CONSULTING ENGINEERS

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PROPOSED RESIDENTIAL DEVELOPMENT MAELOR PLACE, RUABON, WALES FOR WALES AND WEST HOUSING

DECEMBER 2013

PHASE I & II GEO-ENVIRONMENTAL INVESTIGATION REPORT

13104

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EXECUTIVE SUMMARY

Site	*Approximately 0.51ha in area and located off High Street, in the village of Gwynfryn*
NGR	*330320, 343930.*
Site History	*The site has a recorded history as being formerly a hospital from late 19th century to mid 20th century and then as a magistrates court and police station.*
Investigations	*The investigations have extended to:-* • *Intrusive investigations by window sampler boreholes* • *Chemical analyses of soil samples* • *Assessment of results*
Ground Conditions	*Made ground comprising a sandy / gravelly, ashy, brick fill was encountered generally as a thin horizon 0.2 - 0.6m thick with locally thicker deposits to 2.25m bgl. Natural glacial deposits comprising brown gravelly silt and sand and gravels. The depth of the deposits has not been proved.*
Environmental	*Chemical testing has confirmed the made ground contains some slightly elevated concentrations of lead, arsenic and B(a)P within the made ground.*
Trees	*The site contains a number of trees all of which are located at the main boundaries and are assumed to be retained as part of the development proposals. The ground conditions within the site are assessed to be not susceptible to volume change and not prone to tree root effects. However, if clay is encountered in foundation excavations then localised tree root precautions may be required. The limited clays in the site have a LOW volume change potential.*
Foundations	*Strip footings formed on natural firm stiff silt, clay and sands and gravel strata with a safe bearing capacity of 100kN/m^2 at a minimum depth of 0.9m but generally varying between 0.9 – 1.5m below ground level. Reinforcement is required in all foundations to protect against possible minor ground movements associated with nearby geological fault.*
Slabs	*Suspended ground floor slabs are recommended for all plots. All plots require Basic radon gas precautions within the ground floor construction.*
Remediation	*Made ground should be removed from the site in locations where coincides with gardens and open space and replaced with imported topsoil from a certified source. Imported topsoil should be independently validated. Basic radon precautions required*

This brief summary should not be assumed to represent a complete account of all the potential geo-environmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.

GEO-ENVIRONMENTAL INVESTIGATION WORKS

MAELOR PLACE,

RUABON

1.0 INTRODUCTION

1.1 Instructions

1.1.1 We are instructed by Wales and West Housing, Flint Office, Unit 2, Acorn Business Park, Aber Road, Flint, CH6 5YN to undertake a program of ground investigation works at the site off Maelor Place, Ruabon which they intend to redevelop in a residential manner. Our clients will also adopt the findings of this report to inform their purchase of the site.

1.2 Object

1.2.1 The object of these investigations is as follows:

- *to determine the engineering properties of the soils present within the site to form a basis upon which foundation and general infrastructure recommendations and design may be based;*
- *to enable sufficient information regarding ground conditions to be obtained from which risks to end users and the environment can be assessed; and*
- *to utilise the information obtained from the investigations to provide recommendations for remediation measures where required.*

1.3 Scope

1.3.1 The investigations considered within this report have comprised of the following elements:

- *An initial environmental and engineering desk study based upon existing reports, services location information, geological, hydrogeology and hydrological information, a commercially available database and old Ordnance Survey maps;*
- *An initial walkover survey of the site to determine the presence of any visible hazards or features which may affect the design of the ground investigation works;*
- *Intrusive ground investigation works utilising window sampling techniques by specialist contractors;*
- *Assessment of the presence, nature and extent of any soil and groundwater contamination at the site;*
- *Assessment of any potential coal mining or brine subsidence issues;*
- *Determination of the presence of any toxic or explosive gasses from areas of infilling within or adjacent to the site;*
- *Appraisal of the engineering properties of the soils present within the site to form a basis upon which recommendations for foundations and infrastructure construction may be based; and*
- *Identification of the potential requirements for any remedial action, where required.*

1.4 Development Proposals

1.4.1 Our client is currently considering a planning application for the redevelopment of this site. We understand that this report is required to support the planning application and form a basis upon which the site may be developed. We have been provided with a copy of the architectural development proposals and these indicate that the site will be developed by the construction of a series of residential properties including private garden areas along with associated roadways and hard standings.

1.5 Services

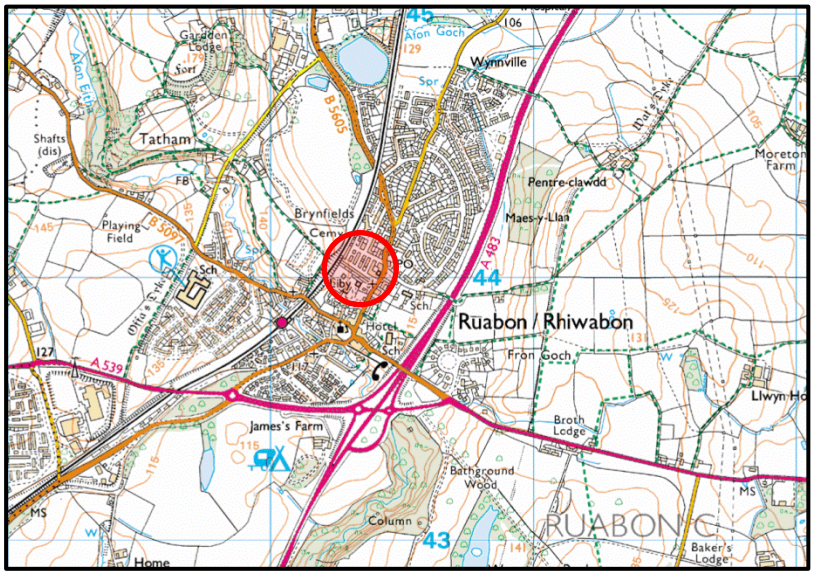
1.5.1 Information regarding the presence of live public services has been provided by our client. The site currently comprises the former council offices, public convenience block, open space with grass and trees, hardstanding for parking and road access to the building. The service plans indicate that live public services enter the site with the majority of them running within the confines of Maelor Place itself to serve the council offices.

2.0 THE SITE

2.1 Location

2.1.1 The site is irregular in shape and extends to an area of 0.51 hectares. It is situated to the west of High Street, Ruabon in the centre of Ruabon. The site is situated at approximate National Grid Reference 330320, 343930. The site location and shape are shown in figure 1 below.

Figure 1 - Site Location



2.2 Boundaries

2.2.1 The boundaries to this site are reasonably well formed but in places indistinct and uncertain. Generally the boundaries are formed by existing site and highway features as detailed upon the appended walkover survey plan. To the east the site is effectively bounded by Ruabon High Street with the highway known as Maelor Place extending through the southern portion of the site towards the west.

A further highway extends from Maelor Place towards other buildings and features which are outside the site area. This highway is to be maintained throughout the development process and whilst it is included within the site area it will remain an important access route for users of residential and institutional buildings to the north of the site. Generally the remaining boundaries to the site are formed against surrounding residential, commercial and institutional buildings and car parking areas etc.

2.3 Access

2.3.1 At the time of the site investigation pedestrian and vehicular access to the site was via Maelor Place from the main road (High Street) to the west.

2.4 Topography

2.4.1 The site topography is generally flat at an elevation of circa 118 - 120m Above Ordnance Datum (mAOD).

2.5 Site Conditions

2.5.1 At the time of the investigation the site comprised the former council offices, NHS clinic, public convenience block, open space with grass and trees, hardstanding for parking and road access to the building

2.6 Trees

2.6.1 Within the central landscaped area of the site there are a significant number of mature and semi-mature trees which are likely to lie within influencing distance of proposed structures.

2.6.2 It is strongly recommended that all trees within the site along with those which are situated outside the site but within potentially influencing distance should be subject to an arboriculturist report. This report should identify the tree species and existing heights so that this information may be utilised within the foundation design process as required.

2.7 Walkover Survey

2.7.1 A site walkover was undertaken on the 14th October 2013 in order to determine the condition and environmental assessing of the site. At the time of the walkover survey the weather conditions were overcast and damp.

2.7.2 The walkover survey has confirmed that the vast majority of the site is already in a developed condition. A block of public toilets is located immediately adjacent to the western boundary along with an associated car parking area. This car park is surrounded by soft landscaped areas of grass and trees. To the south of Maelor Place there is a further soft landscaped area. The western portion of the site contains a large single storey building situated immediately adjacent to the western boundary and which has been utilised as the former council offices but was originally constructed as a Police Station. Here again this building is associated with large areas of adjacent car parking space and hard standings with more minor localised areas of soft landscaping.

2.7.3 As indicated previously, the site contains a public highway which gives access to residential and institutional buildings to the north and west of the site. We anticipate that this roadway will continue in full usage throughout the development process.

2.7.4 The walkover survey has confirmed the presence of a number of mature and semi mature trees which are associated with the soft landscaped area to the east of the site. It is anticipated that many of these trees will be retained as environmental features to the proposed redevelopment. It is however strongly recommended that an arboriculturist report should be undertaken upon all trees within and adjacent to this site prior to any development works taking place.

2.7.5 Further details of the site features apparent at the time of the walkover survey are indicated upon appended drawing number 13104/02 which is appended to this report for reference.

3.0 DESK STUDY

3.0.1 As part of our environmental desk studies we have commissioned an Enviro-Insight report by Groundsure which gives details of all recorded environmental features relating to the site and its immediately surrounding area. We have also obtained copies of all available old Ordnance Survey maps for the area and these give some historical guidance regarding the former usage of the site area and its immediate vicinity. A Geo-Insight report has also been commissioned which assesses the geological structures within the general area of the site.

3.1 Licensed Discharges

3.1.1 The Enviro-Insight report identifies six licensed discharge consents to a water body within a 500m radius of the site. Two of the consents have expired. A single Water Industry Referral (potentially harmful discharges to the public sewer) is recorded within 500m of the site. This is licensed to Supastrip limited at approximately 218m to the south west.

3.2 Pollution Incidents

3.2.1 The Enviro-Insight report identifies one pollution incident within a 250m radius of the site. The incident occurred on 19/08/2003 approximately 131m to the west of the site. The pollutant comprised Construction and Demolition Materials and Wastes. The impact to land was category 3 (minor), whilst impacts to air and water were Category 4 (No impact).

3.3 Landfill Sites

3.3.1 The Enviro-Insight report confirms that there are three records of landfill sites lying within a 250m buffer zone of the study site area. The nearest recorded landfilling activity is an environment agency historic landfill site located 197m and 332m north of the site of interest. These are indicated as being permitted under the Environmental permitting Regulations (Waste) as landfill type A4: Household, Commercial & Industrial Waste Landfill. Its status is recorded as Closure. The remaining entry is at a distance of 223m to the north which was Waste type: Industrial, Commercial and Household. The licence was issued in 1977 and has since been surrendered. From a review of the historical plans these probably relate to the same landfill, but with different operators / permits over time.

3.3.2 Given the intervening land use, railway lines, cuttings and anticipated geological strata between the boundary of the landfill site and the proposed development area it is considered that these will reduce the likelihood of potential lateral migration. The intervening superficial deposits are identified as being Devensian Till, which is identified as being an Unproductive Aquifer with low permeability deposits. Thus, it was considered unlikely that the risk posed to the site from the lateral migration of landfill gasses will be very low and as such a program of gas monitoring is not required.

3.4 Current Land Uses

3.4.1 The environmental report has confirmed that their records indicate the presence of five potentially contaminative industrial sites within 250m of the study area. These potentially contaminative industrial sites include:-

- *An electricity substation 64m south west of the site;*
- *An electricity substation 120m south east of the site;*
- *Mechanical Engineers 129m south west of the site;*
- *An electricity substation 199m north of the site*
- *Ruabon Train Station located 236m south west of the site;*

3.4.2 There are two records of a petrol or fuel storage sites located within 500m of the study site. The closest is located approximately 272m east of the site and is classed as obsolete. The second is located 458m north east and classed as a currently working petrol station.

3.4.3 There are no records of any high pressure underground pipelines within 500m of the study site. Given that the closest petrol filling station is identified as obsolete, it is considered that the tanks should have been decommissioned and thus does not represent a risk to the proposed development. The second petrol filling station is considered to be sufficiently remote so as not to represent a potential hazard in terms of laterally migrating hydrocarbons.

3.5 Hydrogeology & Hydrology

3.5.1 The Groundsure Enviro-Insight report shows that there are no records of productive strata within the superficial geology underlying the site of interest.

3.5.2 The site is located across two types of superficial deposits which are classified as a Secondary A (undifferentiated) Aquifer in the south-eastern section and Unproductive Aquifer in the north-western section. In general the Secondary A Aquifer were previously designated as minor aquifer and provide permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming and important source of base flow to rivers. The Unproductive Aquifer is classed as deposits with low permeability that has negligible significance for water supply or river base flow. Underlying, the superficial deposits is bedrock classed as Secondary A Aquifer. The proposed redevelopment of this site on a residential basis is not considered to represent a potential hazard to the Secondary A aquifer or other groundwater, any subsequent remediation and development of the site should not allow any potential contaminants such as fuel oils etc. to be discharged to the ground. Appropriate management techniques should be utilised at all times

3.5.3 The Enviro-Insight report confirms that there is no groundwater abstraction licences granted within 1000m of the site of interest. Other licences relate to groundwater abstractions situated in excess of 1000m at 1767m and 1919m from the study site and are not shown on the maps. It is not anticipated that the redevelopment of this site will raise any potential contamination issues to these water abstraction points.

3.5.4 The Enviro-Insight report confirms that there are no potable water abstraction licenses within 2000m of the site of interest.

3.5.5 The Enviro-Insight report confirms that there is no surface water abstraction licences granted within 2000m of the site of interest.

3.5.6 The Enviro-Insight report also confirms that a primary river, the Afon Eitha is located some 155m south of the site. The Afon Eitha is also identified approximately 275m and 462m south of the site boundary. An unnamed tertiary river is located 499m south east of the site.

3.5.7 Chemical quality data is provided for the Afon Eitha sampled at a distance of 159m from the study site. The latest available data is for 2008, which identified a Chemical Quality Grade A (Very Good).

3.6 Flooding

3.6.1 The Enviro-Insight report confirms that the site is within 250m of an Environment Agency indicative Zone 2 and Zone 3 flood plain. These are both located approximately 152m south of the site boundary.

3.6.2 There are no flood defences or areas benefiting from flood defences within 250m of the study site, it is also recorded that there are no areas used for flood storage within 250m of the study site.

3.6.3 Groundwater flooding susceptibility areas are located within 50m of the site boundary with the higher susceptibility to ground water flooding being classed as high and the confidence in this rating also being classed as high.

3.7 Environmentally Sensitive Sites

3.7.1 The Enviro-Insight report confirms the presence of designated environmentally sensitive sites within 2000m of the study site and confirms that there are 3 sites of special scientific interest (SSSI) within 2000m of the study site along with 3 special areas of conservation (SAC) also within 2000m of the study site. The report confirms a further 8 records of ancient woodlands and one record of a world heritage site within 2000m of the study site.

3.8 Geology

3.8.1 The environmental report confirms that there are no records of artificial/made ground within 500m of the study site area.

3.8.2 The site lies on a superficial deposit boundary, with the superficial deposits in the north western section of the site comprising Devensian Till which consists of sandy boulder clays with interspersed lenses and bands of sand and gravels. The south-eastern section comprises glaciofluvial deposits of sand and gravels.

The permeability of this superficial ground within the study site boundary is classified as being from low to very high.

3.8.3 The British Geological Society (BGS) indicated that there is one borehole record for the site and another two within close proximity to the site. These were drilled in 1964 and recorded the shallow geology to a maximum depth of 4.87m below ground level. The lithology comprised dry sand and gravel with traces of clay and occasional boulders.

3.8.4 The solid geology at the site comprises the Etruria Formation of Westphalian (Carboniferous) age which predominantly comprises dark, grey mudstones.

3.8.5 A geological fault is indicated to lie within the general vicinity of the site, located approximately 13m east of the site boundary. The fault trends approximately north / north east to south / south west. The fault is not identified on the site, but given that the fault is inferred due care should be given, especially at the eastern section of the site.

3.8.6 The site is classified as being in a radon affected area as between 3 and 5% of properties are shown above the action level for radon gas emission. Accordingly basic radon protective measures are necessary in any properties or extensions to properties considered upon this site.

3.8.7 The site is indicated to lie within an area which may have been subject to coal mining activity in the past. Accordingly it has been recommended that a Coal Authority report should be obtained for the site. A copy of the Coal Authority report is appended to this report for reference.

3.8.8 The Coal Authority has indicated that the site is located within the likely zone of influence from workings in 1 seam of coal at 570m depth, which was last worked in 1927. Any ground movement from these coal workings should have stopped by now. The site is not located within the zone of influence of any present underground coal workings. The Coal Authority has also indicated that there are no known coal mine entries within, or within 20m of, the site boundary. The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50m of the site boundary since 31st October 1994. Coal mining operations are therefore considered to represent an unlikely hazard at this site and no further investigations or precautions are required in terms of coal mining. However, details of the Coal Authority response should be consulted and read in full.

3.8.9 The geological report confirms the presents of a significant number of surface ground workings within the area surrounding the site. The closest recorded surface ground working feature is located approximately 46m and 77m south west of the site, and is classified as a Grave Yard dating from 1873. Further surface ground works are noted 50-58m northwest relating to cuttings, for the railway line dating from 1873 - 1993 and a cemetery 103-113m northwest of the site. The geology report also confirms the presence of a number of underground workings, the closest relating to an unspecified old shaft which was located 410m north of the site. Further entries are noted some 751m to the north of the site relating to a colliery. A colliery and disused mine are also noted approximately 772m to the south west of the site.

3.8.10 The BGS provided the following information that the site is located in a non-coal mining area. This relates to Vein Mineral commodity, however the assessment of the likelihood of it occurring is classed as Rare – infrequent minor mining may have occurred but restricted in extent.

3.8.11 The geological report also presents an estimation of the background soil chemistry within the site area. Reference to the data presented suggests that soil concentrations are generally anticipated to be below current tier 1 assessment criteria in relation to human health effects for the site itself.

3.8.12 Natural Ground Subsidence issues relating are all classed as negligible or very low for the following; Shrink – Swell Clays, Landslides, Ground Dissolution of Soluble Rocks, Compressible Deposits, Collapsible Deposits and Running Sands.

