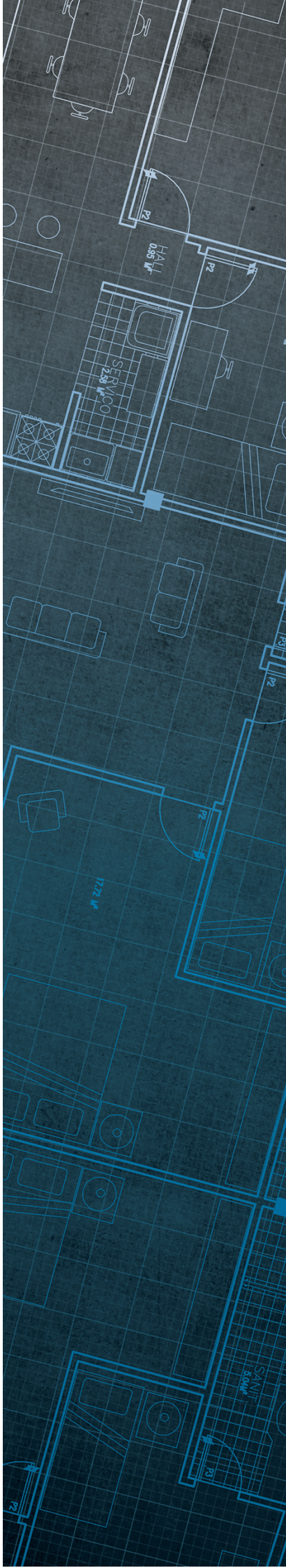
The Coal Authority

Consultants

Coal Mining Report

Land At Erlas Park, Cefn Road,
Wrexham, Ll13 9tt
Wrexham

Date of enquiry:	**12 October 2020**
Date enquiry received:	**12 October 2020**
Issue date:	**12 October 2020**
Our reference:	**51002314699001**
Your reference:	**HYD-7149853**



Consultants

Coal Mining Report

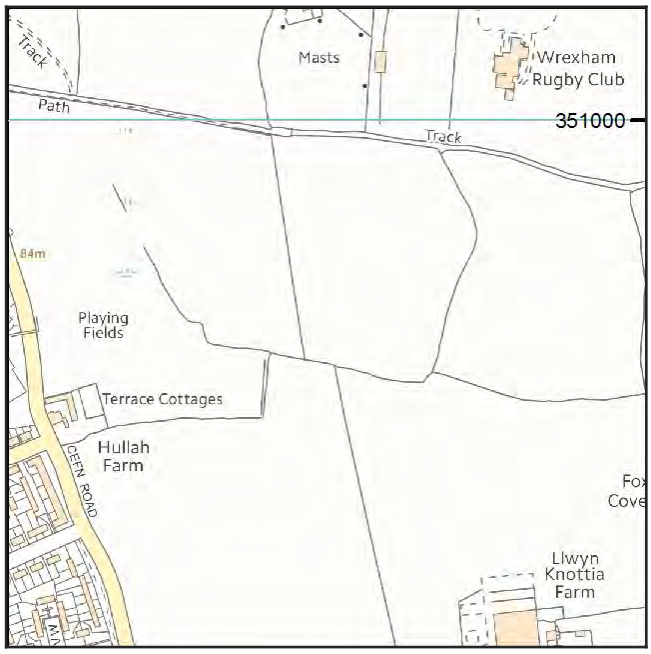
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

Land At Erlas Park, Cefn Road, Wrexham, Ll13 9tt
Wrexham



Approximate position of property

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2018. All rights reserved.