3.9 Site History

3.9.1 A review of the available historical maps indicates the following features on and off site. These are provided in table 1 below:-

Table 1: Review of Historical Maps

Date	Site	Adjacent Land
1873	*The site comprises greenfield with trees noted.*	*Immediately north of the site is open fields with a house named Bryn approximately 200m north. To the east is the main north south road with a row of housing and further east open fields. To the south and south west of the site are houses, the main village of Ruabon and 100m to the south is St Marys Church and a graveyard 75m southwest. To the west are open fields with a railway and cutting approximately 100m distant. A cemetery is marked beyond the railway. Approximately 500m to the north is Tatham Brick & Tile works. Offas Dyke trends northeast – south west approximately 600m to the northwest of the site. Wynstay Colliery is noted approximately east of the site 1000m south west of the site.*
1899	*A hospital has been developed in the south-eastern portion of the site fronting High Street. The northwestern section remains largely undeveloped greenfield, with a small rectangular building on the southern boundary.*	*Development has occurred approximately 50m to the north of the site with housing and roads, identified as Brynfields. Further housing is present to the east of the site, but largely the surrounding area remains unchanged.*
1900	*No significant changes.*	*In the wider surrounds, the Brick & Tile works has expanded. Terra Cotta Brick & Tile Works is now present approximately 750m to the north with additional clay pits identified further north. Wats Dyke is noted approximately 750m east of the site.*
1910	*No significant changes.*	*No significant changes.*
1912	*No significant changes.*	*No significant changes.*
1914	*No significant changes.*	*Partial map with no significant changes noted.*
1938	*No significant changes.*	*Partial map with further expansion of the brick works to the north west of the site noted.*
1949	*No significant changes.*	*No significant changes noted.*
1960	*No significant changes. Minor small building added to rectangular building on southern boundary.*	*Immediately northeast of the site, two buildings are shown and a statement 'Bronze Age Burial Found'. Further northeast, extensive residential development is noted and Ruabon County Primary School is located some 125m east of the site.*
1961	*No significant changes.*	*No significant changes.*

Table 1: Review of Historical Maps		
Date	**Site**	**Adjacent Land**
1964	*Map left blank*	*No significant changes.*
1968	*Hospital building no longer present. A small rectangular building present in same location, fronting High Street*	*Partial map, no significant change. In the wider area, the brickworks 750m to the north indicate a large pond and extensive workings extend to within 400m of the northern site boundary.*
1977	*Map left blank*	*Partial map. In the wider surrounds, residential development beyond the railway to the west is noted.*
1978	*Small rectangular buildings no longer present along eastern boundary or southern boundary. The north-western section has been developed into Police Station and Magistrates Court and path / roadways noted across the site.*	*Minor development with a library adjacent to the north of the site, Wynstay Arms Hotel annotated some 90m to the southeast and a community centre 120m southeast. Police houses are noted adjacent to the eastern boundary.*
1985	*Map left blank*	*No significant changes.*
1989	*Minor changes with the addition of small building fronting High Street identified as PCs (Public Conveniences.*	*No significant changes. Minor housing developed to the south east of the site.*
1992	*No significant changes.*	*No significant changes.*
1994	*No significant changes.*	*The pond located 750m to the north associated with the brickworks is now annotated as Monks Pool. The area of former brick works now extended to within approximately 200m of the northern site boundary and indicated as being 'Disused Workings'.*
1995	*The map is left blank*	*No significant changes.*
2002	*No significant changes.*	*The 'Disused Workings' are now shown stippled, potentially indicating infilling.*
2012	*No significant changes to configuration. Areas of grass noted on eastern section and Police Station now identified as Council Offices.*	*No significant changes. The potentially infilled former brickworks no longer identified on the maps.*

3.9.2 Careful appraisal of available historical information has confirmed that the site was originally greenfield until the development of a Hospital building in the eastern section of the site from between 1873 and 1899. This was present until the mid-1960's when the hospital was removed. Site plans provided by the client indicates working drawings for a new Police Station and Magistrates Court dated November 1965, to the rear of the site (adjacent to the north-western boundary). It is considered likely that the building was built around this time. Subsequently a Public Convenience block was developed on the eastern boundary, fronting High Street. Issues potentially arising from the site history comprise the following:

- *Previous usage as a Hospital, with potential for presence of boiler house;*
- *Presence of fuel tanks within the building, noted on working plans dated November 1965. Located on the western boundary, see appended site drawings;*
- *Substantial structures below ground from previous developments (hospital) and current buildings;*

- *The presence of a historical Bronze Age Burial Find identified on the north eastern boundary (outside development boundary); and*
- *Offsite there is a large landfilled area corresponding with the former workings of the brickworks. The closest point being approximately 200m to the north.*

3.10 Anticipated Ground Conditions

3.10.1 Based upon the information obtained during the initial desk study, the anticipated ground conditions are expected to comprise of strata as detailed in table 2 below.

Table 2: Anticipated Ground Conditions	
Ground Material	***Anticipated Condition***
Made Ground	*Made ground is anticipated across parts of the sit, due to former buildings being present onsite.*
Superficial Deposits	*Glacial tills consisting of sandy, gravely, cobbley clays, boulder clays with interspersed lenses and bands of sand and gravels.*
Bedrock	*Shallow bedrock may consist of the Etruria Formation which are primarily mudstones*
Ground Water	*It is considered that perched water may be present within the underlying permeable sand & gravel superficial deposits.*
Mine Workings	*Coal mining activity is considered to be an issue in the surrounding area. The Coal Report did not identify specific issues with regards to the site.*

3.10.2 Based upon the data available within the Desk Study and tables 1 and 2 above, potential ground related issues associated with the proposed redevelopment of this site are likely to include the elements noted in table 3 below.

Table 3: Potential Ground Related Issues		
Type of Issue	***Site Specific issue***	***Remarks***
Potential on Site Contamination Sources	1. *Potential contamination generated from former usage as hospital.* 2. *Potential for demolition fill* 3. *Fuel storage in Police Station*	1. *Potential contamination from ash, heavy metals, fuels etc.* 2. *Desk study information* 3. *Refer to desk study drawings*
Potential off Site Contamination Sources	1. *Landfill site located circa 200m to the north*	1. *Refer to desk study, intervening geology considered to be Devensian Till with potentially low permeability*
Potential Geotechnical Hazards	1. *Soft / loose ground* 2. *Trees* 3. *Relict foundations*	1. *Sands and gravels within the superficial deposits* 2. *Indicated on walk over survey plan* 3. *Previous buildings and buildings to be demolished*
Other Potential Constraints	1. *Archaeological* 2. *Geological fault on eastern boundary*	1. *Bronze Age Burial noted immediately adjacent to site.* 2. *Refer to desk study information*

3.11 Preliminary Conceptual Model

3.11.1 The information presented within this Desk Study section of this report has been used to compile a preliminary conceptual model for the site. In order for any contamination to represent a significant risk to human health or the environment, there has to be a complete 'pollutant linkage'. The process of identifying pollutant linkages and of assessing the significance of each linkage is based on 'contaminant-pathway-receptor' methodology.

- *a **contaminant** (source) is a substance which is in, on or under the land and which has the potential to cause harm or cause pollution of controlled waters*
- *a **receptor** is either (a) a living organism, a group of living organisms, an ecological system or piece of property and is being or could be harmed by a contaminant or (b) controlled waters that are being or could be polluted by a contaminant.*
- *a **pathway** is one or more route(s) or means by or through which a receptor (a) is being exposed to or affected by a contaminant or (b) could be so exposed or affected. As stated above, there has to be a complete contaminant-pathway-receptor pollutant linkage for there to be the possibility of any risk of harm.*

3.11.2 Consequently, even where a contaminant is identified, if there is no pathway for the contamination to reach a receptor, then there can be no significant risk. Furthermore, even if there is a complete pollutant linkage, it is possible that the contaminant concentration that can pass along the linkage does not represent a significant risk to human health or the environment. Central to this risk assessment process is the development of a 'conceptual model'. This is a descriptive and/or pictorial representation of the area of potential contamination, the surrounding environment and the processes acting on the contaminants by which they can move and come into contact with receptors (e.g. by leaching and migration into groundwater). Production of a conceptual model requires an assessment of risk to be made. Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences.

3.11.3 Therefore, in order to assess risk both the likelihood and the consequences of an event must be taken into account. This report adopts the methodology for risk evaluation presented in CIRIA report C552 'Contaminated Land Risk Assessment – A Guide to Good Practice', 2001. The method is qualitative and involves the classification of the following: The identified potential contaminant and receptors have been considered along with any possible pathways that may link them. The resulting pollution linkages are considered in Table 5 below. The risk classification has been estimated in accordance with the terms and definitions based upon CIRIA C552 Contaminated Land Risk Assessment, A Guide to Good Practice: 2001. The method is qualitative and involves the classification of the following:

- *The magnitude of the potential severity or consequence of the risk occurring; and*
- *The magnitude of the likelihood or probability of the risk occurring.*

3.11.4 Once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned using Table 4.

		Table 4: Comparison of Consequence against Probability			
		Consequence / Risk			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low Likelihood	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

3.11.5 In the context of regulatory definition of 'Contaminated Land' (as defined by the EPA 1990), 'very high' and 'high' risks would fall under the classification of 'Contaminated Land'. 'Moderate' risk could also potentially be classified as 'Contaminated Land' but any lower risk rating would not. Thus the following potential exposure pathways between potential and known contaminant sources based on information provided to date and receptors are tentatively identified in Table 5 below.

Table 5: Preliminary Conceptual Site Model						
Potential Source	**Potential Receptor**	**Possible Pathway**	**Probability**	**Consequence**	**Risk**	**Remarks**
Desk study indicates potential for demolition / ash fill material to be present. Potential heavy metals, fuels and	*Site personnel during construction*	*Direct contact of soils Inhalation or ingestion of soil / dust*	*Li*	*Md*	*Mod*	*Need to assess the actual ground conditions by site investigation*
	Future site users	*Direct contact of soils Inhalation or ingestion of soil / dust*	*Lw*	*Md*	*Mod /Low*	
	Surface water in the vicinity of the site	*Leaching of contaminants through drainage system*	*Lw*	*Mi*	*Low*	
	Ground water in aquifer	*Leaching of contaminants to ground water*	*Li*	*Md*	*Mod*	
	Future site users	*Vapour migration from soils*	*Ul*	*Md*	*Low*	
	Proposed buildings and services	*Direct contact with contaminated soils*	*Li*	*Md*	*Mod / Low*	
	Plants in gardens and soft landscaping	*Direct contact*	*Li*	*Mr*	*Low*	

Table 5: Preliminary Conceptual Site Model

Potential Source	Potential Receptor	Possible Pathway	Probability	Consequence	Risk	Remarks
Contaminated ground water	Site personnel during construction	Water entering excavations	Lw	Mr	Low	No significant source of potential groundwater contamination noted. Site is over Secondary A aquifer, considered to be at depth
	Future site Users	Retained surface water	Lw	Mi	Low	
Landfill gases from offsite landfill and strata below site.	Proposed buildings and occupiers	Ground gas migration into buildings	Lw	Sv	Mod	Assessment of potential ground gas issues to be undertaken
Radon gas	Proposed buildings and occupiers	Ground gas migration into buildings	Ul	Sv	Moderate/Low	Basic radon precautions required

Key: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor Hi = High, Li = Likely, Lw = Low Likelihood, Ul = Unlikely

4.0 SITE WORKS

4.1 Approach

4.1.1 Based upon the results of the initial desk study appraisal, the investigations at this site have comprised of the following:-

- Investigations have been undertaken to identify and confirm the ground conditions present over the site area and these works have included sampling of relevant strata for chemical analysis and further consideration.

4.2 Intrusive Works

4.2.1 The ground conditions at this site have been investigated by a program of window sampling. A total of ten (10 no.) window sample holes were excavated to a maximum depth of 3.45m below ground level (bgl) utilising a drive in window sampling rig in the presence of an experienced geotechnical engineer. These works have been undertaken by Geo-Ventures (UK) Ltd., who is a ground investigation specialist contractor.

4.3 Locations

4.3.1 The locations of the general investigatory window sample holes were chosen by REFA in conjunction with accessible areas of the site and avoiding below ground services in an effort to identify the representative ground conditions present across the site area. Reference was made to the desk study information and the site walkover. The locations of each window sample hole are provided on the ground investigation location plan which also indicates the site layout at the time of the investigation.

4.4 Records

4.4.1 During the investigations details of strata types, water entries, ground conditions and levels within each window sample hole have been maintained. This information has been collated into a series of window sample logs which are appended to this report for reference. During these investigations representative samples of the strata encountered have been retained for laboratory testing as required.

4.5 Targeting

4.5.1 The Environmental Desk Study has shown that the site has been developed previously since the late 19th Century with a hospital until the mid-1960's when the current site layout was developed with a Magistrates Court and Police Station. As such, the investigation comprised a combination of targeted, and non-targeted sampling regime has been adopted for these investigations in accordance with the recommendations laid down in BS10175: 2001: "Investigation of Potentially Contaminated Sites". Representative samples of the strata from within the area have also been retained for laboratory testing as required and where appropriate. The initial ground investigation strategy is detailed within table 6 below.

Table 6: Initial Ground Investigation Strategy

Exploratory Hole No.	***Target***	***Purpose***
WS01-WS10	*Generally over the site area.*	*To determine the general nature of underlying soils and geology including:* 1. *Nature, distribution and thickness of made ground* 2. *Nature, degree and extent of potential contamination* 3. *Content of unacceptable material eg biodegradable matter etc.* 4. *Suitability of the ground for the founding of structures* 5. *Engineering properties of the ground*

5.0 GROUND CONDITIONS

5.1 Topsoil

5.1.1 The investigations works have confirmed that the site contains an upper layer of topsoil material within the landscaped areas extending typically to thicknesses in the order of some 0.2 – 0.50m. Generally the topsoil is relatively sandy and contains elements of gravel.

5.2 Made Ground

5.2.1 Made ground was encountered generally as a thin horizon 0.2 - 0.6m below the topsoil or hardstanding areas. The made ground was locally thicker in two locations, WS07 to a depth of 1.40m bgl and at WS08 to a depth of 2.25m bgl. The fill material generally comprised sandy / gravelly, ashy, brick fill. No odours or visual signs of hydrocarbon contamination were noted during the investigation.

5.3 Natural Strata

5.3.1 The natural strata recorded during the site investigation comprise predominantly two main lithologies. Brown gravelly silt was encountered at four locations and typically sand and gravel was recorded underlying the silt, where present. It is considered that the superficial deposits comprises glacial till material as anticipated from the initial desk study information. Within the investigations the upper glacial till materials have been identified to extend to a depth of approximately 3.45m below existing ground level although the depth of the deposits has not been proved.

5.3.2 The visual assessment and appraisal of the natural strata present within the site area suggests that it is capable of offering a safe bearing capacity in excess of 100kN/m^2 at a minimum depth of 0.9m below ground level. Accordingly it is likely that the natural glacial till material will be suitable for the adoption of a shallow spread type foundation to traditional residential structures.

5.4 Bedrock

5.4.1 Bedrock was not encountered within any of the sampling locations.

5.5 Groundwater

5.5.1 These investigations have identified little evidence of groundwater with all investigations being undertaken in effectively dry conditions. It is therefore considered unlikely that groundwater will represent any significant difficulties to the development of this site.

5.5.2 It is possible that surface water may become perched within deeper excavations during prolonged wet weather conditions. Water which does become retained within excavations may however be removed by simple sump pumping operations. The accumulation of water within excavations is not anticipated to represent a particularly development hazard on the basis that appropriate management techniques are adopted.

5.6 Excavations

5.6.1 It is essential that personnel should not be allowed to approach or enter any excavation made upon this site unless appropriate precautions have been adopted to ensure that hazardous site instability has been prevented. This is particularly important in relation to foundation and drainage construction where operatives may be specifically required to enter deeper excavations.

5.7 Contamination

5.7.1 These investigations have noted the presence of made ground across the site with a maximum thickness of 2.25m bgl at WS08. The depth of fill was not proved at this location during the investigation.

5.8 Sampling

5.8.1 Based upon the initial site appraisal, in conjunction with the findings of the intrusive investigations, a series of representative samples of the strata encountered have been retained for chemical analyses.

This analysis has been intended to determine the potential presence of any contamination which may represent a hazard to site operatives or end users of the site. This section of the work is considered in more detail in sections 7 and 8 of this report.

5.9 Plasticity

5.9.1 A total of three (3 no.) samples of clay soil have been obtained during these investigations and returned to PSL who are a UKAS certified civil engineering laboratory. Index testing undertaken on these samples has confirmed that only one sample (WS7 - 1.50) exhibits plasticity with a plasticity index of 19%. Calculation of the modified plasticity index in accordance with the recommendations presented by the NHBC Handbook Chapter 4.2 confirms that the value is not above 20%. Accordingly the clays within this site are considered to have a LOW shrinkage potential as defined by NHBC Handbook Chapter 4.2. Majority of the strata within the site is considered not to be susceptible to volumetric change with variation in moisture content.

5.10 Landfill Gasses

5.10.1 The environmental desk study indicates three records relating to landfills within 250m of the site. These are considered to be the same landfill associated with the infilled brickworks to the north of the site. The edge of the landfill is approximately 200m distant from the study site. Given the intervening land use, railway lines, cuttings and anticipated geological strata between the boundary of the landfill site and the proposed development area it is considered that these will reduce the likelihood of potential lateral migration. The intervening superficial deposits are identified as being Devensian Till, which is identified as being an Unproductive Aquifer with low permeability deposits. Thus, it was considered unlikely that the risk posed to the site from the lateral migration of landfill gasses will be very low and as such a program of gas monitoring is not required.

5.11 SUDS

5.11.1 The superficial deposits present within this site have been confirmed to comprise of a combination of glacial till along with glaciofluvial deposits. These materials comprise predominately of firm to stiff silt deposits, though thin clay bands are also present along with more significant sand and gravel deposits. Within the areas where sands and gravels are present, it is considered that this strata may be permeable and may be conducive to the adoption of a soakaway system of surface water disposal. However, the presence of these sands and gravels is considered to represent sporadic occurrences only and are not uniform over the site area. It is recommended that a program of soakaway testing will be necessary to ascertain whether the sand and gravel deposits are suitably permeable to allow for soakaway disposal. A program of permeability testing should be undertaken in accordance with the procedures and recommendations laid down in BRED 365 2007 "Soakaway Design". If the ground conditions present within this site are proved not to be suitable or viable for localised surface water drainage, then the surface water at this site will need to be disposed of to an appropriate gravity drainage point outside the site area.

6.0 CONTAMINATION ANALYSIS & ASSESSMENT CRITERIA

6.1 Sampling

6.1.1 A total of ten (10 no.) soil samples were obtained from the topsoil and made ground strata encountered during the ground investigation and have been subjected to chemical analyses.

6.1.2 The soil sampling program has included the following elements:-

- *4 no. samples of surface topsoil;*
- *5 no. samples of made ground;*
- *1 no. sample of natural strata.*

6.2 Ground Conditions

6.2.1 The ground conditions encountered at the site comprise the following:

- *a thin upper layer of topsoil within the landscaped areas of the site;*
- *hardstanding within developed areas of the site;*
- *made ground comprising ash, cinders, gravel and brick fill; and*
- *superficial deposits comprising a gravelly silt and dry sand and gravels.*

6.3 Laboratory

6.3.1 All samples selected for chemical analysis have been returned to Exova (UK) Laboratories who are an MCERTS and UKAS accredited laboratory facility. Each sample has been subject to a range of chemical analyses to determine the concentrations of a wide range of common contaminants applicable to the former use of this site and the materials present. Details of the analysis program are shown in table 6 below. Confirmation of the UKAS and MCERTS accreditations for each test is indicated within the results which are appended to this report.

6.4 Development Proposals

6.4.1 It is understood that the proposed development will comprise a combination of residential properties to include bungalows, houses and flats with private gardens, landscaped areas and parking. As such the conditions and assessment criteria adopted for the proposed redevelopment will be based upon the most sensitive end use, i.e. residential with home grown food uptake assessment criteria.

6.5 Analysis Range

6.5.1 The initial desk study and preliminary conceptual site model indicate that the site may have been affected by contamination associated with:-

- *Made ground material from demolition of former structures*
- *Infilling of former voids and / or basements*
- *Boiler house associated with former hospital*
- *Fuel storage for the Police Station*

6.5.2 Table 7 below provides details of the analytical testing schedule for the samples obtained and tested.

Table 7: Chemical Testing Schedule		
Analysis	**Determinands**	**No. of Samples**
Metals	Arsenic, Cadmium, Chromium (total),Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Zinc	10
Inorganics	Cyanide, Soluble sulphates, Sulphide, pH, Organic matter	10
Organics	PAH – USEPA 16 suite, Phenol	10
	TPH (CWG ali / aro split)	3

6.5.3 *The samples obtained from this site were considered to be subject to a program of metals, inorganics and poly aromatic hydrocarbons (PAH) analyses. In addition 3 samples were tested for the presence of total petroleum hydrocarbons (TPH). Accordingly all samples have been placed into a 500ml wide necked brown glass jar. All soil samples have been stored in cool boxes at a temperature of approximately 4ºC (+/- 2ºC) until delivery to the selected laboratory. All sample containers were marked with the site address, window sample number, depth, date and time of sampling. All samples have been tested within the specified handling period to accord with the sampling protocol presented by Exova.*

6.6 Results

6.6.1 *Full details of the chemical analyses results are appended to this report and should be read in conjunction with the comments and recommendations regarding risk assessments etc. Summaries of the test results are presented in conjunction with current assessment criteria in Section 7 of this report.*

6.7 Risk Assessment Methodology

6.7.1 *The current UK approach to the consideration of contaminated land is based upon the principles of risk assessment. This in turn is founded upon the use of a source-pathway-target principle in order to establish the presence of a potential pollutant linkage. Our approach to the risk assessment is consistent with UK guidance and best practice. As advocated in the EA Policy Statement: Guidelines for Environmental Risk Assessment and Management a tiered approach has been adopted. This tiered approach is central to Part IIA of the Environmental Protection Act 1990 and the Town and Country Planning Act 1990.*

6.8 Site Classification

6.8.1 *Given the proposed development plans the site usage has been considered on the basis of an end use of residential as defined EA Science Report SC050021/SR3 2009 in relation to the most recent soil guideline values.*

6.9 Assessment Criteria

6.9.1 *The concentrations of contaminants within the ground have been compared to a range of generic soil guideline values that have been prepared by DEFRA and the Environment Agency. Where published, soil guideline values (SGV) have been utilised as intervention values for the purpose of an initial tier 1 assessment.*

6.9.2 *At the time of the preparation of this report soil guideline values were available only for a limited number of contaminants and the development of both the CLEA model and additional soil guideline values are on-going.*

Where published soil guideline values are available they have been utilised as intervention values for the purposes of an initial tier 1 assessment. A number of SGV's have recently been updated to reflect a modern approach to the protection of human health.

6.9.3 Where soil guideline values were not published at the time of preparing this report, generic assessment criteria (GAC) published by Land Quality Management Ltd., in conjunction with the Chartered Institute Of Environmental Health have been adopted. The values published in the LQM/CIEH "Generic Assessment Criteria for Human Health Risk Assessment": 2nd Edition have been adopted.

6.9.4 Reference has also been made to published soil screening values presented by Atkins Ltd., under their Atrisk Subscription Service. The SSVs have been adopted where SGVs or GACs are not available. The remaining contaminants have been considered based upon information that was the best available at the time of the study.

7.0 RESULTS OF ANALYSIS & QUALITATIVE RISK ASSESSMENT

7.1. Model

7.1.1 As discussed above, assessment of contaminated land is based upon a simple assessment of pollutant linkages referred to as the source-pathway-target model. This assessment considers the current or proposed usage of the site in terms of suitability for use. This implies the use of risk assessment in principle in order to evaluate the potential effects and concerns of contamination on a site-specific basis.

7.1.2 Initial assessment of the chemical analyses results has been undertaken to assess the concentrations of determinands in relation to tier 1 assessment criteria. The summary of these test results is detailed below.

7.2 Results Summary

7.2.1 The following tables 8 - 10 have been prepared as a summary of the laboratory analyses depending upon the class of analyses undertaken and the type of material. The test results have been compared to the adopted assessment criteria, relating to a proposed residential land usage with home grown produce.

7.3 Metals & Inorganics

7.3.1 Table 8 provides a summary of the soil chemical analysis results for metals and inorganic species. The results show that only slight exceedances of two metals were recorded. Arsenic was recorded in two samples above the GAC with the maximum value being 59 mg/kg obtained at WS10 at 0.5m from the made ground. Lead recorded one isolated concentration that exceeded the GAC at WS06 at 0.5m again related to the ashy made ground material. All other determinands were below their respective GHC's were available.

Table 8: Summary of Contamination Analysis: Metals & Inorganics					
	No. of Samples	**Range of Values (mg/kg)**	**Assessment Criteria[1] (mg/kg)**	**No. of Samples Failing**	**Locations**
Arsenic	10	7 – 59	32[1]	2	WS08 – 0.5m WS10 – 0.5m
Cadmium	10	<0.5 – 2.6	10[1]	0	
Chromium (total)	10	17 – 33	3000[3]	0	
Copper	10	12 – 128	2330[3]	0	
Lead	10	41 – 487	342[2]	1	WS06 – 0.5m
Mercury	10	<0.5 – 1.1	170[1]	0	
Nickel	10	16 – 50	130[1]	0	
Selenium	10	<2	350[1]	0	
Zinc	10	55 – 498	3750[3]	0	
Total Cyanide	10	<10	34[2]	0	
Phenol	10	<1	420[3]	0	
pH	10	6.8 – 9.1	-	-	
SOM	10	0.81 – 8.38	-	-	
SO_4 (w/s) – g/l	10	<0.01 – 0.07	0.5[4]	0	
Sulphide	10	<2 - 67	-	-	

[1] Revised SGV – SC050021 (values based upon "Residential" land use).
[2] Atkins Atrisk SSV residential with consumption of home grown produce (6% SOM)
[3] LQM and CHIC Generic Assessment Criteria 2nd Edition.
[4] BRE Special Digest 1:2005 DS-1.

7.4 Speciated PAH

7.4.1 The soil samples retained from these investigations have been subject to a programme of analyses which have assessed the concentrations of the individual constituents of the polycyclic aromatic hydrocarbon series. A summary of these results is shown in Table 9. The assessment criteria utilised are based upon the presence of 6% soil organic matter within the samples generally. Reference to the tests results does however show more variable soil organic matter content.

7.4.2 Table 9 identifies that the majority of samples obtained from this site do not contain any significant concentrations of PAH compounds. One compound, Benzo(a)pyrene was recorded above the GAC in one location WS2 at 0.2m. This sample was obtained from the topsoil material at the site. This marginal exceedance is not considered to represent a site wide issue or pose a significant risk to site operatives or end users of the site.

Table 9: Summary of Contamination Analysis: PAH USEPA 16 Suite					
	No. of Samples	**Range of Values (mg/kg)**	**Assessment Criteria[1] (mg/kg)**	**No. of Samples Failing**	**Locations**
Acenaphthene	10	<0.1	100	0	
Acenaphthylene	10	<0.1	850	0	
Anthracene	10	<0.1 – 0.1	9200	0	
Benzo{a}anthracene	10	<0.1 – 1.1	5.9	0	
Benzo{a}pyrene	10	<0.1 – 1.1	1.0	1	WS2 0.2m
Benzo{b}fluoranthene	10	<0.1 – 1.2	7.0	0	
Benzo{ghi}perylene	10	<0.1 – 0.7	47	0	
Benzo{k}fluoranthene	10	<0.1 – 0.6	10	0	
Chrysene	10	<0.1 – 1.2	9.3	0	
Dibenz{ah}anthracene	10	<0.1 – 0.1	0.9	0	

Table 9: Summary of Contamination Analysis: PAH USEPA 16 Suite					
	No. of Samples	**Range of Values (mg/kg)**	**Assessment Criteria[1] (mg/kg)**	**No. of Samples Failing**	**Locations**
Fluoranthene	*10*	*<0.1 – 1.9*	*670*	*0*	
Fluorene	*10*	*<0.1*	*780*	*0*	
Indeno{123-cd}pyrene	*10*	*<0.1 – 0.6*	*4.2*	*0*	
Naphthalene	*10*	*<0.1*	*8.7*	*0*	
Phenanthrene	*10*	*<0.1 – 0.5*	*380*	*0*	
Pyrene	*10*	*<0.1 – 1.9*	*1600*	*0*	
[1] LQM & CHIC Generic Assessment Criteria 2nd Edition - Residential (6% SOM)					

7.5 Sulphates

7.5.1 *Within the program of laboratory testing each sample has also been analysed to determine the concentration of water soluble sulphates within the ground. Reference to the laboratory results presented by Exova confirms that soluble sulphates are present at concentrations of between <0.02 and 0.42g/l. Reference to BRE Special Publication 1 : 2005 "Concrete in Aggressive Ground" confirms that at <0.5g/l, the design sulphate class for this site is DS-1. Accordingly the ACEC class for the site is assessed to be AC-1S on the basis that static groundwater is present and the pH value is >5.5.*

7.6 Speciated TPH

7.6.1 *Three samples were submitted for speciated TPH analysis to include BTEX compounds and aliphatic and aromatic fractions. None of the samples recorded concentrations above their respective GAC, as shown in Table 10. Thus, petroleum hydrocarbon contamination is not anticipated to be a significant issue at this site based upon these test results. Nevertheless of course it will be important to maintain a watching brief during any subsequent site development works.*

Table 10: Summary of Contamination Analysis: TPH CWG & BTEX Suite					
	No. of Samples	**Range of Values mg/kg**	**Assessment* Criteria mg/kg**	**No. of Samples Failing**	**Notes**
Aliphatic EC> 5 - 6	*3*	*<0.01*	*30*	*0*	
Aliphatic EC> 6 - 8	*3*	*<0.01*	*73*	*0*	
Aliphatic EC> 8 – 10	*3*	*<1*	*19*	*0*	
Aliphatic EC> 10 - 12	*3*	*<1*	*93*	*0*	
Aliphatic EC> 12 - 16	*3*	*<1.53 – 2.48*	*740*	*0*	
Aliphatic EC> 16 - 35	*3*	*35 – 63.40*	*45000*	*0*	
Aliphatic EC> 35 - 44	*3*	*17.60 – 25.90*	*45000*	*0*	
Aromatic EC> 5 – 7	*3*	*<0.01*	*65*	*0*	
Aromatic EC> 7 - 8	*3*	*<0.01*	*120*	*0*	
Aromatic EC> 8 - 10	*3*	*<1*	*27*	*0*	
Aromatic EC> 10 - 12	*3*	*<1*	*69*	*0*	
Aromatic EC> 12 - 16	*3*	*<1 – 2.20*	*140*	*0*	
Aromatic EC> 16 - 21	*3*	*4.0 – 6.61*	*250*	*0*	
Aromatic EC> 21 - 35	*3*	*11.90 – 20.40*	*890*	*0*	
Aromatic EC> 35 - 44	*3*	*6.58 – 11.60*	*890*	*0*	

Table 10: Summary of Contamination Analysis: TPH CWG & BTEX Suite

	No. of Samples	Range of Values mg/kg	Assessment* Criteria mg/kg	No. of Samples Failing	Notes
Benzene	3	<0.01	0.33[1]	0	
Toluene	3	<0.01	610[1]	0	
EthylBenzene	3	<0.01	350[1]	0	
M/P Xylenes	3	<0.01	230[1]	0	
O Xylene	3	<0.01	250[1]	0	
Methyl tert-Butyl Ether	3	<0.01	20[2]	0	

*Criteria values based upon LQM and CHIC Generic Assessment Criteria - Residential (1% SOM).
[1]Criteria values based upon soil guideline values (2009) – Residential (1% SOM)
[2]Atkins - At risk SSV. Residential with consumption of home grown produce (1% SOM)

8.0 DISCUSSIONS

8.1 General

8.1.1 The desk study element and review of the available historical information has confirmed that the site was originally greenfield until the development of a Hospital building in the eastern section of the site from between 1873 and 1899. This was present until the mid-1960's when the hospital was removed. Site plans provided by the client indicates working drawings for a new Police Station and Magistrates Court dated November 1965, to the rear of the site (adjacent to the north-western boundary). It is considered likely that the building was built around this time. Subsequently a Public Convenience block was developed on the eastern boundary, fronting High Street.

8.1.2 The initial walkover survey of the site has identified no visible evidence of any potentially hazardous contamination but nevertheless it should be considered that the potential exists for the presence of unidentified contamination in areas that were not viewed or inaccessible at the time of the inspection. In addition, no access was available to the interior of the building works during the walkover and subsequent intrusive investigation. Thus there is the possibility that areas of the site that have not been investigated may contain areas of potential contamination.

8.1.3 The results of the chemical analyses undertaken upon representative samples of strata obtained from this site have been assessed in Section 7 above and subject to further discussion below.

8.2 Metals & Inorganics

8.2.1 A summary of the soil chemical analysis results for metals and inorganic species is provided in Table 8. The results show that only slight exceedances of two metals were recorded. Arsenic was recorded in two samples above the GAC with the maximum value being 59 mg/kg obtained at WS10 at 0.5m from the made ground. Lead recorded one isolated concentration that exceeded the GAC at WS06 at 0.5m again related to the ashy made ground material. All other determinands were below their respective GHC's.

It is not considered that these slightly elevated concentrations pose a significant risk to the end user, nevertheless they warrant further assessment in that they are located at shallow depth and occurred within the made ground material. This material should it be present in areas of soft standing (garden areas or open space) may need to be removed and / or capped over to prevent dermal contact with the underlying soils. Reference to the finished site lay out plan will be necessary to identify whether this action is necessary.

8.3 PAH Suite

8.3.1 The results of the chemical analysis identifies that the majority of samples obtained from this site do not contain any significant concentrations of PAH compounds. One compound, Benzo(a)pyrene was recorded above the GAC in one location WS2 at 0.2m. This sample was obtained from the topsoil material at the site. This marginal exceedance is not considered to represent a site wide issue or pose a significant risk to site operatives or end users of the site. PAH compounds are not considered to be a significant issue or represent a potential long term hazard to the site.

8.4 Speciated TPH

8.4.1 None of the samples obtained and analysed recorded concentrations above their respective GAC. Thus, petroleum hydrocarbon contamination is not anticipated to be a significant issue at this site based upon these test results. Nevertheless of course it will be important to maintain a watching brief during any subsequent site development works, in particular within areas that were not accessible during the site investigation.

8.5 Ground Gases

8.5.1 The environmental desk study indicates three records relating to landfills within 250m of the site. These are considered to be the same landfill associated with the infilled brickworks to the north of the site. The edge of the landfill is approximately 200m distant from the study site. Given the intervening land use, railway lines, cuttings and anticipated geological strata between the boundary of the landfill site and the proposed development area it is considered that these will reduce the likelihood of potential lateral migration. The intervening superficial deposits are identified as being Devensian Till, which is identified as being an Unproductive Aquifer with low permeability deposits. Thus, it was considered unlikely that the risk posed to the site from the lateral migration of landfill gasses will be very low and as such a program of gas monitoring is not required.

8.6 Revised Conceptual Site Model

8.6.1 As a result of these intrusive ground investigations and subsequent program of chemical analyses, it has been possible to revise the preliminary conceptual site model presented in Section 3. The revised conceptual site model is now shown in table 8 below. This report adopts the methodology for risk evaluation presented in CIRIA report C552 'Contaminated Land Risk Assessment – A Guide to Good Practice', 2001.

8.6.2 In the context of regulatory definition of 'Contaminated Land' (as defined by the EPA 1990), 'very high' and 'high' risks would fall under the classification of 'Contaminated Land'. 'Moderate' risk could also potentially be classified as 'Contaminated Land' but any lower risk rating would not.

Thus the following potential exposure pathways between potential and known contaminant sources based on information provided to date and receptors are tentatively identified in Table 11 below.

Table 11: Revised Conceptual Site Model

Potential Source	Potential Receptor	Possible Pathway	Probability	Consequence	Risk	Mitigation
Slightly elevated concentrations of arsenic, lead and B(a)P were recorded within the made ground	Site personnel during construction	Direct contact of soils Inhalation or ingestion of soil / dust	Ul	Md	Low	Removal of made ground and / or capping of contaminated materials within sensitive garden areas Site personnel to wear adequate PPE
	Future site users	Direct contact of soils Inhalation or ingestion of soil / dust	Ul	Md	Low	
	Surface water in the vicinity of the site	Leaching of contaminants through drainage system	Lw	Mi	Low	
	Ground water in aquifer	Leaching of contaminants to ground water	Ul	Md	Low	
	Future site users	Vapour migration from soils	Ul	Md	Low	
	Proposed buildings and services	Direct contact with contaminated soils	Lw	Mi	Low	
	Plants in gardens and soft landscaping	Direct contact	Lw	Mr	Very Low	
Contaminated ground water	Site personnel during construction	Water entering excavations	Lw	Mr	Very Low	Groundwater was not encountered during the investigation
	Future site Users	Retained surface water	Lw	Mi	Very Low	
Landfill gases	Proposed buildings and occupiers	Ground gas migration into buildings	Ul	Sv	Low	Not considered to be a risk due to geology
Radon gas	Proposed buildings and occupiers	Ground gas migration into buildings	Li	Md	Moderate	Basic radon precautions required

Key: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor Hi = High, Li = Likely, Lw = Low Likelihood, Ul = Unlikely

8.7 Preliminary Remediation Proposals

8.7.1 These investigations have identified the presence of made ground across the site. Contamination testing of the material has indicated generally low levels of contamination and only minor exceedances of lead, arsenic and benzo (a) pyrene within the ashy made ground. Given the proposed sensitive end use of the site it is considered that removal of this material will be required in areas corresponding with private gardens and open space. Where topsoil is present then this should be stripped and retained on site if feasible.

8.8 Foundations

8.8.1 The ground conditions within this site are fairly variable and comprise of made ground generally as a thin horizon 0.2 - 0.6m below the topsoil or hardstanding areas. The made ground was locally thicker in two locations, WS07 to a depth of 1.40m bgl and at WS 08 to a depth of 2.25m bgl. The fill material generally comprised sandy / gravelly, ashy, brick fill. Underlying the made ground natural strata was recorded during the site investigation comprise predominantly two main lithologies. Brown gravelly silt was encountered at four locations and typically sand and gravel was recorded underlying the silt, where present.

8.8.2 The natural strata is considered to offer a safe bearing capacity of at least 100kN/m^2 at a depth of some 0.9m below ground level. As such the strata within this site is suitable for the adoption of a shallow spread type foundation. The majority of the structures within this site may be founded at a minimum depth of 0.9m below existing ground level. All foundations should be provided with nominal reinforcement to protect against any potential minor ground movements associated with the adjacent geological faulting.

8.8.3 The areas of slightly deeper made ground are suspected to be associated with the location of potential former service routes and based upon the results of these investigations are considered to represent isolated localised features. In areas where made ground extends to a significant depth it will be necessary for foundations to extend through the made ground materials to bear upon more competent strata below. Accordingly it is possible that locally foundations may need to extend to significantly greater depths than 0.9m below existing ground level.

8.8.4 These investigations have demonstrated that majority of the strata present within this site is non-cohesive and is unlikely to be significantly affected by volumetric change as a result of variation in moisture content. Nevertheless it is important to recognise that where properties are to be situated within close proximity of existing trees, regardless as to whether these trees are to be removed or retained, it will be necessary for careful consideration to be undertaken within the foundation excavations. Where clay strata is identified within these foundation excavations, it will be necessary for further appraisals to be undertaken to determine the minimum foundation depths in accordance with the recommendations laid down in NHBC Handbook Chapter 4.2.

8.9 Ground Floor Construction

8.9.1 It is recommended that all properties within this site should be provided with a suspended ground floor construction. This may be of a specialist manufactured precast concrete beam and block type, or of a designed cast insitu construction. It is recommended within the areas of potential tree root influences that a beam and block floor utilising an appropriate air void be adopted in accordance with the recommendations made by the NHBC. In all other areas it will be possible to utilise a cast insitu ground floor construction if required. Basic radon gas precautions are required in all ground floor constructions.

8.10 Precautions

8.10.1 Whilst these investigations have not located any evidence of suspicious or unusual ground conditions, it is important to recognise that should such features become evident during the development process, they should be drawn to the attention of the appropriate authorities before proceeding.

It is important that inspection, sampling and testing of any unusual materials encountered within the site is undertaken so as to ensure that these do not represent a hazard to site operatives or final end users.

9.0 CONCLUSIONS & RECOMMENDATIONS

9.1 Remediation

9.1.1 The desk study and ground investigations have identified the presence of made ground across the site. Contamination testing of the material has indicated generally low levels of contamination and only minor exceedances of lead, arsenic and benzo (a) pyrene within the ashy made ground. Given the proposed sensitive end use of the site it is considered that removal of this material will be required in areas corresponding with private gardens and open space. Where any material is brought onto the site for capping or as topsoil, then this will need to be clean, free from contamination and obtained from a reputable source. Appropriate testing and validation will be required where necessary.

9.1.2 The site lies within an area which may be affected by radon gas omissions. Accordingly it will be necessary for all properties and extensions to properties on this site to be provided with basic radon gas precautions in accordance with the recommendations and procedures laid down in BRE 211 2007 Radon : "Guidance on Protective Measures for New Buildings".

9.2 Foundations

9.2.1 The superficial strata within this site is considered to be conducive to the use of a shallow spread type foundation formed at a minimum depth of 0.9m below ground level. Localised areas of deeper made ground have been encountered and it is therefore possible that foundations may need to extend to increased depths locally, though there is no evidence to suggest that widespread deep made ground is present. It is of course important to recognise that the ground conditions within this site may become disturbed by the removal of the existing buildings and as such this may result in foundations extending to slightly increased depths more generally. For budgetary purposes it is recommended that consideration be given to the prospect that foundations will be formed generally within a zone of 0.9 – 1.5m below ground level where the natural strata offers a safe bearing capacity of at least 100kN/m^2.

9.2.2 The strata within this site is not considered to be susceptible to volume change as a result of variation in moisture content and as such tree root effects are unlikely to represent a significant hazard. The investigations have however identified the presence of very thin localised areas of cohesive clay deposits and it is recommended that where natural clay strata is encountered within foundation excavations which are located within the vicinity of existing trees, there may be a requirement for foundation precautions to be adopted. This will however only be determined by site inspections during the construction process. Where foundation precautions are considered to be necessary, the clay strata is considered to have a low volume change potential and foundations should be designed in accordance with the requirements of NHBC Handbook Chapter 4.2 in conjunction with the arboriculturists report.

9.2.3 All foundations within this site should be provided with nominal reinforcement to provide protection against any potential minor ground movements which may be associated with the geological faulting which is known to be present within this area.

9.3 Ground Floor Construction

9.3.1 It is recommended that a suspended ground floor construction be adopted to all properties located within this site. These constructions may be of a precast concrete beam and block arrangement or of a suitably designed cast insitu reinforced concrete. In those areas where potential tree root influences are important, it is recommended that a pre-cast concrete beam and block floor construction be utilised with an appropriate air void in accordance with the requirements of the NHBC. Basic radon gas precautions are required to all structures located upon this site.

9.4 SUDS

9.4.1 The superficial deposits present within this site have been confirmed to comprise of glacial till material consisting of silts and sands and gravels. This type of strata is considered to be effectively permeable and is conducive to the adoption of a soakaway system of surface water disposal. It is recommended that a programme of testing will be necessary to ascertain whether this is the case. If it is not suitable or viable then the surface water at this site will need to be disposed of to an appropriate drainage point outside the site area.