Ordnance Survey Licence number: 100020315

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	MAIN	Coal	3V3G	690	West	3.5	North-East	220	1962
unnamed	MAIN	Coal	3V3B	692	West	3.5	North-East	220	1963
unnamed	MAIN	Coal	3V3L	693	Beneath Property	3.8	East	220	1968
unnamed	QUAKER	Coal	3U69	693	West	2.7	South-East	110	1966
unnamed	QUAKER	Coal	3U5S	693	West	4.3	South-East	110	1965
unnamed	MAIN	Coal	3V3O	694	Beneath Property	4.1	East	220	1967
unnamed	MAIN	Coal	3V3I	695	Beneath Property	5.6	North-East	220	1970
unnamed	MAIN	Coal	3V3N	697	South-West	4.1	East	220	1970
unnamed	MAIN	Coal	3V5C	700	West	2.3	East	220	1969
unnamed	MAIN	Coal	3V3S	702	South	3.6	East	220	1972
unnamed	MAIN	Coal	3V59	703	South-West	3.9	East	220	1970
unnamed	MAIN	Coal	3V5A	705	West	1.8	North	220	1966
unnamed	MAIN	Coal	3V3C	722	North-West	4.3	East	220	1960
unnamed	MAIN	Coal	3V3P	731	Beneath Property	6.5	North-East	220	1970
unnamed	MAIN	Coal	3V3Q	737	East	7.4	East	220	1972
unnamed	MAIN	Coal	3V3K	748	East	5.9	East	220	1973
unnamed	MAIN	Coal	3V3H	754	East	5.9	North-East	220	1973

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Copyright © 2020 The Coal Authority

Abandoned mine plan catalogue numbers

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

NW693	NW694	

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

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Copyright © 2020 The Coal Authority

Section 2 – Investigative or remedial activity

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

Site investigations
None recorded within 50 metres of the enquiry boundary.

Remediated sites
None recorded within 50 metres of the enquiry boundary.

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

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

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

Mine gas
None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes
None recorded within 500 metres of the enquiry boundary.

Copyright © 2020 The Coal Authority

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

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

Withdrawal of support notices
The property is in an area where a notice to withdraw support was given in 1949.

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

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Copyright © 2020 The Coal Authority