9.5 Other Issues

9.5.1 The desk study identified that immediately adjacent to the northeastern boundary of the site, a Bronze Age Burial Find was annotated on the 1960 historical map. This may lead to interest from the county archaeologist that will need to be factored into any development proposal. Further guidance can be found in Planning Policy Statement 5 (PPS5).

10.0 NOTES

10.1 *All reports are for advisory purposes only and all design decisions are the ultimate responsibility of others.*

10.2 *Unless stated otherwise the investigation has been undertaken in general accordance with the recommendations given in BS 5930 : 1999 "A Code of Practice for site Investigations" and the laboratory testing has been carried out in accordance with BS 1377 : 1990 "Methods of Test for Civil Engineering Purposes".*

10.3 *Soil and rock descriptions are generally based on the scales of strength and relative density within BS 5930 although it should be noted that in certain circumstances descriptions are based on site records or a qualitative assessment without the benefit of in-situ or laboratory test results.*

10.4 *The assessment of ground conditions given in this report is based on the results of the fieldwork and laboratory testing carried out and there may be other conditions at the site not encountered by these works, which have not been taken into account.*

10.5 *The scope of the investigation and information provided may not necessarily reflect all the geotechnical and environmental aspects related to the site, and the omission of certain items does not mean that the site is unaffected by such problems.*

10.6 *It should be noted that groundwater levels can vary and may at times be significantly different to those recorded during the investigation and attention is drawn to BS 5930 which indicates that measurements may be necessary over an extended period of time to investigate changes in groundwater pressures due to seasonal, tidal and other causes.*

10.7 *Any recommendations on construction methods within this report are for initial guidance only and all design proposals remain the responsibility of the appropriate contractor/consultant.*

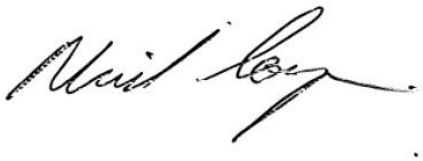
10.8 *Further assessment, investigation, construction activities or time may reveal conditions that were not found during the period of investigation and, therefore, could not have been taken into account in the preparation of the report and where such information might impact upon the stated opinion R. E. Fry & Associates Ltd request the opportunity to review such information and modify the report if necessary.*

10.9 *Where information has been obtained from sources other than the direct findings of the investigation, R. E. Fry & Associates Ltd cannot and does not guarantee the authenticity or reliability of this information.*

10.10 *Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by R. E. Fry & Associates Ltd for the effects of any future changes to such guidelines and legislation.*

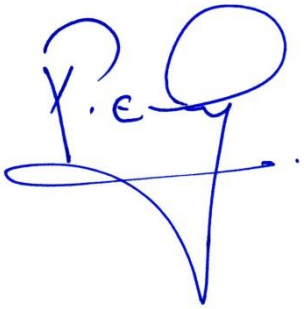
10.11 *This report has been prepared on the instructions and to the requirements of the named client and any unauthorised party using this information for any purpose does so at his own risk and any duty of care to that party is excluded.*

Signed for and on behalf of
R E FRY & ASSOCIATES LIMITED



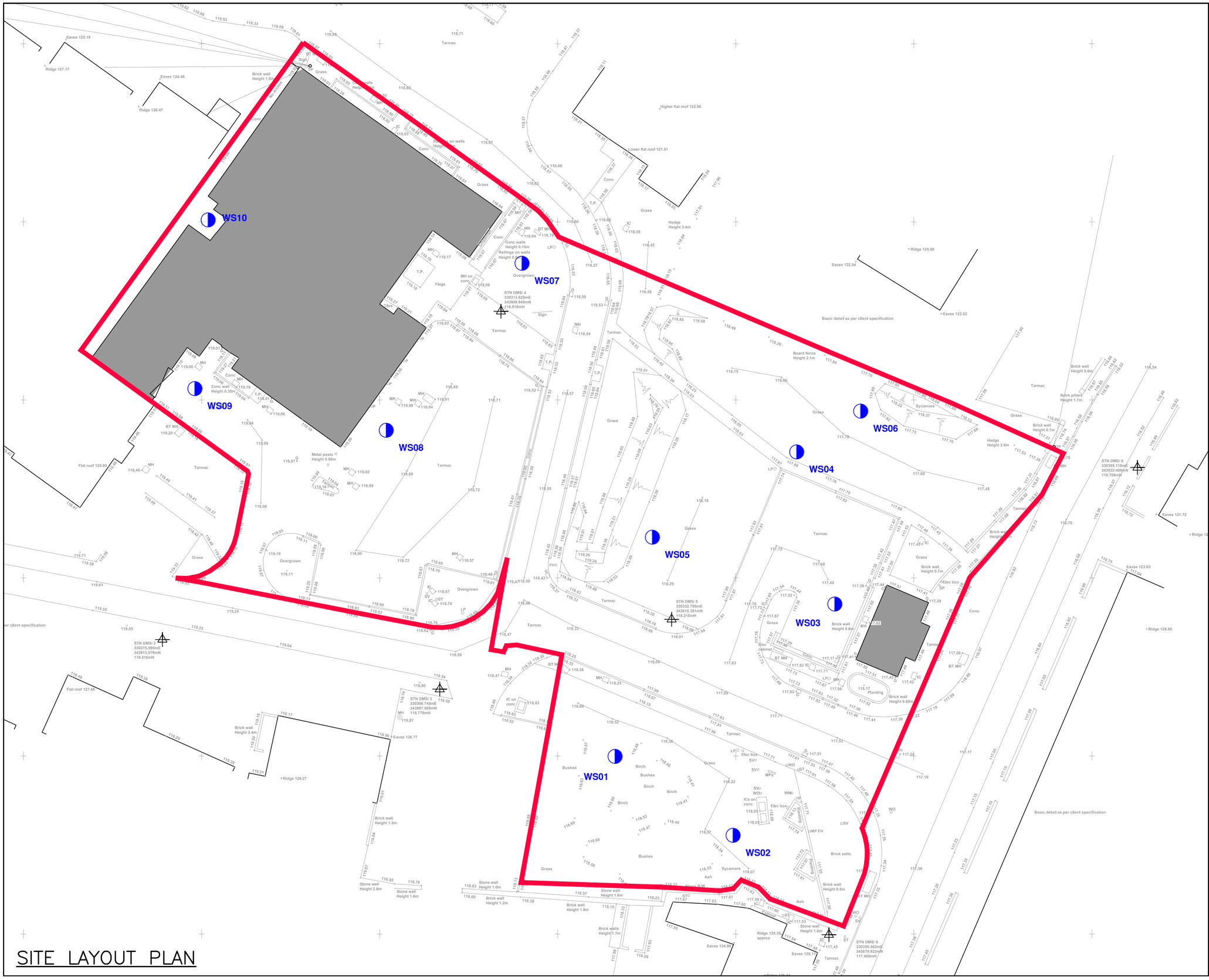
N A COYNE B Sc (Hons), FGS

Signed for and on behalf of
R E FRY & ASSOCIATES LIMITED



R E FRY B Sc (Hons), C Eng.,MI Struct.E.,M.a.P.S.

APPENDIX A



Key

Site Boundary

Existing Buildings

WS01 Approximate locations of REFA window sampler boreholes

revision suffix	Revision Details	Date

Drawing Stage		Drawing Status			
	Draft		Comments	●	Tender
●	Issued		Information		Construction
	Preliminary		Approval		As Built

This drawing is not authorised unless signed as checked & approved

Client
Wales & West Housing Association

Job title
Maelor Place, High Street, Ruabon

Drawing title
Ground Investigation

REFA
45 Bridgeman Terrace
Wigan, Lancs
WN1 1TT
Tel: –(01942) 826020
Fax: –(01942) 230816
CONSULTING ENGINEERS
CIVIL • STRUCTURAL
GEOTECHNICAL • ENVIRONMENTAL

Chkd	Appvd	date	scale	drawn
		11.12.13	1:250	PT

DRAWING No **13104/01** rev

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Any discrepancies to this drawing discovered on site should be reported to REFA immediately. IF IN DOUBT ASK!

APPENDIX B



SITE LAYOUT PLAN

Key

- Site Boundary
- Existing Buildings
- Existing Trees & Hedges
- Soft Landscaping & Grass
- Areas Of Tarmac Hard Standing

Note:
The site include numerous service routes many of which are live & serving adjoining areas. The Identification & disconnection of appropriate services will be an essential requirement at this site.

revision suffix	Revision Details	Date

Drawing Stage			Drawing Status		
	Draft		Comments	●	Tender
●	Issued		Information		Construction
	Preliminary		Approval		As Built

This drawing is not authorised unless signed as checked & approved

Client
Wales & West Housing Association

Job title
Maelor Place, High Street, Ruabon

Drawing title
Walk Over Survey

REFA
45 Bridgeman Terrace
Wigan, Lancs
WN1 1TT
Tel:-(01942) 826020
Fax:-(01942) 230816
CONSULTING ENGINEERS
CIVIL • STRUCTURAL
GEOTECHNICAL • ENVIRONMENTAL

Chkd	Appvd	date	scale	drawn
		11.12.13	1:500	PT

DRAWING No **13104/02** rev

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APPENDIX C



21 May 2013 11:18:31 – T:\Projects\Projects\CF\CF373-Ruabon\CAD\Active\000 Planning\Feasibility\CF373.06_Proposed Layout.dwg

Number **CF373.07**

NOTES:
THIS DRAWING IS COPYRIGHT. DO NOT SCALE FROM THIS DRAWING. WORK TO FIGURED DIMENSIONS ONLY. CHECK ALL DIMENSIONS ON SITE. ANY DISCREPANCIES TO BE NOTIFIED TO THE ARCHITECT.

DEVELOPMENT SITE (RED BOUNDARY)

- 2no.4P2B HOUSES (82m²)
- 2no. 3P2B BUNGALOW (58m²)
  1no. 3P2B WHEELCHAIR BUNGALOW (80m²)
- 14no. 2P1B WALK UP FLATS (51m²)

TOTAL: 19 UNITS

REV	DESCRIPTION	DATE BY (CHKD)
–	–	–

Job **MAELOR PLACE, RUABON for WALES AND WEST**

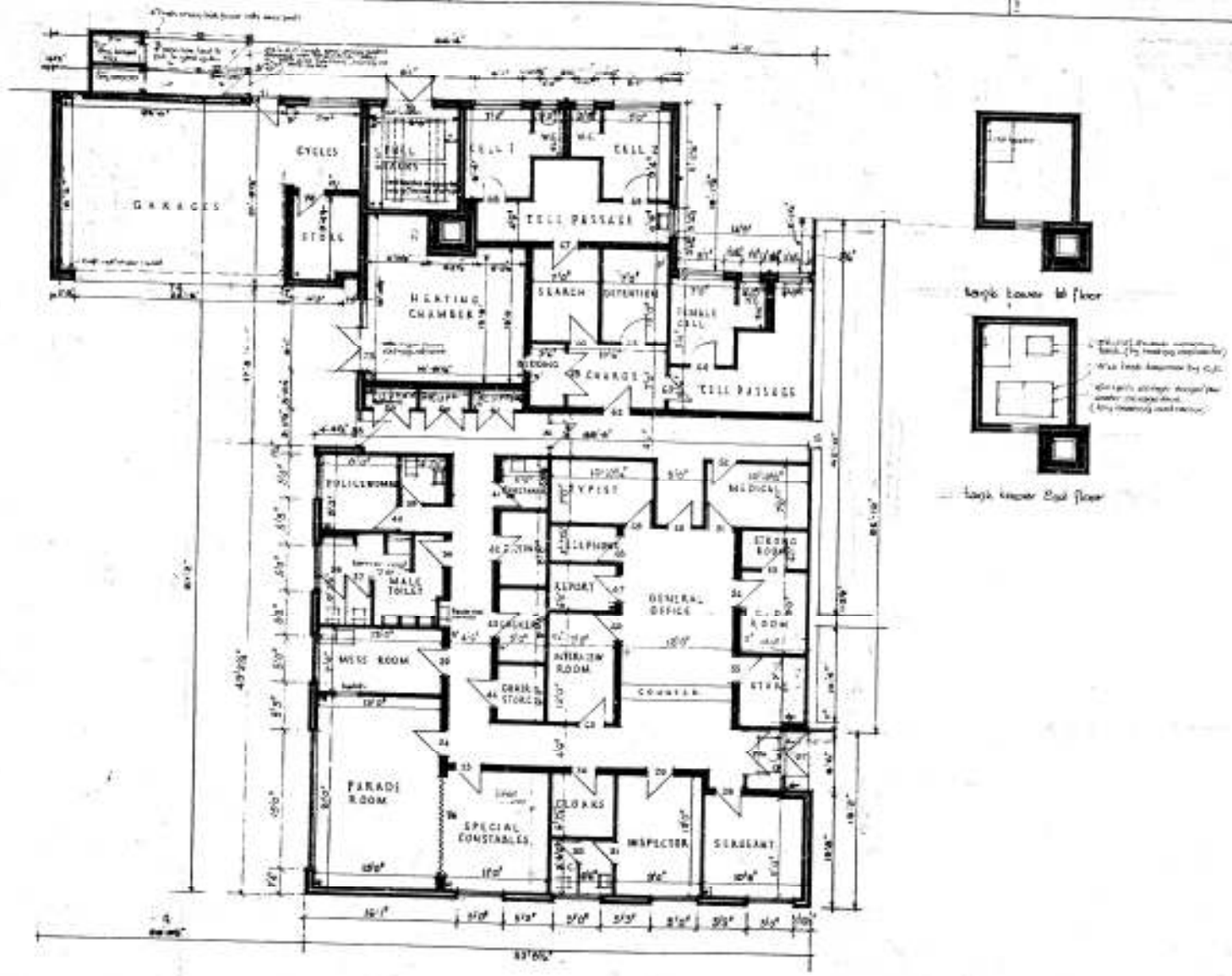
Drawing **PROPOSED SITE PLAN – OPTION 6**

Number **CF373.07**

Scale	Date	Drawn	(Checked)
1:500@A3	20.05.13	SD	SV

Ainsley Gommon
architecture . urban design
THE OLD POLICE STATION, 15 GLYNNE WAY, HAWARDEN CH5 3NS
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Registered Office: 1 Price Street, Hamilton Square, Birkenhead CH41 6JN
www.ainsleygommonarchitects.co.uk

APPENDIX D



Single Storey 1st Floor

Single Storey Roof Plan

NEW COUNTY BUILDINGS
HIGH STREET RUABON

WORKING DRAWINGS

RJ053 | 1 - 36 | B

CMS INCHES

CULL REPROGRAPHICS

APPENDIX E

Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS01**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 18/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Black sandy TOPSOIL		
					0.20			
0.20	G					Medium dense / dense brown gravelly SILT		
0.50	G							
1.00-1.45	SPT(C) N=19		2,3/3,4,4,4,8		(1.80)			
1.00-1.45	D							
					2.00			
2.00-2.45	SPT(C) N=37		7,8/8,9,10,10			Fine to coarse sub-rounded / sub-angular sandstone GRAVEL		
2.00-2.45	D				(0.45)			
					2.45			
						Complete at 2.45m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS02**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 18/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Black sandy TOPSOIL		
0.20	G				0.30			
0.50	G					Medium dense brown gravelly SILT		
					(1.10)			
1.00-1.45	SPT(C) N=37		5,7/7,9,11,10					
1.00-1.45	D							
					1.40			
1.45-1.90	SPT(C) N=40		7,10/10,11,9,10		(0.50)	Dense brown medium / coarse SAND and fine / medium angular sandstone GRAVEL		
1.45-1.90	D				1.90			
						Complete at 1.90m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS03**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 19/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)	MADE GROUND : tarmac		
					0.10			
0.20	G				(0.10)	MADE GROUND : broken limestone fill		
0.50	G				0.20			
					(0.40)	Brown sandy fine / medium sub-rounded GRAVEL		
					0.60			
1.00-1.45	SPT(C) N=16		3,4/3,4,5,5,4			Medium dense brown slightly clayey sandy fine / medium sub-rounded / sub-angular GRAVEL		
1.00-1.45	D							
1.50	D				(1.85)			
2.00-2.45	SPT(C) N=22		6,5/6,6,5,5					
2.00-2.45	D							
					2.45	Complete at 2.45m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

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Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS04**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 18/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	Brown sandy TOPSOIL		
0.20	G				0.50			
0.50	G					Medium dense brown gravelly SILT		
1.00-1.45	SPT(C) N=17		2,5/5,4,4,4					
1.00-1.45	D				(1.85)			
1.50	D							
1.90-2.35	SPT(C) N=28		6,6/7,5,7,9					
1.90-2.35	D				2.35			
						Complete at 2.35m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS05**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 18/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown sandy TOPSOIL		
0.20	G				0.20 (0.30)	MADE GROUND : slightly ashy brick fill (Drillers description)		
0.50	G				0.50	Medium dense / dense yellow / brown clayey sandy fine / medium sub-rounded / sub-angular GRAVEL		
1.00-1.45	SPT(C) N=12		1,3/3,3,3,3					
1.00-1.45	D				(1.75)			
1.50	D							
1.80-2.25	SPT(C) N=36		6,10/11,10,7,8					
1.80-2.25	D				2.25	Complete at 2.25m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS06**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 18/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Brown sandy TOPSOIL		
0.20	G				0.30			
					(0.20)	MADE GROUND : brown / black ash and cinder fill with fragments of broken brick		
0.50	G				0.50			
						Medium dense brown gravelly SILT		
1.00-1.45	SPT(C) N=13		3,2/2,3,3,5		(1.00)			
1.00-1.45	D							
					1.50			
1.50-1.95	SPT(C) N=37		7,8/7,10,10,10			Dense yellow / brown claybound sandy fine / medium angular sandstone GRAVEL		
1.50-1.95	D				(0.45)			
					1.95			
						Complete at 1.95m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS07**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 18/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Brown sandy TOPSOIL		
0.20	G				0.30			
0.50	G					MADE GROUND : loose yellow / brown / black gravelly ash fill		
					(1.10)			
1.00-1.45	SPT(C) N=5		1,0/1,0,2,2					
1.00-1.45	D				1.40			
1.50	D				(0.40)	Soft / firm brown gravelly CLAY / SILT (Made Ground?)		
					1.80			
2.00-2.45	SPT(C) N=15		9,8/6,5,2,2			Medium dense yellow / brown sandy fine / medium sub-rounded / sub-angular sandstone GRAVEL		
2.00-2.45	D							
2.50	D				(1.65)			
3.00-3.45	SPT(C) N=42		9,9/10,9,11,12					
3.00-3.45	D				3.45			
						Complete at 3.45m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS08**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 19/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)	MADE GROUND : paving flag		
					0.10			
0.20	G					MADE GROUND : medium dense yellow / brown coarse sand and fine / medium angular sandstone gravel fill		
0.50	G							
1.00-1.45	SPT(C) N=13		1,0/1,4,4,4					
1.00-1.45	D				(2.15)			
1.50	D							
1.80-2.25	SPT(C) N=19		4,4/4,6,1,8					
1.80-2.25	D							
					2.25			
						Complete at 2.25m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS09**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 19/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)	MADE GROUND : tarmac		
					0.10			
0.20	G				(0.10)	MADE GROUND : hardcore (Drillers description)		
0.50	G				0.20	Loose / medium dense yellow / brown medium / coarse SAND and fine / medium sub-rounded / sub-angular sandstone GRAVEL		
1.00-1.45	SPT(C) N=9		5,5/2,2,3,3,2					
1.00-1.45	D				(2.25)			
1.50	D							
2.00-2.45	SPT(C) N=24		5,5/6,4,7,7					
2.00-2.45	D				2.45			
						Complete at 2.45m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site	Number
Maelor Place, Ruabon	**WS10**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler				13-826
	Location	**Dates** 19/11/2013	**Engineer** Robert E Fry & Associates Limited	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)	MADE GROUND : tarmac		
					0.10			
0.20	G				(0.50)	MADE GROUND : brown sand and clay fill with fragments of broken brick		
0.50	G				0.60			
1.00-1.45	SPT(C) N=19		3,4/5,5,6,3			Medium dense yellow / brown medium / coarse SAND and fine / medium sub-rounded / sub-angular sandstone GRAVEL		
1.00-1.45	D							
1.50	D				(1.85)			
2.00-2.45	SPT(C) N=16		4,4/4,4,4,4					
2.00-2.45	D							
2.50	D				2.45			
3.00-3.45	SPT(C) N=28		3,5/6,6,7,9					
3.00-3.45	D							
						Complete at 3.45m		

Remarks
Services inspection pit excavated by hand to 1.00m

Scale (approx)	Logged By
1:50	Dr J Crook

Figure No. 13-826.WS01

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Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Standard Penetration Test Results

Site : Maelor Place, Ruabon

Client :

Engineer : Robert E Fry & Associates Limited

Job Number 13-826

Sheet 1 / 1

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
WS01	1.00	1.15	1.45	CPT	2	3	3	4	4	8	N=19	
WS01	2.00	2.15	2.45	CPT	7	8	8	9	10	10	N=37	
WS02	1.00	1.15	1.45	CPT	5	7	7	9	11	10	N=37	
WS02	1.45	1.60	1.90	CPT	7	10	10	11	9	10	N=40	
WS03	1.00	1.15	1.45	CPT	3	4	3	4	5	4	N=16	
WS03	2.00	2.15	2.45	CPT	6	5	6	6	5	5	N=22	
WS04	1.00	1.15	1.45	CPT	2	5	5	4	4	4	N=17	
WS04	1.90	2.05	2.35	CPT	6	6	7	5	7	9	N=28	
WS05	1.00	1.15	1.45	CPT	1	3	3	3	3	3	N=12	
WS05	1.80	1.95	2.25	CPT	6	10	11	10	7	8	N=36	
WS06	1.00	1.15	1.45	CPT	3	2	2	3	3	5	N=13	
WS06	1.50	1.65	1.95	CPT	7	8	7	10	10	10	N=37	
WS07	1.00	1.15	1.45	CPT	1	0	1	0	2	2	N=5	
WS07	2.00	2.15	2.45	CPT	9	8	6	5	2	2	N=15	
WS07	3.00	3.15	3.45	CPT	9	9	10	9	11	12	N=42	
WS08	1.00	1.15	1.45	CPT	1	0	1	4	4	4	N=13	
WS08	1.80	1.95	2.25	CPT	4	4	4	6	1	8	N=19	
WS09	1.00	1.15	1.45	CPT	5	5	2	2	3	2	N=9	
WS09	2.00	2.15	2.45	CPT	5	5	6	4	7	7	N=24	
WS10	1.00	1.15	1.45	CPT	3	4	5	5	6	3	N=19	
WS10	2.00	2.15	2.45	CPT	4	4	4	4	4	4	N=16	
WS10	3.00	3.15	3.45	CPT	3	5	6	6	7	9	N=28	

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APPENDIX F

SJ34SW 88

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

5-7, NEW YORK ROAD,
LEEDS, 2.

Contract No. 16308/B296 Borehole No. 3

Location Ruabon Ground Level

Client Denbigh County Architect Date 28th July 1964

3033
4393

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	Ø deg.	m.c. %	y lb/cu. ft.	N
Top Soil		1'-0"	1'0"						
Dry Sand & Gravel with traces of clay and occasional boulders.				3'6" I					18
				8'6" I					18
		16'-0"		15'6" I					12+
+ 6" Penetration only									

Water struck at — Maximum Observed Water Level

Undisturbed Sample []
Disturbed Sample o
Water Sample Δ
Penetration Test I

c = Cohesion
Ø = Angle of Internal Friction
m.c = Moisture Content
y = Dry Density
N = Standard Penetration Value

Water levels may be subject to seasonal or tidal variation and should not be taken as constant.

British Geological Survey

APPENDIX G

centremapslive.com
the mapping portal from Laser Surveys

CENTREMAPS
Brockamin House, ,
Worcester, WR6 5JU

GroundSure Reference:	CMAPS-CM-265373-7904-151013EDR
Your Reference:	7904
Report Date:	15 Oct 2013
Report Delivery Method:	**Email - pdf**
Client Email:	andy@centremaps.com

GroundSure EnviroInsight

Address: MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Dear Sir/Madam,

Thank you for placing your order with CENTREMAPS. Please find enclosed the GroundSure EnviroInsight as requested

If you need any further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.
GroundSure EnviroInsight

centremapslive.com
the mapping portal from Laser Surveys

GroundSure
ENVIRONMENTAL INSIGHT

GroundSure EnviroInsight

Address: MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Date: 15 Oct 2013

GroundSure Reference: CMAPS-CM-265373-7904-151013EDR

Your Reference: 7904

Client: CENTREMAPS



Brought to you by CENTREMAPS

Aerial Photograph of Study Site

NW ▲ N NE



◄W E►

SW ▼ S SE

Aerial photography supplied by Getmapping PLC.
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Site Name: MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN
Grid Reference: 330320,343930
Size of Site: 0.51 ha

Overview of Findings

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

Report Section	Number of records found within (X) m of the study site boundary					
1. Environmental Permits, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations						
Records of historic IPC Authorisations	0	0	0	0	-	-
Records of Part A(1) and IPPC Authorised Activities	0	0	0	0	-	-
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	1	0	-	-
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0	-	-
Records of List 1 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of List 2 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0	-	-
Records of Licensed Discharge Consents	0	0	4	2	-	-
Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0	-	-
1.2 Records of COMAH and NIHHS sites	0	0	0	0	-	-
1.3 Environment Agency Recorded Pollution Incidents						
National Incidents Recording System, List 2	0	0	1	-	-	-
National Incidents Recording System, List 1	0	0	0	-	-	-
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0	-	-
2. Landfill and Other Waste Sites	on-site	0-50	51-250	251-500	501-1000	1000-1500
2.1 Landfill Sites						
Environment Agency Registered Landfill Sites	0	0	1	1	0	-
Environment Agency Historic Landfill Sites	0	0	1	0	1	1
BGS/DoE Landfill Site Survey	0	0	0	0	0	0
GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Environment Agency Licensed Waste Sites	0	0	0	0	5	11

3. Current Land Uses	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	0	0	5	-	-	-
3.2 Records of Petrol and Fuel Sites	0	0	0	2	-	-
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0	-	-

4. Geology	Description
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site? *	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site? *	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
Source: Scale: 1:50,000 BGS Sheet 121	

* This includes an automatically generated 50m buffer zone around the site.

5. Hydrogeology and Hydrology	on-site	0-50	51-250	251-500	501-1000	1001-2000
5.1 Are there any records of Productive Strata in the Superficial Geology within 500m of the study site?				Yes		
5.2 Are there any records of Productive Strata in the Bedrock Geology within 500m of the study site?				Yes		
5.3 Groundwater Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	2
5.4 Surface Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.6 Are there any Source Protection Zones within 500m of the study site?					No	

5.7 River Quality	on-site	0-50	51-250	251-500	501-1000	1001-1500
Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	Yes	No	No	No
5.8 Detailed River Network entries within 500m of the site	0	0	1	3	-	-
5.9 Surface water features within 250m of the study site	No	No	Yes	-	-	-

6. Flooding	
6.1 Are there any Environment Agency indicative Zone 2 floodplains within 250m of the study site?	Yes
6.2 Are there any Environment Agency indicative Zone 3 floodplains within 250m of the study site?	Yes
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	High
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

7. Designated Environmentally Sensitive Sites	on-site	0-50	51-250	251-500	501-1000	1001-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	3
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0

7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	3
7.3 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.4 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	3
7.5 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.6 Records of Ramsar sites	0	0	0	0	0	0
7.7 Records of World Heritage Sites	0	0	0	0	0	1
7.8 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.9 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.10 Records of National Parks	0	0	0	0	0	0
7.11 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.12 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
7.13 Records of Ancient Woodlands	0	0	1	1	1	5

8. Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Very Low

9. Mining

9.1 Are there any coal mining areas within 75m of the study site?	Yes
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Negligible
9.3 Are there any brine affected areas within 75m of the study site?	No

Using this Report

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

1. Environmental Permits, Incidents and Registers

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

2. Landfills and Other Waste Sites

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

3. Current Land Uses

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

4. Geology

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

5. Hydrogeology and Hydrology

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

6. Flooding

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

7. Designated Environmentally Sensitive Sites

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

8. Natural Hazards

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

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

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

Note: Maps

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

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

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

1. Environmental Permits, Incidents and Registers Map

NW N NE



◄W E►

SW S SE

Authorisations,Incidents and Registers Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- 250 / 500 Search Buffers (m)
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

1.Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

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

Records of historic IPC Authorisations within 500m of the study site: **0**

Database searched and no data found.

Records of Part A(1) and IPPC Authorised Activities within 500m of the study site: **0**

Database searched and no data found.

Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: **1**

The following Water Industry Referral records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance [m]	Direction	Address	Permission reference	Local Authority	First Date Received	Last Date Received	Status
9A	218.0	SW	Supastrip Ltd, Providence Chapel, Bridge Street, Ruabon, Ruabon, Ll14 6da	AU5688	Wrexham County Borough Council	01-06-2001	16-07-2013	Received

Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site: **0**

Database searched and no data found.

Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: **0**

Database searched and no data found.

Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: **0**

Database searched and no data found.

Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: **0**

Database searched and no data found.

Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site: **0**

Database searched and no data found.

Records of Licensed Discharge Consents within 500m of the study site: **6**

The following Licensed Discharge Consents records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
2	191.0	SW	330220, 343720	Address: Ruabon 5 Duke Street Private Garage, Ruabon 5 Duke Street Private Gar, 5 Duke Street Private Garage, Private Garage Effluent Type: Unspecified Permit Number: CM0033401 Permit Version: 1	Receiving Water: Eitha Status: Consent Expired - Time Limit Issue date: 20/4/1966 Effective Date: 20/4/1966 Revocation Date: 5/4/1995
3	217.0	S	330331, 343663	Address: Tal Y Lan Cso, Ruabon Ps (se Of Bridge Street), (se Of Bridge Street) Ruabon, Ruabon, Ruabon, RUABON Effluent Type: Sewage Discharges - Pumping Station - Water Company Permit Number: CM0008201 Permit Version: 1	Receiving Water: Eitha Status: New Consent, By Application (wra 91, Section 88) Issue date: 8/1/1960 Effective Date: 8/1/1960 Revocation Date: -
4	220.0	N	330300, 344200	Address: Gardden Lodge Landfill Site Ruabon, Gardden Lodge Landfill Site, Tatham Road, Ruabon, Wrexham Effluent Type: Trade Discharges - Site Drainage Permit Number: CG038700101 Permit Version: 1	Receiving Water: Drainage System Via A Culvert Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 19/5/2000 Effective Date: 19/5/2000 Revocation Date: -
5	227.0	S	330353, 343652	Address: Ruabon Ps, Ruabon Ps, LL14 1US Effluent Type: Sewage Discharges - Pumping Station - Water Company Permit Number: CM0190801 Permit Version: 3	Receiving Water: Eitha Status: Varied Under Epr 2010 Issue date: - Effective Date: - Revocation Date: -
6	262.0	S	330310, 343620	Address: Paddock Row Ruabon , Paddock Row Ruabon , Ruabon , Ruabon , Ruabon , Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: CG0358201 Permit Version: 1	Receiving Water: River Eitha Status: New Consent, By Application (wra 91, Section 88) Issue date: 21/7/1994 Effective Date: 21/7/1994 Revocation Date: -
7	387.0	W	329900, 344070	Address: Ruabon Comprehensive School, Ruabon Comprehensive School Effluent Type: Unspecified Permit Number: CM0055601 Permit Version: 1	Receiving Water: Eitha Status: Consent Expired - Time Limit Issue date: 20/3/1969 Effective Date: 20/3/1969 Revocation Date: 5/4/1995

Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: **0**

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: **0**

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site: **1**

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

ID	Distance	Direction	NGR	Details	
1	131.0	W	330155, 343871	Incident Date: 19/08/2003 Incident Identification: 183455 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

Records of National Incidents Recording System, List 1 within 250m of the study site: **0**

Database searched and no data found.

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

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? **0**

Database searched and no data found.

2. Landfill and Other Waste Sites Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Landfill & Other Waste Sites Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

E.A. Active Landfill

E.A. Historic Landfill

Local Authority Landfill

Historic and Planned Waste Sites

E.A. Licensed Waste Site

BGS / DoE Survey Landfill

2. Landfill and Other Waste Sites

2.1 Landfill Sites

Records from Environment Agency landfill data within 1000m of the study site: 2

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

ID	Distance	Direction	NGR	Details	
1	197.0	N	330077, 344722	Address: Tatham Road, Ruabon, Wrexham, Clwyd, LL14 6RF Landfill Reference: 37109.0 Environmental Permitting Regulations (Waste) Reference: SHA001 Landfill Type: A4 : Household, Commercial & Industrial Waste Landfill	Operator: Shanks Northern Ltd Status: Closure IPPC Reference: EPR Reference:
2	332.0	NW	330087, 344716	Address: Gardden, Tatham Road, Ruabon, Wrexham, Clwyd, LL14 6RF Landfill Reference: 37014.0 Environmental Permitting Regulations (Waste) Reference: SHA005 Landfill Type: A4 : Household, Commercial & Industrial Waste Landfill	Operator: Shanks Midlands Ltd Status: Closure IPPC Reference: EPR Reference:

Records of Environment Agency historic landfill sites within 1500m of the study site: 3

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

ID	Distance	Direction	NGR	Details	
3	223.0	N	330100, 344500	Site Address: Gardden Clay Pit, Gardden Lodge, Tatham Road, Ruabon, Wrexham, Clywd Waste Licence: Yes Site Reference: WMBC L/23, WMBC L82 Waste Type: Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 01-Apr-1977 Licence Surrendered: Licence Hold Address: A8 Edinburgh Road, Coatbridge, Lanarkshire Operator: -
4	502.0	NW	329800, 344200	Site Address: Llys Offa, Tatham Road, Wrexham, Ruarbon Waste Licence: Yes Site Reference: WMBC L/29 Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 02-Jun-1983 Licence Surrendered: 02-Jun-1984 Licence Hold Address: - Operator: -
Not shown	1312.0	N	330800, 345500	Site Address: Hafod Quarry, Bangor Road, Johnstown, Wrexham Waste Licence: Yes Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: WW1/L/SWM001	Licence Issue: 30-Apr-1999 Licence Surrendered: 23-May-2005 Licence Hold Address: - Operator: -

Records of BGS/DoE non-operational landfill sites within 1500m of the study site: 0

Database searched and no data found.

Records of Local Authority landfill sites within 1500m of the study site: 0

Database searched and no data found.

2.2 Other Waste Sites

Records of waste treatment, transfer or disposal sites within 500m of the study site: 0

Database searched and no data found.

Records of Environment Agency licensed waste sites within 1500m of the study site: 16

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

ID	Distance	Direction	NGR	Details	
Not shown	763.0	N	330087, 344716	Site Address: Gardden, Tatham Road, Ruabon, Wrexham, Clwyd, LL14 6RF Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA005 EPR reference: EA/EPR/BP3494FC/A001 Operator: Shanks Midlands Ltd Waste Management licence No: 37014 Annual Tonnage: 400.0	Issue Date: 02/05/1989 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Gardden Claypit 1 Midlands Correspondence Address: -, -
Not shown	765.0	N	330083, 344716	Site Address: Tatham Road, Ruabon, Wrexham, LL14 6DR Type: Household, Commercial & Industrial Waste Landfill Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA001 EPR reference: - Operator: Shanks Northern Ltd Waste Management licence No: 37109 Annual Tonnage: 0.0	Issue Date: 06/07/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Gardden Claypit 2 Northern Correspondence Address: -, Unit 9, Abbey Lane Industrial Estate, Burscough, Ormskirk, Merseyside, L40 7SR
Not shown	768.0	N	330087, 344721	Site Address: Tatham Road, Ruabon, Wrexham, LL14 6DR Type: Household, Commercial & Industrial Waste Landfill Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA005 EPR reference: - Operator: Shanks Midlands Ltd Waste Management licence No: 37014 Annual Tonnage: 0.0	Issue Date: 02/05/1989 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Gardden Claypit 1 Midlands Correspondence Address: -, Woodside House, Church Road, Woburn Sands, Milton Keynes, MK17 8TA
Not shown	772.0	N	330077, 344722	Site Address: Tatham Road, Ruabon, Wrexham, Clwyd, LL14 6RF Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA001 EPR reference: EA/EPR/HP3694FJ/A001 Operator: Shanks Northern Ltd Waste Management licence No: 37109 Annual Tonnage: 51712.0	Issue Date: 06/07/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Gardden Claypit 2 Northern Correspondence Address: -, -
Not shown	984.0	N	330083, 344942	Site Address: Land / Premises At, Gardden Ind Est, Ruabon, Wrexham, Clwyd, LL14 6RG Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BEN001 EPR reference: EA/EPR/VP3394FX/A001 Operator: Bennett D Waste Management licence No: 37163 Annual Tonnage: 30000.0	Issue Date: 31/03/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Clwyd Car Breakers Correspondence Address: -, -

Not shown	1005.0	N	330053, 344957	Site Address: Gardden Industrial Estate, Ruabon, Wrexham, Clwyd, LL14 6RG Type: Vehicle depollution facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CLW002 EPR reference: EA/EPR/NP3290VM/A001 Operator: Clwyd Breakers Ltd Waste Management licence No: 102006 Annual Tonnage: 74999.0	Issue Date: 07/10/2010 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Clwyd Breakers Ltd Correspondence Address: -, -
Not shown	1031.0	N	330082, 344990	Site Address: Gardden Ind Est, Ruabon, Wrexham, LL14 6RG Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HAY001 EPR reference: - Operator: Haywards I Waste Management licence No: 37162 Annual Tonnage: 0.0	Issue Date: 31/03/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: I Haywards Ltd Correspondence Address: -, Gardden Ind Est, Ruabon, Wrexham, LL14 6RG
Not shown	1031.0	N	330082, 344990	Site Address: I Hayward Ltd, Gardden Ind Est, Ruabon, Wrexham, Clwyd, LL14 6RG Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HAY001 EPR reference: EA/EPR/EP3794FY/V003 Operator: I Hayward Limited Waste Management licence No: 37162 Annual Tonnage: 24999.0	Issue Date: 31/03/1999 Effective Date: - Modified: 31/01/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: I Hayward Ltd Correspondence Address: -, -
Not shown	1106.0	N	330096, 345069	Site Address: H K Motors, Gardden Industrial Estate, Ruabon, Wrexham, Clwyd, LL14 6RG Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HKM002 EPR reference: EA/EPR/AP3194FU/V002 Operator: Williams H K; K; D H; A K; C A; I J And N G Williams Waste Management licence No: 37231 Annual Tonnage: 4999.0	Issue Date: 28/03/2003 Effective Date: - Modified: 10/12/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: H K Motors, Ruabon Correspondence Address: -, -
Not shown	1209.0	SW	329206, 343357	Site Address: Off Plas Bennion Road, Wynnstay Bank Ruabon, Wrexham, Clwyd, LL14 1TP Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 3CW010 EPR reference: - Operator: 3 C Waste Ltd Waste Management licence No: 37039 Annual Tonnage: 0.0	Issue Date: 01/10/1993 Effective Date: 13/11/2001 Modified: 10/12/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Wynnstay Banks Civic Amenity Site Correspondence Address: Chris Giffiths, Barton House, Darland Lane, Lavister, Wrexham, LL12 0EL
Not shown	1209.0	SW	329206, 343357	Site Address: Off Plas Bennion Road, Wynnstay Bank Ruabon, Wrexham, Clwyd, LL14 3ES Type: Household Waste Amenity Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 3CW010 EPR reference: EA/EPR/MP3394FY/V004 Operator: 3 C Waste Ltd Waste Management licence No: 37039 Annual Tonnage: 0.0	Issue Date: 01/10/1993 Effective Date: 13/11/2001 Modified: 28/02/2007 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Wynnstay Banks Civic Amenity Site Correspondence Address: -, -
Not shown	1209.0	SW	329206, 343357	Site Address: Off Plas Bennion Road, Wynnstay Bank Ruabon, Wrexham, Clwyd, LL14 1TP Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 3CW010 EPR reference: - Operator: 3 C Waste Ltd Waste Management licence No: 37039 Annual Tonnage: 0.0	Issue Date: 01/10/1993 Effective Date: 13/11/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Wynnstay Banks Civic Amenity Site Correspondence Address: -, Barton House, Darland Lane, Lavister, Wrexham, LL12 0EL

Not shown	1329.0	SW	329107, 343288	Site Address: Acrefair, Plas Madoc, Wrexham, Clwyd, LL14 3ES Type: Household Waste Amenity Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS025 EPR reference: - Operator: Waste Recycling Limited Waste Management licence No: 100081 Annual Tonnage: 0.0	Issue Date: 23/10/2007 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Plas Madoc Household Waste Recycling Centre Correspondence Address: -, Bold Business Centre, Bold Lane, Sutton, St Helens, Merseyside, WA9 4TX
Not shown	1329.0	SW	329107, 343288	Site Address: Land/ Premises At, Acrefair, Plas Madoc, Wrexham, Clwyd, LL14 3ES Type: Household Waste Amenity Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS025 EPR reference: EA/EPR/NP3095EW/A001 Operator: Waste Recycling Ltd Waste Management licence No: 100081 Annual Tonnage: 24999.0	Issue Date: 23/10/2007 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Plas Madoc Household Waste Recycling Centre Correspondence Address: -, -
Not shown	1329.0	SW	329107, 343288	Site Address: Plas Madoc H W R C, Wynnstay Industrial Estate, Acrefair, Wrexham, Clwyd, LL14 3ES Type: Household Waste Amenity Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS025 EPR reference: EA/EPR/NP3095EW/V002 Operator: F C C Recycling (U K) Limited Waste Management licence No: 100081 Annual Tonnage: 24999.0	Issue Date: 23/10/2007 Effective Date: - Modified: 22/11/2012 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Plas Madoc Household Waste Recycling Centre Correspondence Address: -, -
Not shown	1433.0	N	330100, 345400	Site Address: Brother Industries (U K) Ltd, Vauxhall Industrial Estate, Ruabon, Wrexham, Clwyd, LL14 6HA Type: Material Recycling Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRO197 EPR reference: EA/EPR/FB3234AY/A001 Operator: Brother Industries (U K) Ltd Waste Management licence No: 103896 Annual Tonnage: 300.0	Issue Date: 06/08/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Brother Industries (U K) Ltd Correspondence Address: -, -

3. Current Land Use Map

NW N NE



W E

SW S SE

Current Land Use Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Underground High Pressure Oil & Fuel Pipelines

3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: **5**

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

ID	Distance	Direction	Company	Address	Activity	Category
1	64.0	SW	Electricity Sub Station	LL14	Electrical Features	Infrastructure and Facilities
2	120.0	SE	Electricity Sub Station	LL14	Electrical Features	Infrastructure and Facilities
3	129.0	SW	T T N Engineering Ltd	2 The Walks, Bridge Street, Ruabon, Wrexham, LL14 6DG	Mechanical Engineers	Engineering Services
4	199.0	N	Electricity Sub Station	LL14	Electrical Features	Infrastructure and Facilities
5	236.0	SW	Ruabon Station	LL14	Railway Stations, Junctions and Halts	Public Transport, Stations and Infrastructure

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: **2**

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance	Direction	NGR	Company	Address	LPG	Status
6	272.0	E	330614, 343807	Obsolete	Victoria Garage, B5605, B5605, Ruabon, Wrexham, Clwyd, LL14 3RS	Not Applicable	Obsolete
7	458.0	NE	330783, 344138	Esso	Rss Ruabon Service Area, Ruabon Bypass, Ruabon Bypass, Ruabon, Wrexham, Clwyd, LL14 6YY	No	Open

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site: **0**

Database searched and no data found.