Section 4 – Further information

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

Development advice

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

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

Section 5 – Data definitions

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

Past underground coal mining

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

Probable unrecorded shallow workings

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

Spine roadways at shallow depth

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

Mine entries

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

Abandoned mine plan catalogue numbers

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

Outcrops

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

Geological faults, fissures and breaklines

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

Copyright © 2020 The Coal Authority

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

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

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

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

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

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

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

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

Copyright © 2020 The Coal Authority

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

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

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

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

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

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

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

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

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

Copyright © 2020 The Coal Authority

The Coal Authority

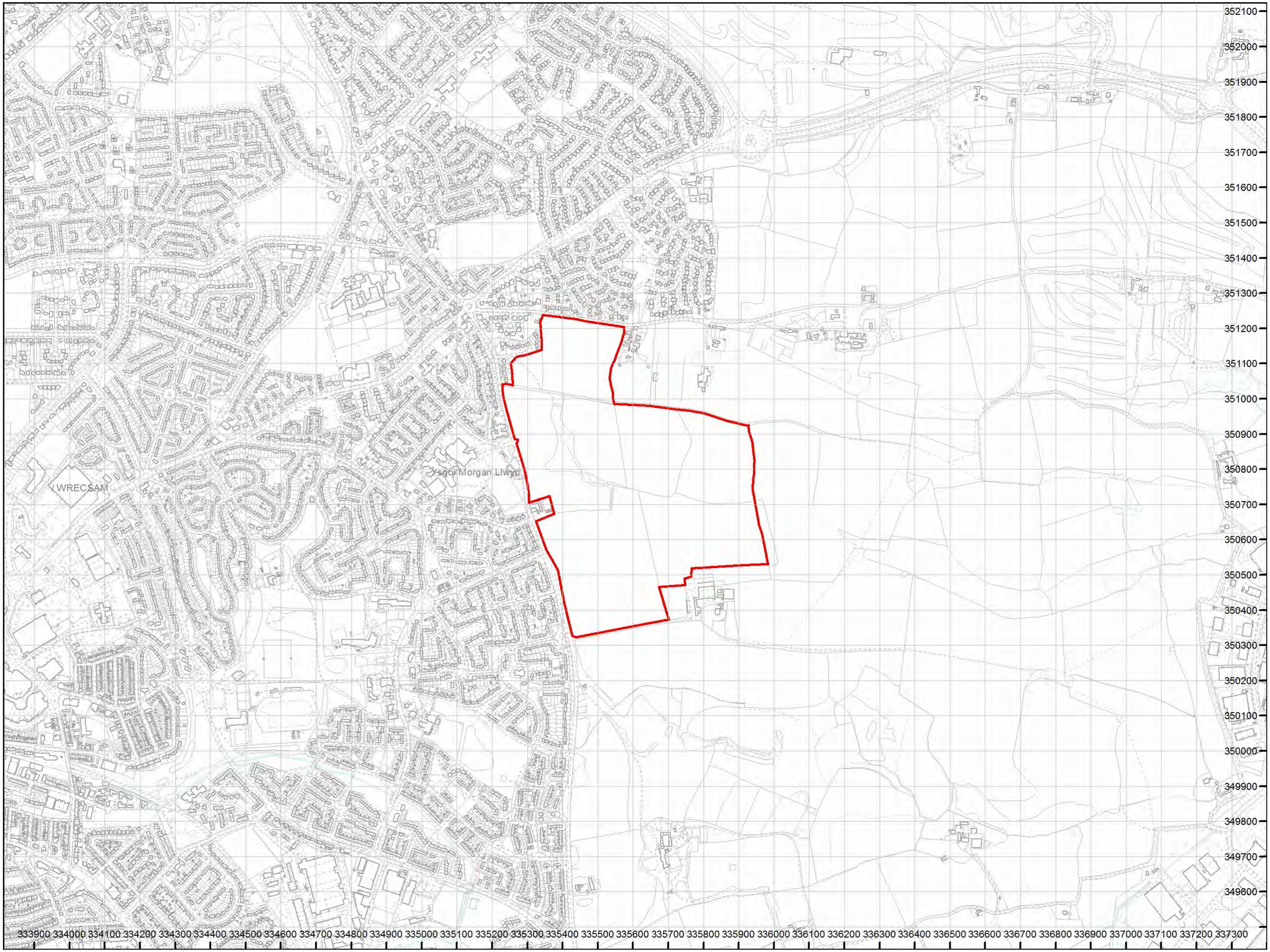
Summary of findings

Reproduced by permission of Ordnance Survey on behalf of HMSO.
© Crown copyright and database right 2018. All rights reserved.
Ordnance Survey Licence number: 100020315

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

Key

Approximate position of the enquiry boundary shown



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

Appendix E

Preliminary Geotechnical Risk Register

Geotechnical Hazard Identification – Desk Study Stage

Potential geotechnical hazards have been assessed in accordance with the general requirements of ICE/DETR Document 'Managing Geotechnical Risk' and the HE documents HD 41/15 and CD 622. The following pages set out the identified geotechnical risks and hazards which are associated with the proposed development and establish the approach which is to be taken to manage the risks including the geotechnical input and analysis.

Table E.1 is a preliminary assessment of possible geotechnical hazards at the site at Desk Study stage. This information is used to assist with site investigation design.

Table E.1: Possible geotechnical hazards

Hazard	Comment	Hazard status based on desk study	
		Could be present and / or affect site (i.e. Plausible)	Unlikely to be present and/or affect site
Uncontrolled Made Ground (variable strength and compressibility).	Locally associated with backfilled ponds	✓	-
Soft / loose compressible ground (low strength and high settlement potential).	Within sands and gravels of the glaciofluvial sheet deposits or Glacial Till.	✓	-
Desiccation of soils, shrinkage / swelling of the clay fraction of soils under the influence of vegetation and after removal of mature trees.	Glacial Till present in the west, mature trees are close to or situated at this area. The volume change potential of the Glacial Till should be assessed.	✓	-
Extensive excavations for the removal of tree root systems.	The site is heavily vegetated and tree root systems will require removal and over excavation.	✓	-
Designing foundations to accommodate heave due to extensive tree removal.	An arboricultural survey should be undertaken. Foundation should be designed below the depth due to tree influence.	✓	-
Variable lateral and vertical changes in ground conditions.	Potential where the similar age Glacial Till meets the Glaciofluvial Sheet Deposits. Foundation may span two strata.	✓	-
High sulphates present in the soils.	Locally associated with backfill within the ponds.	✓	-
Adverse chemical ground conditions, (e.g. expansive slag).	No risk posed to site.	-	✓
Obstructions.	No previous major development onsite.	-	✓
Existing below ground structures to remain (foundations of footbridge in the south west).	Footbridge likely to remain.	✓	-
Shallow groundwater.	Within the sand and gravels.	✓	-