4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

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

4.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
GFDUD-SAGR	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL

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

4.3 Bedrock and Solid Geology

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

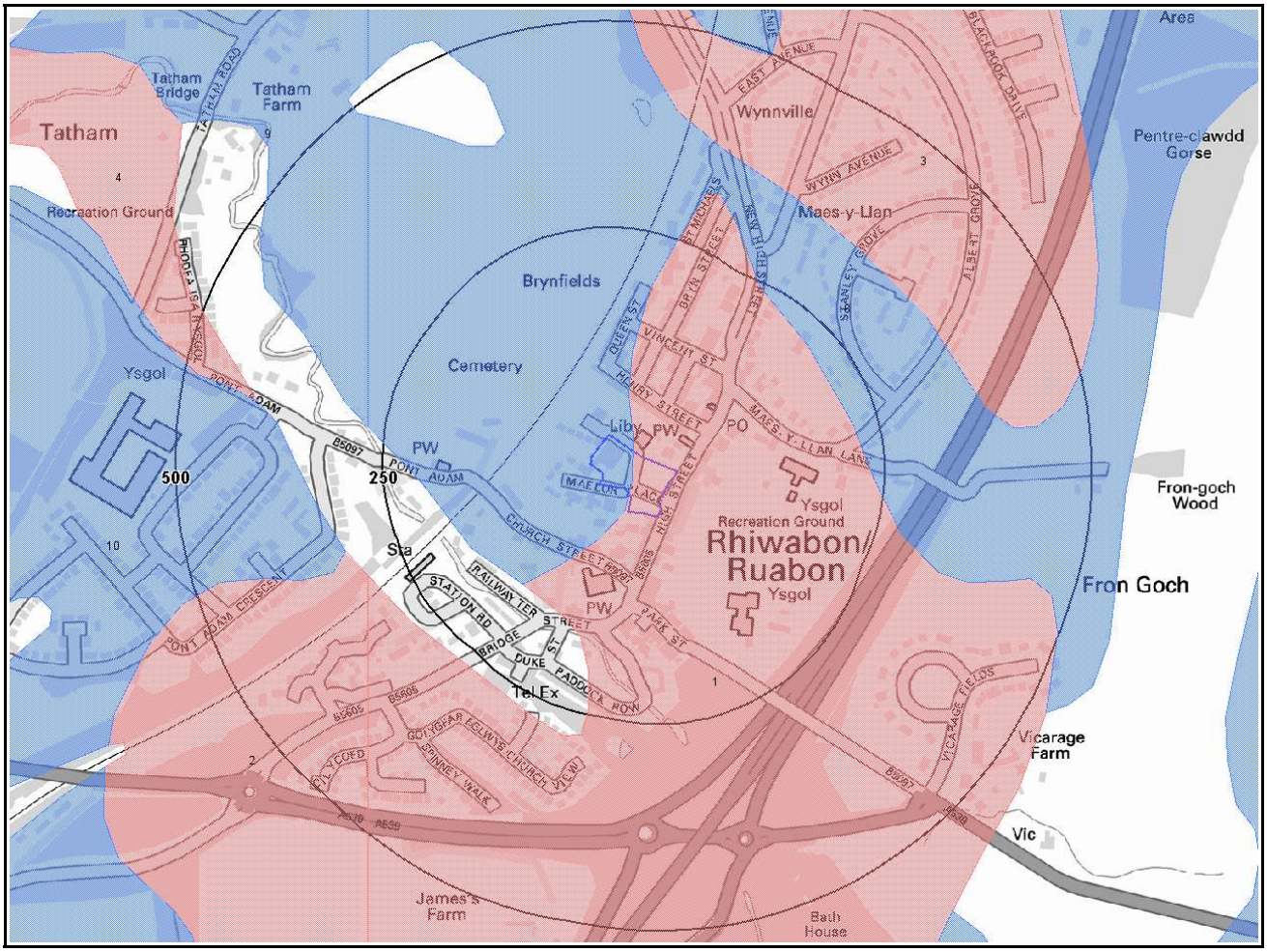
LEX Code	Description	Rock Type
ETM-MDST	ETRURIA FORMATION	MUDSTONE
ETM-MDST	ETRURIA FORMATION	MUDSTONE

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

For more detailed geological and ground stability data please refer to the "GroundSure GeoInsight". Available from our website.

5a. Hydrogeology - Aquifer Within Superficial Geology

NW N NE



W E

SW S SE

Aquifer Within Superficial Geology Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

5b. Hydrogeology - Aquifer Within Bedrock Geology and Abstraction Licenses

NW N NE



W E

SW S SE

Aquifer Within Bedrock Geology Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

Secondary Aquifer - Undifferentiated Layers

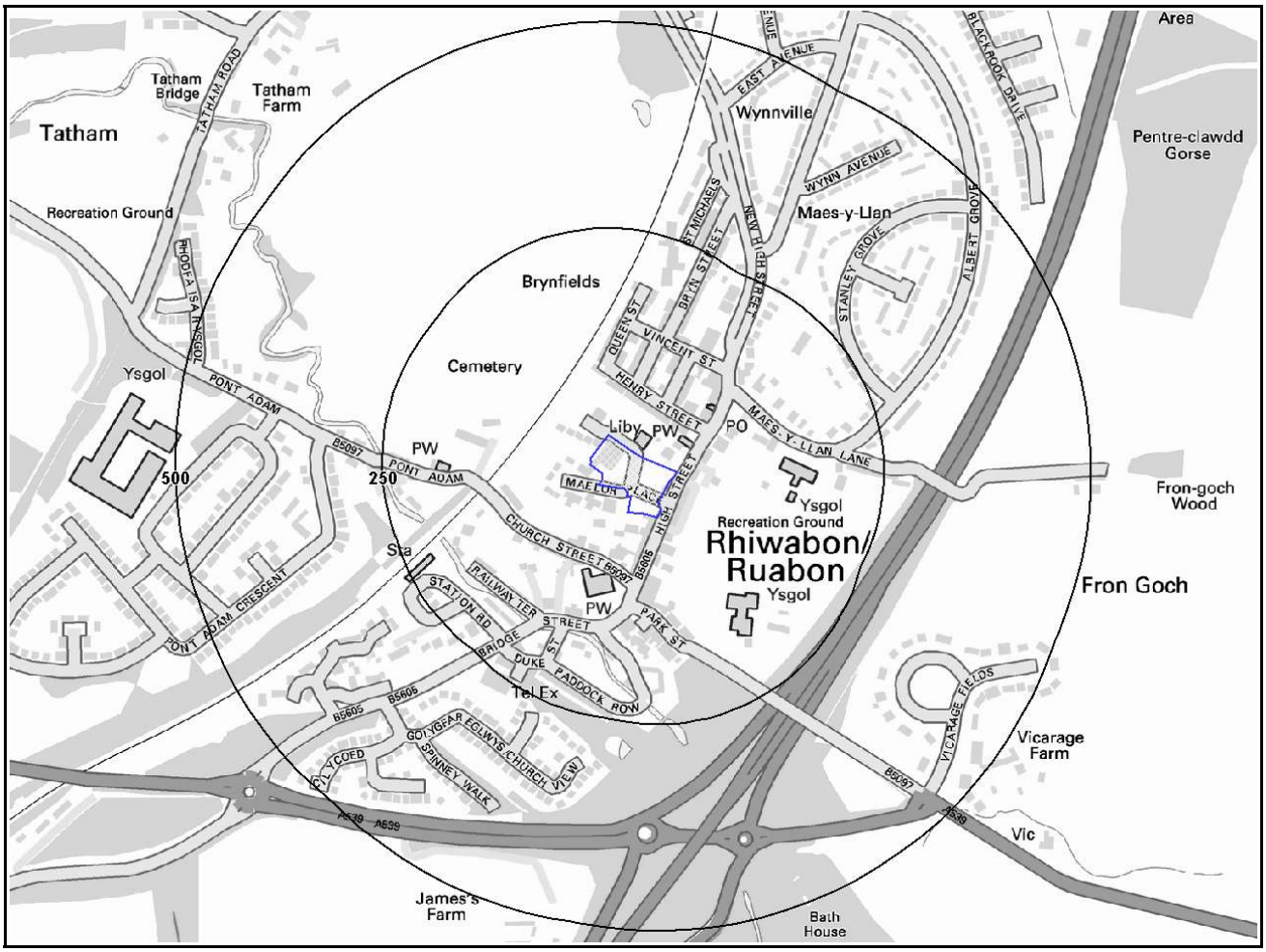
Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

NW N NE



W E

SW S SE

SPZ and Potable Water Abstraction Licenses Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2 - Outer Catchment

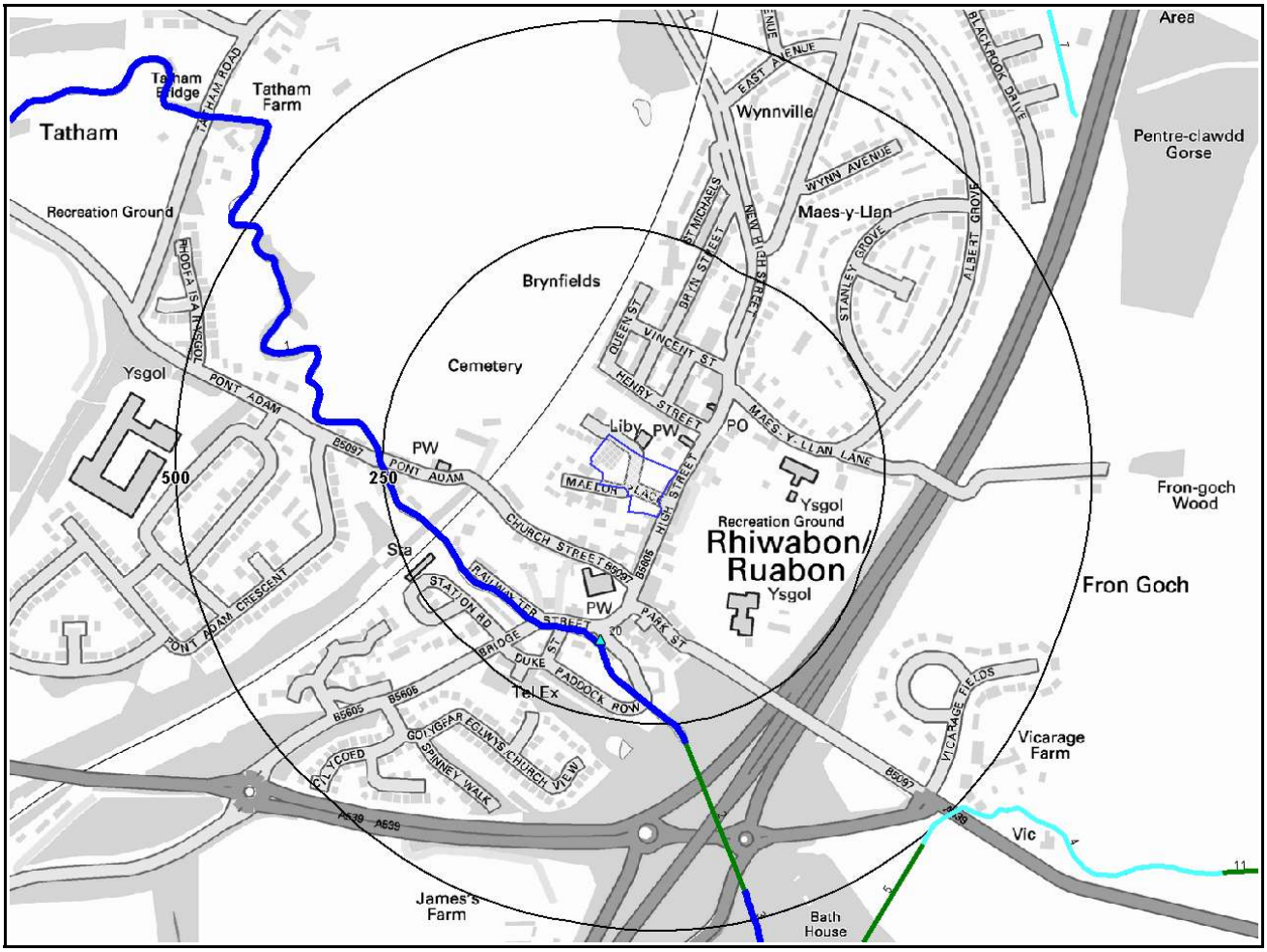
Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

5d. Hydrology – Detailed River Network and River Quality

NW N NE



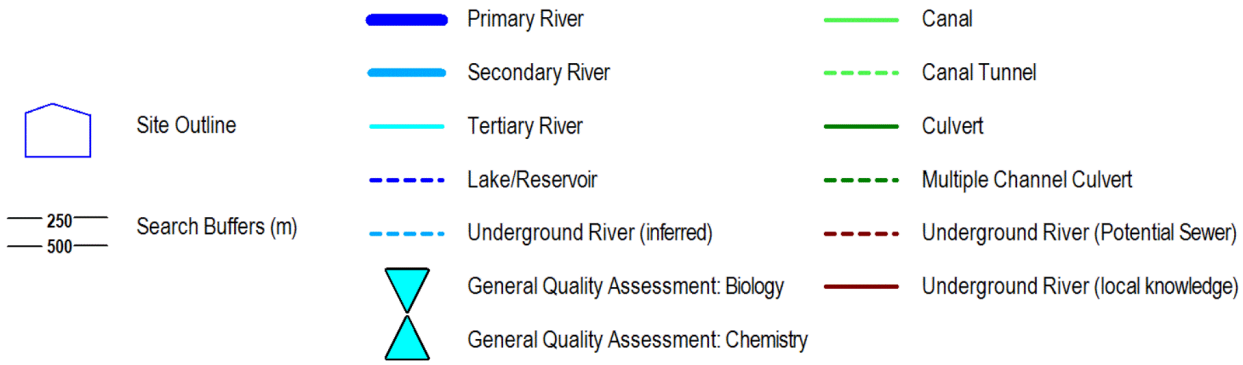
W E

SW S SE

Hydrology Legend

Mapping sourced from Ordnance Survey

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

5.Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

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

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

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance [m]	Direction	Designation	Description
1	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
8	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
9	271.0	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	297.0	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
10	313.0	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
3	344.0	NE	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	407.0	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

5.2 Aquifer within Bedrock Deposits

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

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

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance [m]	Direction	Designation	Description
1	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	268.0	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

5.3 Groundwater Abstraction Licences

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

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance	Direction	NGR	Details	
Not shown	1767.0	E		Licence No: 24/67/7/0133 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 324 Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 24/2/1967 Version End Date:
Not shown	1919.0	NE		Licence No: 24/67/7/0183 Details: General Farming & Domestic Direct Source: Eaw Groundwater Point: Well Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: N153 Original Start Date: 1/9/1975 Expiry Date: - Issue No: 100 Version Start Date: 26/4/1978 Version End Date:

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? **No**

Database searched and no data found.

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? **No**

Database searched and no data found.

5.6 Source Protection Zones

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

Database searched and no data found.

5.7 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? **Yes**

Biological Quality:

Database searched and no data found.

Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (5d):

ID	Distance [m]	Direction	NGR	River Details	Chemical Quality Grade (Headline Indicator)				
					2005	2006	2007	2008	2009
20	159.0	S	330280, 343730	River Name: Eitha Reach: Conf.r.dee W.park - Conf.trib.nr.penycae End/Start of Stretch: Sample Point NGR	A	A	A	A	-

5.8 Detailed River Network

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

The following Detailed River Network records are represented on the Hydrology Map (5d):

ID	Distance	Direction	Details	
1	155.0	S	River Name: Afon Eitha Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
2	275.0	S	River Name: Afon Eitha Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
3	462.0	S	River Name: Afon Eitha Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
4	499.0	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

5.9 Surface Water Features

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

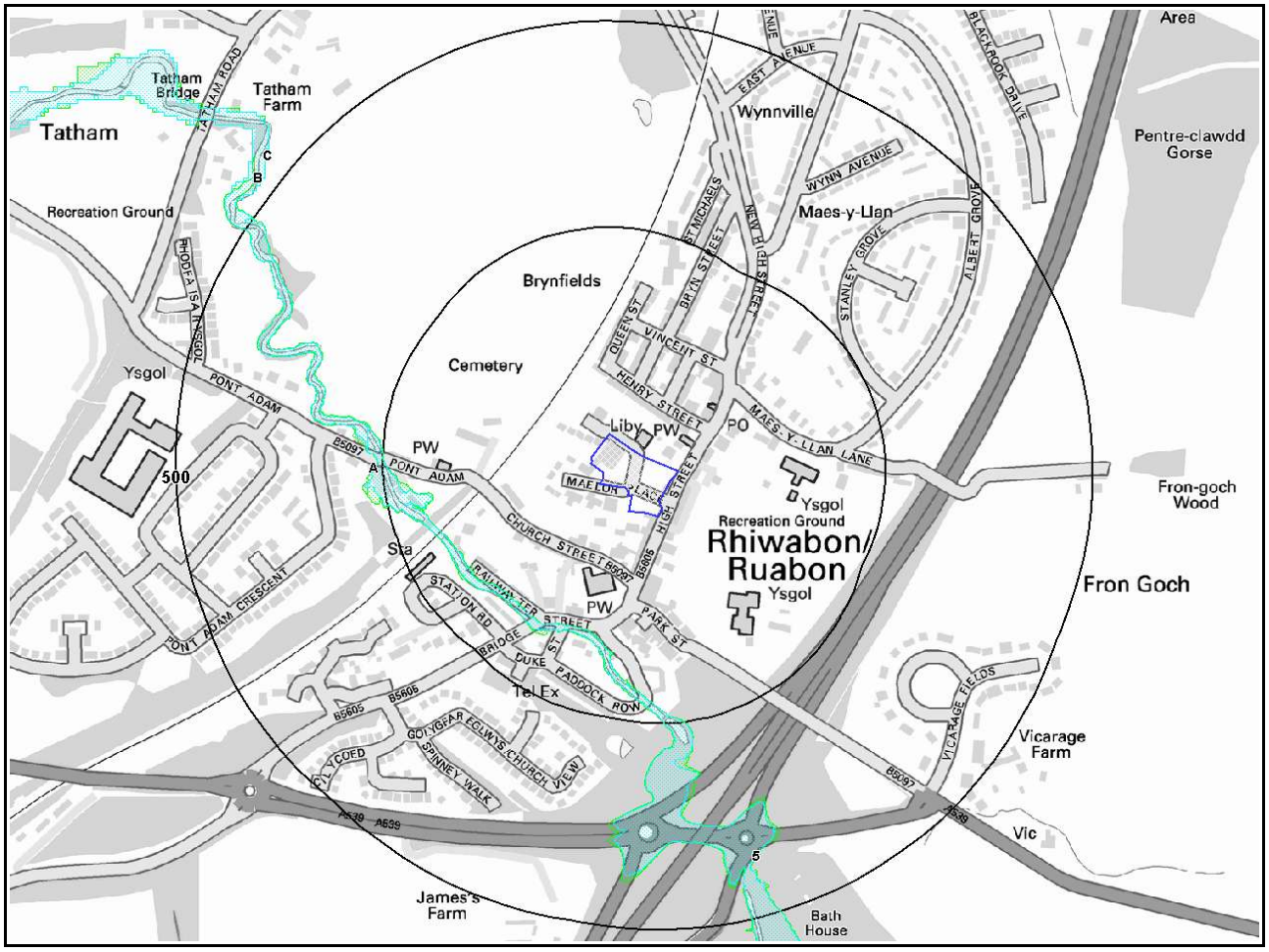
The following surface water records are not represented on mapping:

Distance to Surface Water (m)	on-site	0-50	51-250
Surface water features within 250m of the study site	No	No	Yes

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6. Environment Agency Flood Map

NW ▲ N NE



◄W E► SW S ▼ SE

Environment Agency Flood Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Zone 2 Floodplain

Zone 3 Floodplain

Flood Storage Area

Area Benefiting from Flood Defences

Flood Defences

6. Flooding

6.1 Zone 2 Flooding

Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%) or greater from rivers and the sea but less than 1% from rivers or 0.5% from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 2 floodplain? **Yes**

The following floodplain records are represented as green shading on the Flood Map:

ID	Distance	Direction	Update	Type
1	152.0	S	09-Sep-2013	Zone 2 - (Fluvial Models)

6.2 Zone 3 Flooding

Zone 3 estimates the annual probability of flooding as one in one hundred (1%) or greater from rivers and a one in two hundred (0.5%) or greater from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 3 floodplain? **Yes**

The following floodplain records are represented as blue shading on the Flood Map:

ID	Distance	Direction	Update	Type
9	153.0	S	09-Sep-2013	Zone 3 - (Fluvial Models)

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site? **No**

6.4 Areas benefiting from Flood Defences

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

6.5 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? **No**

6.6 Groundwater Flooding Susceptibility Areas

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

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

6.7 Groundwater Flooding Confidence Areas

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

Notes:

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

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

7.Designated Environmentally Sensitive Sites Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Designated Environmentally Sensitive Sites Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- Areas of Outstanding Natural Beauty
- SAC
- SPA
- Nitrate Vulnerable Zones
- SSSI
- Ramsar
- Nitrate Sensitive Areas
- NNR
- LNR
- National Parks
- World Heritage Sites
- Environmentally Sensitive Areas
- Ancient Woodlands

7.Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? **No**

Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: **3**

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

ID	Distance	Direction	SSSI Name	Data Source
Not shown	1114.0	N	Stryt Las A'r Hafod	Countryside Council for Wales
Not shown	1490.0	N	Stryt Las A'r Hafod	Countryside Council for Wales
Not shown	1955.0	SW	Afon Dyfrdwy (River Dee)	Countryside Council for Wales

Records of National Nature Reserves (NNR) within 2000m of the study site: **0**

Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 2000m of the study site: **3**

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

ID	Distance	Direction	SAC Name	Data Source
Not shown	1114.0	N	Johnstown Newt Sites	Countryside Council for Wales
Not shown	1490.0	N	Johnstown Newt Sites	Countryside Council for Wales
Not shown	1955.0	SW	River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (Wales)	Countryside Council for Wales

Records of Special Protection Areas (SPA) within 2000m of the study site: **0**

Database searched and no data found.

Records of Ramsar sites within 2000m of the study site: **0**

Database searched and no data found.

Records of Local Nature Reserves (LNR) within 2000m of the study site: **0**

Database searched and no data found.

Records of World Heritage Sites within 2000m of the study site: **1**

The following World Heritage Site records provided by English Heritage and Cadw are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance	Direction	World Heritage Site Name	Data Source
Not shown	1889.0	SW	Pontcysyllte Aqueduct and Canal Buffer Zone	English Heritage

Records of Environmentally Sensitive Areas within 2000m of the study site: **0**

Database searched and no data found.

Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site: **0**

Database searched and no data found.

Records of National Parks (NP) within 2000m of the study site: **0**

Database searched and no data found.

Records of Nitrate Sensitive Areas within 2000m of the study site: **0**

Database searched and no data found.

Records of Nitrate Vulnerable Zones within 2000m of the study site: **0**

Database searched and no data found.

Records of Ancient Woodland within 2000m of the study site: **8**

The following Ancient Woodland records are supplied by English Nature/Scottish Natural Heritage/Countryside Council for Wales and are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance	Direction	Ancient Woodland Name	Type
8	168.0	S	Unknown	Ancient Replanted Woodland
9	458.0	S	Unknown	Ancient Replanted Woodland
10	963.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1328.0	S	NANT-Y-CAE-COCH WOOD/BATHGROUND/+	Ancient and Semi-Natural Woodland
12	1419.0	SW	Unknown	Ancient Replanted Woodland
Not shown	1421.0	SW	HOPYARD WOOD	Ancient and Semi-Natural Woodland
Not shown	1791.0	S	Unknown	Ancient Replanted Woodland
Not shown	1836.0	S	Unknown	Ancient and Semi-Natural Woodland

8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

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

8.1.1 Shrink Swell

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

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

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

8.1.2 Landslides

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

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

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

8.1.3 Soluble Rocks

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

Soluble rocks are not present in the search area. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

8.1.4 Compressible Ground

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

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

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

8.1.5 Collapsible Rocks

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

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

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

8.1.6Running Sand

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

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

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

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

9.Mining

9.1 Coal Mining

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

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

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

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*? **Negligible**

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? **No**

Guidance: No Guidance Required.

10.Contacts

CENTREMAPS

Telephone: 01886 832972
groundsure@centremaps.co.uk
CENTREMAPS, Brockamin House, Leigh, Worcester, London, WR6 5JU

Directors: M C Walker, MInst C.E.S., C M Walker,
S J Hawkins BSc (Hons), S E Stewart BSc (Hons)
Registered No. 1890261 Registered in England and Wales
Registered Company: Laser Surveys Limited
Brockamin House, Leigh, Worcester, WR6 5JU.

British Geological Survey (England & Wales)

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276. Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

Environment Agency

National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY
Tel: 08708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk

Public Health England

Public information access office, Public Health England
Wellington House, 133-155 Waterloo Road, London, SE1 8UG
https://www.gov.uk/government/organisations/public-health-england
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000

The Coal Authority

200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5
Web: www.groundstability.com

Ordnance Survey

Romsey Road
Southampton SO16 4GU
Tel: 08456 050505

Local Authority

Authority: Wrexham County Borough Council
Phone: 01978 292000
Web: www.wrexham.gov.uk
Address: The Guildhall, Wrexham, LL11 1AY

Get Mapping PLC

Virginia Villas, High Street, Hartley Witney, Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements

Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, English Nature who retain the Copyright and Intellectual Property Rights for the data.

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:
"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.
"Client" means the party or parties entering into a Contract with GroundSure.
"Commercial" means any building or property which is not Residential.
"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than
(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and
(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).
"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.
"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.
"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.
"Data Reports" means reports comprising factual data with no accompanying interpretation.
"Fees" has the meaning set out in clause 5.1.
"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.
"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.
"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.
"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.
"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.
"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.
"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.
"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.
"Residential" means any building or property used as or intended to be used as a single dwelling.
"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.
"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.
"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.
"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.
"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.
2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.
2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.
2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.
2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.
2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and
(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and
(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.
3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.
3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.
3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.
3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.
3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.
4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;
(i) the Beneficiary,
(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
(iv) the first purchaser or first tenant of the Site, and
(v) the professional advisers and lenders of the first purchaser or tenant of the Site.
4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.
4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").
5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.
5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to
(i) full payment of all relevant Fees and
(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.
6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.
6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.
6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:
(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;
(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;
(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
(iv) not combine the Services with or incorporate such Services into any other information data or service;
(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);
(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and
(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,
6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.
6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:
(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;
(ii) any use made of the Reports, Services, Materials or any part of them; and
(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.
7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.
7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.
7.4 GroundSure shall not be liable for
(i) loss of profits;
(ii) loss of business;
(iii) depletion of goodwill and/or similar losses;
(iv) loss of anticipated savings;
(v) loss of goods;
(vi) loss of contract;
(vii) loss of use;
(viii) loss or corruption of data or information;
(ix) business interruption;
(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;
(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
(xiii) loss or damage to a computer, software, modem, telephone or other property; and
(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.
7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.
7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.
8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:
(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or
(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.
9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:
(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and
(ii) the Reports and/or Mapping provided under this Contract are
(a) supplied to the Client's specification(s) and in any event
(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:
(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and
(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract. 11 Anti-Bribery
11.1 The Client warrants that it shall:
(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;
(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and
(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.
11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.
12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.
12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.
12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.
12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:
(i) the Client or Beneficiary's failure to provide facilities, access or information;
(ii) fire, storm, flood, tempest or epidemic;
(iii) Acts of God or the public enemy;
(iv) riot, civil commotion or war;
(v) strikes, labour disputes or industrial action;
(vi) acts or regulations of any governmental or other agency;
(vii) suspension or delay of services at public registries by Third Party Data Providers;
(viii) changes in law; or
(ix) any other reason beyond GroundSure's reasonable control.
In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.
12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.
12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.
12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.
12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.
12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.
12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

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APPENDIX H

centremapslive.com
the mapping portal from Laser Surveys

CENTREMAPS
Brockamin House,
Worcester, WR6 5JU

Report Reference:	CMAPS-CM-265373-7904-151013GEO
Your Reference:	7904
Report Date	15 Oct 2013
Report Delivery Method:	Email - pdf

GroundSure GeoInsight

Address: MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure GeoInsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

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GroundSure
ENVIRONMENTAL INSIGHT

GroundSure GeoInsight

Address: MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Date: 15 Oct 2013

Report Reference: CMAPS-CM-265373-7904-151013GEO

Your Reference: 7904



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If you would like any further assistance regarding this report then please contact
CENTREMAPS on (T) 01886 832972, (F) 01883 833485, email: groundsure@centremaps.co.uk

Aerial Photograph of Study Site

NW N NE



W E

SW S SE

Aerial photography supplied by Getmapping PLC.
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Site Name: MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN
Grid Reference: 330320,343930
Size of Site: 0.51 ha

Overview of Findings

The GroundSure GeoInsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and GroundSure's unique database including historical surface ground and underground workings.

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

Report Section	Number of records found within (X) m of the study site boundary
1. Geology	**Description**
1.1 Artificial Ground,	
1.1.1 Is there any Artificial Ground /Made Ground present beneath the study site?*	No
1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology & Landslips	
1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?	Yes
1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
1.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No
1.3 Bedrock, Solid Geology & Faults	
1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
1.3.2 Are there any records relating to permeability of bedrock within the study site* boundary?	Yes
1.3.3 Are there any records of faults within 500m of the study site boundary?	Yes
1.3.4 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is in a Radon Affected Area, as between 3 and 5% of properties are above the Action Level
1.3.5 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	Basic radon protective measures are necessary

* This includes an automatically generated 50m buffer zone around the site

Source:Scale 1:50,000 BGS Sheet No:121

2. Ground Workings	on-site	0-50	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	2	14	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	0	0	0	3	5
2.3 Current Ground Workings	0	0	0	0	3

3. Mining, Extraction & Natural Cavities	on-site	0-50	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	3	5
3.2 Coal Mining	1	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining*	1	0	0	1	1
3.5 Non–Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

*This includes an automatically generated 50m buffer zone around the site

4. Natural Ground Subsidence	on-site*	0-50	51-250	251-500	501-1000
4.1 Shrink-Swell Clay	Very Low	-	-	-	-
4.2 Landslides	Very Low	-	-	-	-
4.3 Ground Dissolution of Soluble Rocks	Null	-	-	-	-
4.4 Compressible Deposits	Negligible	-	-	-	-
4.5 Collapsible Deposits	Very Low	-	-	-	-
4.6 Running Sand	Very Low	-	-	-	-

* This includes an automatically generated 50m buffer zone around the site

5. Borehole Records	on-site	0-50	51-250	251-500	501-1000
5.1 BGS Recorded Boreholes	1	2	3	-	-

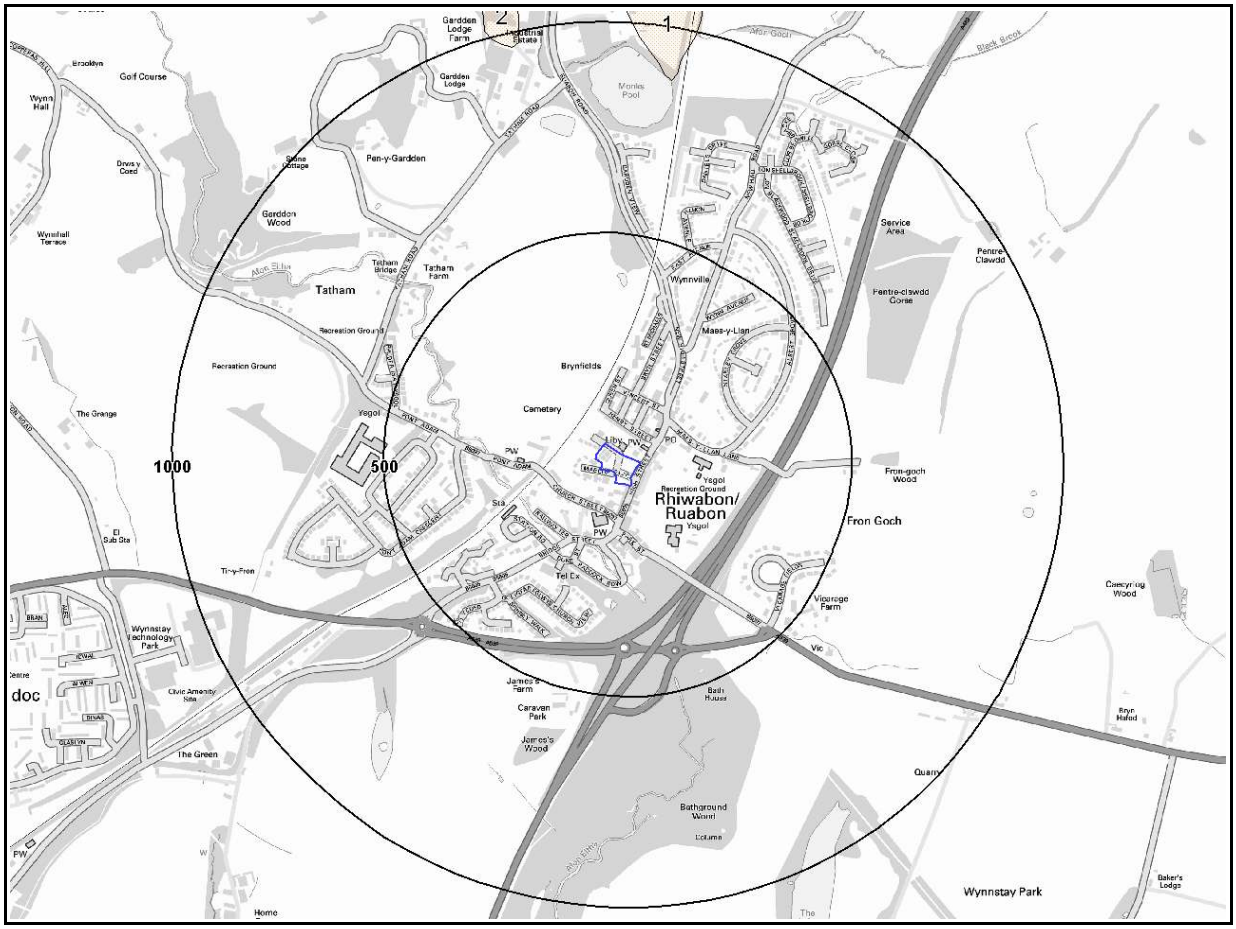
6. Estimated Background Soil Chemistry	on-site	0-50	51-250	251-500	501-1000
6.1 Records of Background Soil Chemistry	2	3	0	-	-

1.1 Artificial Ground Map

NW N NE

W E

SW S SE



Artificial Ground Legend

Mapping sourced from Ordnance Survey

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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:121

1.1.1 Artificial/Made Ground

Are there any records of Artificial/Made Ground within 500m of the study site boundary? **No**

Database searched and no data found.

1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site* boundary? **No**

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site.

1.2 Superficial Deposits and Landslips Map

NW N NE

W E

SW S SE



Superficial and Landslips Legend

Mapping sourced from Ordnance Survey

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Site Outline

500
1000
Search Buffers (m)

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/Drift Geology

Are there any records of Superficial Deposits/Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	Lex Code	Description	Rock Description
1	0.0	On Site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	0.0	On Site	GFDUD-SAGR	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
3	313.0	W	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
4	344.0	NE	GFDUD-SAGR	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
5	395.0	S	ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
6	407.0	W	RTDU-SAGR	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site* boundary? Yes

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	High
0.0	On Site	Mixed	High	Low

1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site* boundary? No

Database searched and no data found.

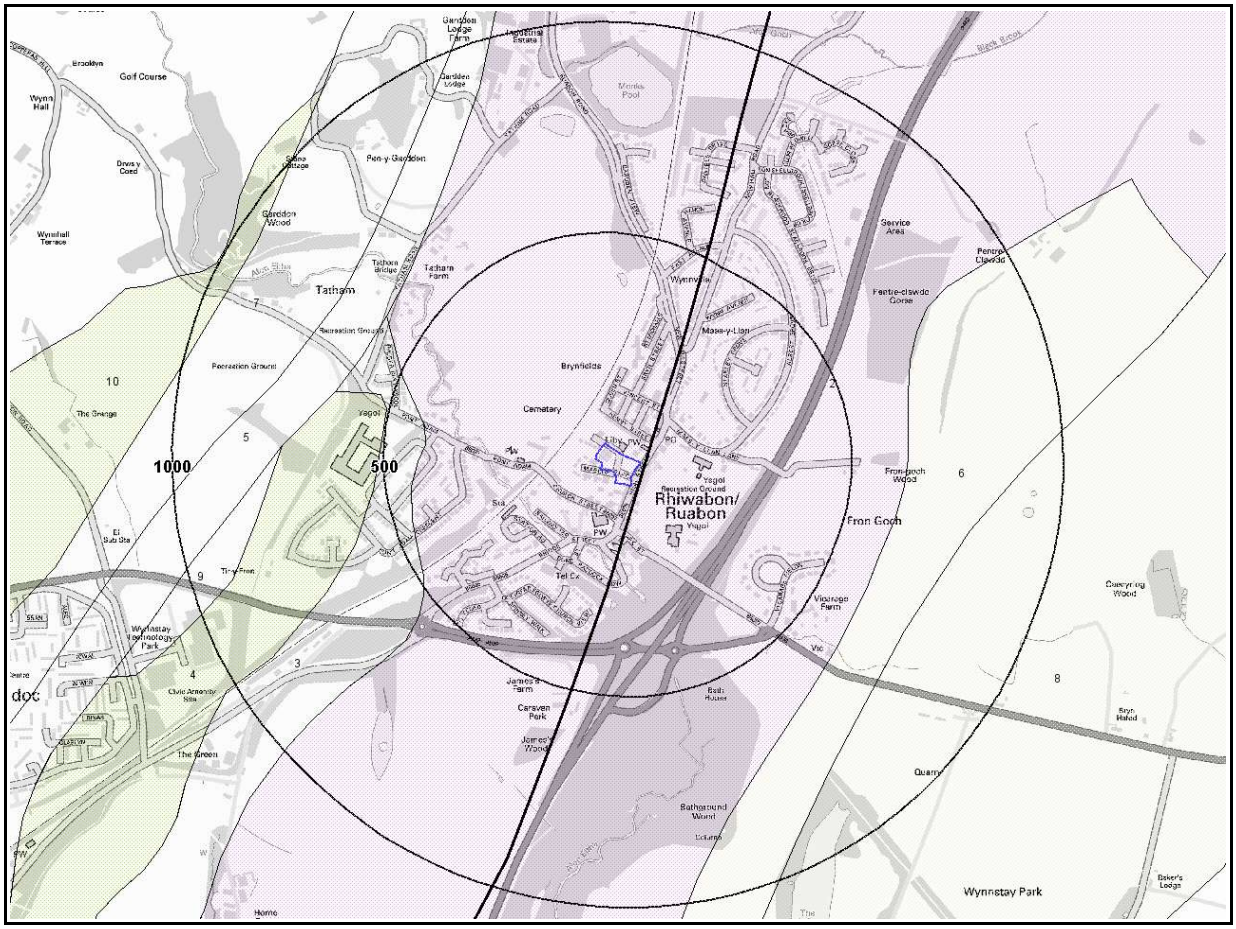
*This includes an automatically generated 50m buffer zone around the site.