Hazard	Comment	Hazard status based on desk study	
		Could be present and / or affect site (i.e. Plausible)	Unlikely to be present and/or affect site
Changing groundwater conditions.	Due to granular nature of the superficial deposits seasonal groundwater variations may occur.	✓	-
Risk from erosion.	No risk posed to site.	-	✓
Risk from flooding.	Groundwater flooding risk is moderate across the majority of the site.	✓	-
Loose Made Ground or Glaciofluvial Sheet Deposits, leading to difficulty with excavation and collapse of side walls.	The density of the Made Ground and Glaciofluvial Sheet Deposits requires assessment.	✓	-
Slope stability issues – general slopes.	Unlikely to pose a risk to site.	-	✓
Slope stability issues – retaining walls.	No risk posed to site.	-	✓
Earthworks – settlement (due to placement of fill on soft / loose ground).	The suitability of site won soils for use as fill requires assessment.	✓	-
Earthworks – poor bearing capacity of new fill.	The suitability of site won soils for use as fill requires assessment.	✓	-
Earthworks – unsuitability of site won material to be reused as fill.	The suitability of site won soils for use as fill requires assessment.	✓	-
Solution features in Chalk.	No risk posed to site.	-	✓
Cavities in the Superficial Deposits due to solution features.	No risk posed to site.	-	✓
Dissolution (associated with “wet rock head”).	No risk posed to site.	-	✓
Brine extraction.	No risk posed to site.	-	✓
Mining.	No risk posed to site.	-	✓
Cambered ground with gulls possibly present.	No risk posed to site.	-	✓
Relict Slip Surfaces.	No risk posed to site.	-	✓
Solifluction.	No risk posed to site.	-	✓
Problematic soils (silts and rewetting etc.).	No risk posed to site.	-	✓

Appendix F

Plausible Source-Pathway-Receptor Contaminant Linkages

Summary of Potential Contaminant Linkages

Table F.2 lists the plausible contaminant linkages which have been identified. These are considered as potentially unacceptable risks in line with guidelines published in CLR 11 and additional risk assessment is required.

Source – Pathway – Receptor Linkages have been assessed in general accordance with guidance in CIRIA Report C552 (Rudland et al 2001) but with the addition of a 'no linkage' category (See Table F.1). More details are given in the relevant Hydrock methodology, referenced in Appendix G, including descriptions of typical examples of probability and consequences.

It should be noted that whilst the risk assessment process undertaken in this report may identify potential risks to site demolition and redevelopment workers, consideration of occupational health and safety issues is beyond the scope of this report and need to be considered separately in the Construction Phase Health and Safety Plan.

Table F.1: Consequence versus probability assessment.

		Consequence			
Probability		Severe	Medium	Mild	Minor
	High Likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Very low risk
	Low Likelihood	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Very low risk	Very low risk	Very low risk
	No Linkage	No risk			

Table F.2: Exposure model – preliminary risk assessment of source-pathway-receptor contaminant linkages

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
Made Ground, associated with backfilled pond possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials and PAHs (S01)	Ingestion, inhalation or direct contact.	Site users.	Likely	Medium	Moderate	Backfilled ponds are present in the centre and south east of the site. Due to the size of the ponds there is potential for deep Made Ground associated with the infilling of the ponds. The ground investigation should assess the depth and characteristics of Made Ground within the backfilled ponds Chemical analysis should be undertaken on the Made Ground to confirm if mitigation measures will be required to break the SPR linkage.
		Root uptake.	Unlikely	Medium	Very Low	
		Water supply pipes.	Unlikely	Medium	Very Low	The location of the backfilled ponds is localised. Therefore, it is unlikely that services will be laid within these areas
	Inhalation of fugitive dust.	Neighbours.	Low likelihood	Medium	Low	The risk of significant generation of dust is likely only during site development process and can therefore be controlled. The Made Ground should be tested for non-visible asbestos loose fibres to confirm no further mitigation is required.
		Site users.				
	Leaching through unsaturated zone.	Groundwater in the Secondary A aquifer in the superficial deposits.	Low likelihood	Medium	Low	There is potential for deep Glaciofluvial Sheet Deposits underlying the site >20m thickness with cohesive bands inhibiting vertical migration of groundwater. The site is not within a groundwater source protection zone and there are no groundwater abstractions within 1km of the site. Any leachable contaminants will likely be diluted to lower concentrations prior to them reaching any receptors. On the site walkover it was noted that the current pond onsite was in poor condition with algal bloom. Therefore, it is unlikely that chemical conditions will worsen in the pond from the migration of leachable contamination. Leachate testing should be undertaken on sample of Made Ground or groundwater samples collected from installed boreholes within the Made Ground from the backfilled pond to confirm very low to low risk.
	Base flow from contaminated groundwater.	Aquatic ecosystems and Surface waters within onsite pond.	Low likelihood	Minor	Very Low	

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
Ground gases (carbon dioxide and methane) from organic materials in the Made Ground associated with the backfilled pond. (S02)	Migration, build up and asphyxiation. Migration, build up and explosion	Site users.	Likely	Medium	Moderate	It is anticipated that Made Ground will be present associated with the backfilled pond. The location and size of the backfilled ponds is unlikely to generate a volume of ground gas to pose risk to offsite receptors. The gas generation is anticipated to be localised in the vicinity of the backfilled ponds. Ground gas monitoring will be undertaken within installed boreholes in the vicinity of the proposed dwellings to confirm risk.
		Neighbours.	Low likelihood	Medium	Low	
Pesticides (organochlorine or organophosphates) spread across the farmland to the east and south west to aid the growth of corn (S03)	Ingestion	Site users.	Low likelihood	Medium	Low	It is likely that pesticides will have been used during the growth of corn within the farmland. However, it is anticipated that the volume of pesticides and infrequency of use will results in the degradation and dilution of pesticides following their use. Samples of soils and groundwater should be tested for the presence of OCP and OPP to confirm the low risk.
	Leaching through unsaturated zone.	Groundwater in the Secondary A aquifer in the superficial deposits.	Low likelihood	Medium	Low	
Radon (S04)	Inhalation.	Site User	Likely	Medium	Moderate	The radon map within the environmental report indicates that 3-5% of homes are above the action level and basic radon protection measures are required for new buildings at this location in line with current guidance.

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
Hydrocarbon fuels from the unspecified tank adjacent to the north west including leakage from the Tank, general spillage, together with uncontrolled disposal and spillage from waste receptacles. (S05)	Leaching through unsaturated zone.	Groundwater in the Secondary A aquifer in the superficial deposits.	Low likelihood	Medium	Low	Due to the permeability of sand and gravels there is a possibility for a horizontal migration of fuel spillages from the unspecified tank adjacent to the north west of the site. However due to the likelihood for aerobic conditions within the sand and gravels and potential age of any dissolved or light non-aqueous phase liquids pre 1980s, 30 years of natural attenuation will likely have occurred degrading any present contaminants to lower concentrations. The ground investigation will need to ensure no shallow entrained petroleum hydrocarbon are present below the site. Testing will be undertaken within the Glaciofluvial Sheet Deposits to ensure there are no elevated concentrations of petroleum hydrocarbon. Ground gas monitoring will be undertaken to ensure no gas production is occurring from degrading hydrocarbons.
	Vapours	Site users.				

Appendix G

Hydrock Methodologies

This appendix provides additional background information on certain approaches and methods used by Hydrock Consultants Limited in the preparation of this report.

The following Hydrock Methodologies apply to this report. These are not included, but are available on request by quoting the methodology reference, revision and date.

Reference	Name	Revision	Date
001	Desk Study	001	30/07/2018