1.3 Bedrock and Faults Map

NW N NE

W E

SW S SE



Bedrock & Faults Deposits Legend

Mapping sourced from Ordnance Survey

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Site Outline

500
1000
Search Buffers (m)

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:121

1.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	ETM-MDST	Etruria Formation - Mudstone	Westphalian
2	13.0	E	ETM-MDST	Etruria Formation - Mudstone	Westphalian
3	402.0	W	PLMC-MDSS	Pennine Lower Coal Measures Formation And Pennine Middle Coal Measures Formation (undifferentiated) - Mudstone, Siltston	Bolsovian (westphalian C) / Langsettian (westphalian A)

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site* boundary? Yes

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Low	Low

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	Category Description	Feature Description
11	13.0	E	FAULT	Normal fault, inferred

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3.4 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is in a Radon Affected Area, as between 3 and 5% of properties are above the Action Level

1.3.5 Radon Protection

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

* This includes an automatically generated 50m buffer zone around the site.

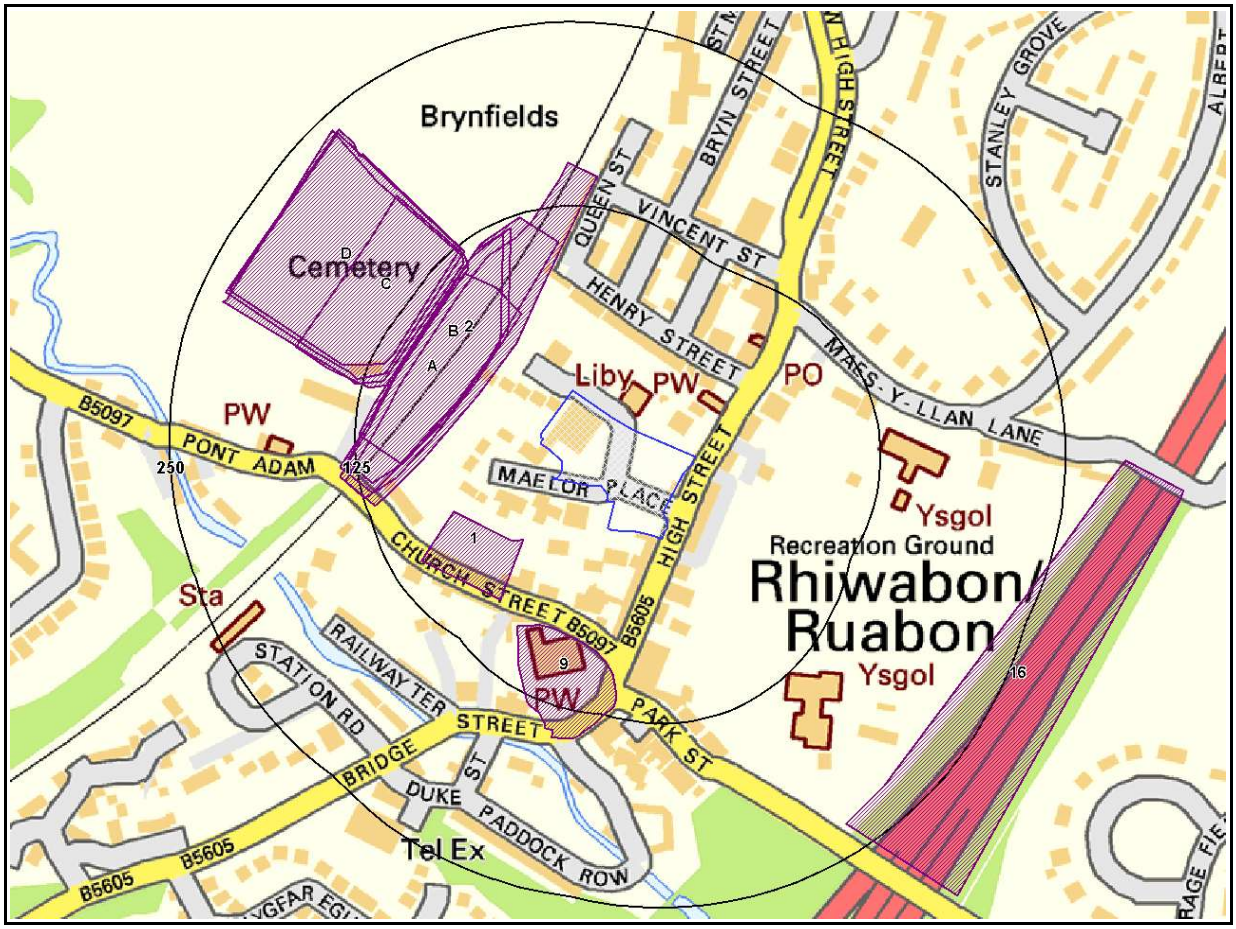
Basic radon protective measures are necessary

2. Ground Workings Map

NW N NE

W E

SW S SE



Ground Workings Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

2. Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1	46.0	SW	330222,343868	Grave Yard	1873
2	50.0	NW	330221,344018	Cuttings	1873
3A	56.0	NW	330193,343983	cuttings	1949
4A	57.0	NW	330190,344000	Cuttings	1949
5A	57.0	NW	330190,344000	Cuttings	1949
6B	57.0	NW	330198,343994	cuttings	1993
7B	57.0	NW	330198,343994	cuttings	1968
8B	58.0	NW	330186,343975	Cuttings	1898
9	77.0	SW	330286,343782	Grave Yard	1873
10 C	103.0	NW	330161,344047	Cemetery	1898
11 C	103.0	NW	330161,344047	Cemetery	1873
12 D	108.0	NW	330135,344071	Cemetery	1949
13 D	110.0	NW	330137,344072	Cemetery	1949
14 D	113.0	NW	330139,344072	Cemetery	1993
15 D	113.0	NW	330139,344072	Cemetery	1968
16	221.0	SE	330589,343785	Cuttings	1993

2.2 Historical Underground Workings Features derived from Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? Yes

The following Historical Underground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	410.0	N	330314,344393	Unspecified Old Shaft	1949
Not shown	413.0	N	330316,344395	Unspecified Old Shaft	1949
Not shown	413.0	N	330316,344395	Unspecified Old Shaft	1898
Not shown	735.0	SW	329411,343417	Colliery	1949

Not shown	751.0	N	330058,344811	Colliery	1873
Not shown	772.0	SW	329413,343360	Unspecified Disused Mine	1960
Not shown	872.0	N	330526,345257	Colliery	1949
Not shown	923.0	SW	329346,343325	Colliery	1873

2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? **Yes**

The following Current Ground Workings information is provided by British Geological Society:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	528.0	N	3302 00,34 4500	Clay & Shale	Gardden	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	933.0	SW	3294 20,34 3550	Sandstone	Wynnstay	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	996.0	NW	3294 10,34 4455	Sandstone	Gardden Lodge Quarries	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3. Mining, Extraction & Natural Cavities Map

NW N NE



W E

SW S SE

Mining, Extraction & Natural Cavities Legend

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities

Non-Coal Mining

Highly likely

Likely

Unlikely

Highly unlikely

Rare

3.Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? **Yes**

The following Historical Mining information is provided by Groundsure :

ID	Distance (m)	Direction	NGR	Details	Date
4A	410.0	N	330314,344 393	Unspecified Old Shaft	1949
5A	413.0	N	330316,344 395	Unspecified Old Shaft	1898
6A	413.0	N	330316,344 395	Unspecified Old Shaft	1949
7	735.0	SW	329411,343 417	Colliery	1949
Not shown	751.0	N	330058,344 811	Colliery	1873
9	772.0	SW	329413,343 360	Unspecified Disused Mine	1960
Not shown	872.0	N	330526,345 257	Colliery	1949
Not shown	923.0	SW	329346,343 325	Colliery	1873

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? **Yes**

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

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

3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? **No**

The following information provided by JPB is not represented on Mapping:

Database searched. No results found.

3.4 Non – Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? **Yes**

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

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Not available	Vein Mineral	Rare - Infrequent minor mining may have occurred but restricted in extent.
2	402.0	W	Not available	Iron Ore (Bedded)	Highly Unlikely - Localised small scale mining may have occurred but restricted in extent.
Not shown	917.0	N	Not available	Iron Ore (Bedded)	Highly Unlikely - Localised small scale mining may have occurred but restricted in extent.

3.5 Non – Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? **No**

Database searched and no data found.

3.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? **No**

Database searched and no data found.

3.7 Brine Extraction

This dataset provides information from the Brine Compensation Board which has been discontinued and is now covered by the Coal Authority.

Are there any Brine Extraction areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level. More detailed information on potential Tin Mining may be found in Section 3.4 – Non-Coal Mining Hazards.

Are there any Tin Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.10 Clay Mining

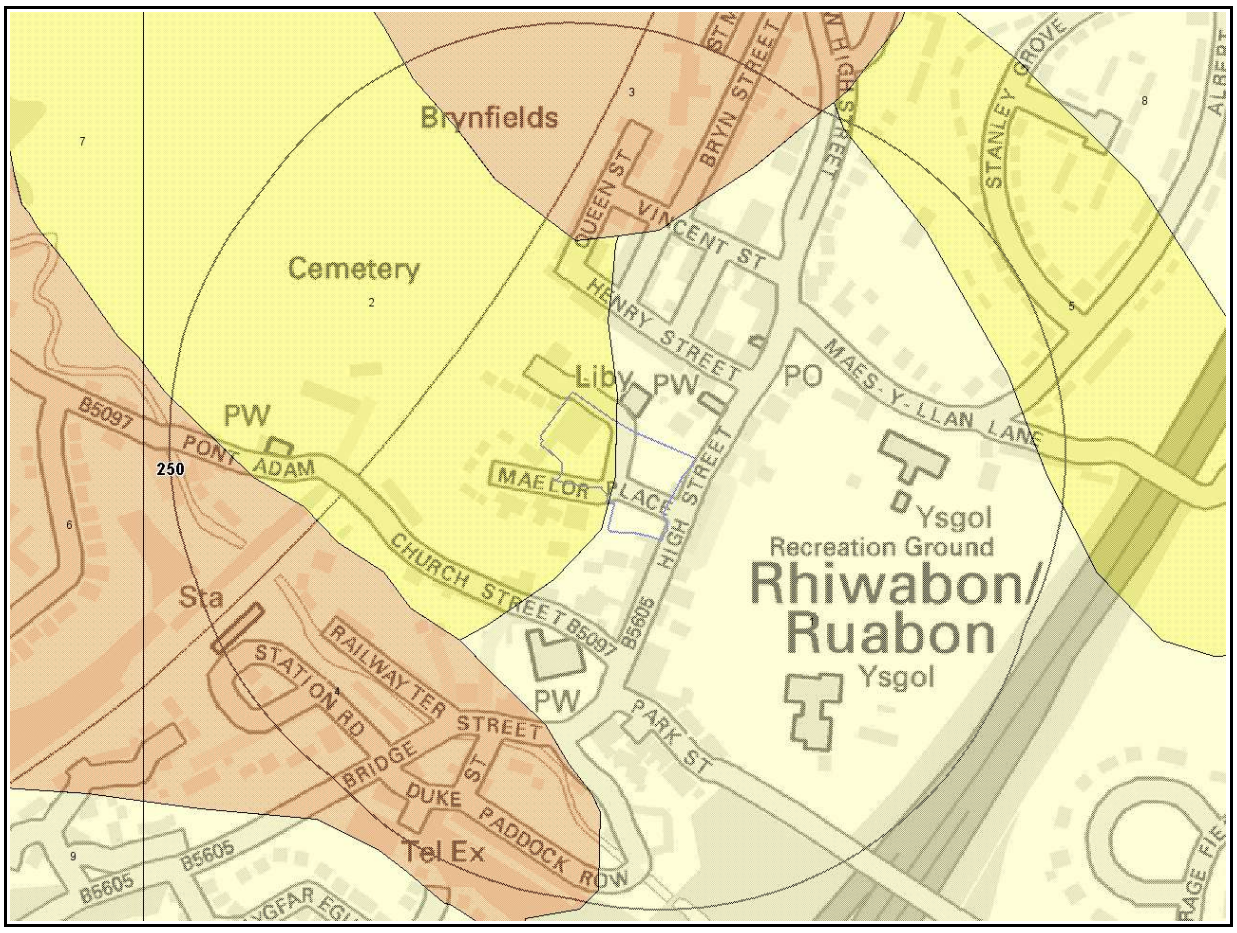
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

4. Natural Ground Subsidence
4.1 Shrink-Swell Clay Map

NW N NE



W E

SW S SE

Shrink-Swell Clay Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

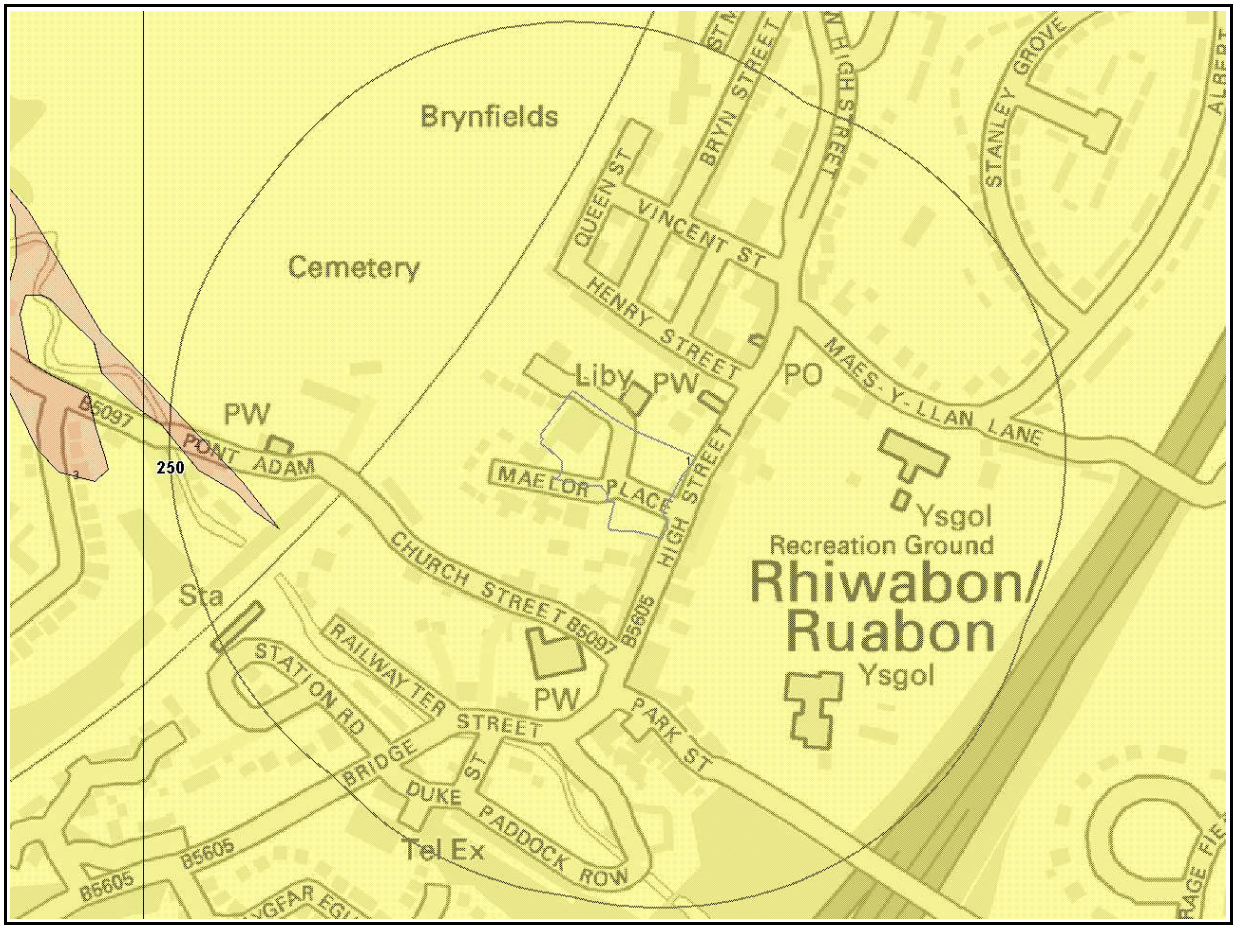
Low
Moderate
High

4.2 Landslides Map

NW N NE

W E

SW S SE



Landslides Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

Moderate

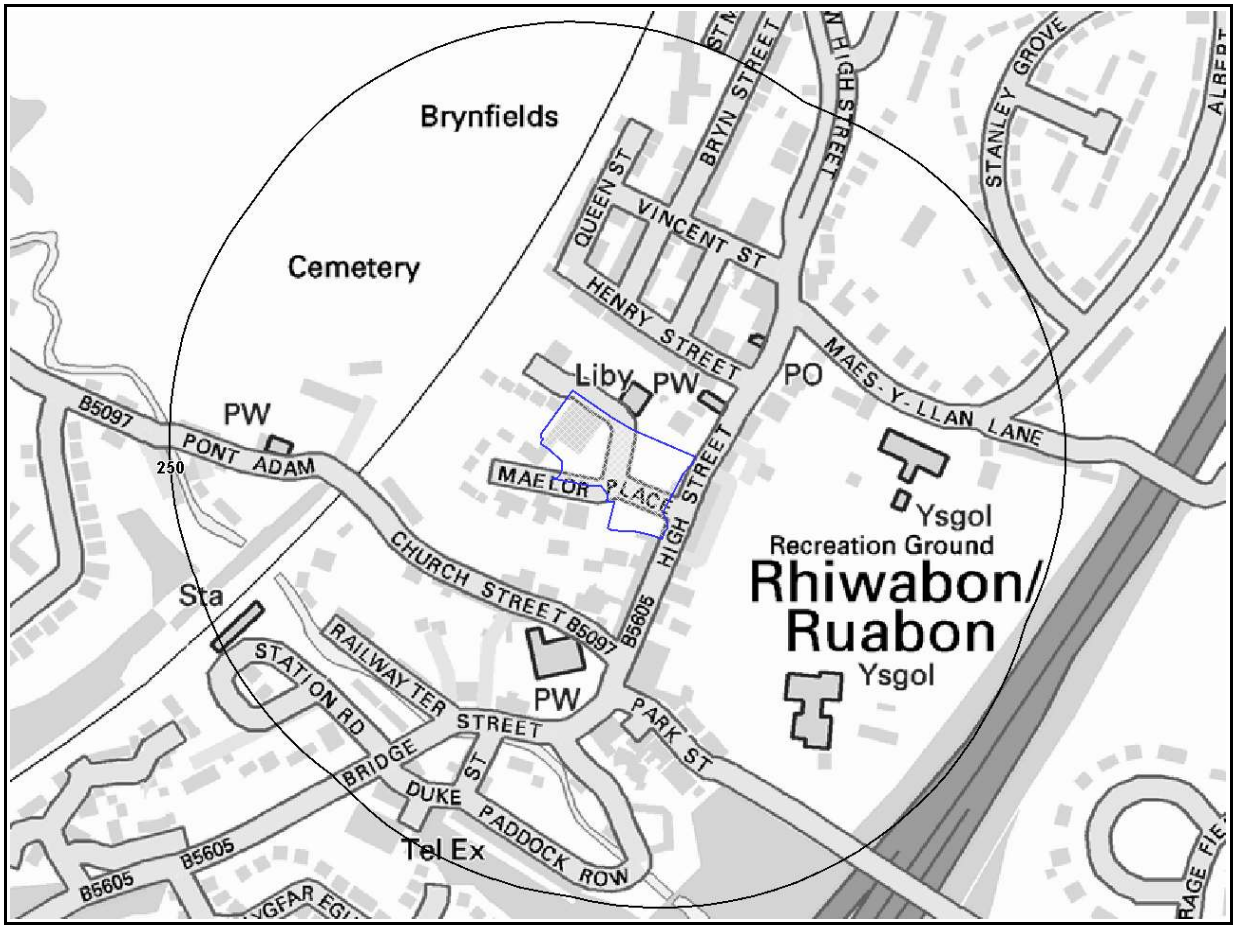
High

4.3 Ground Dissolution Soluble Rocks Map

NW N NE

W E

SW S SE



Ground Dissolution Soluble Rocks Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

Moderate

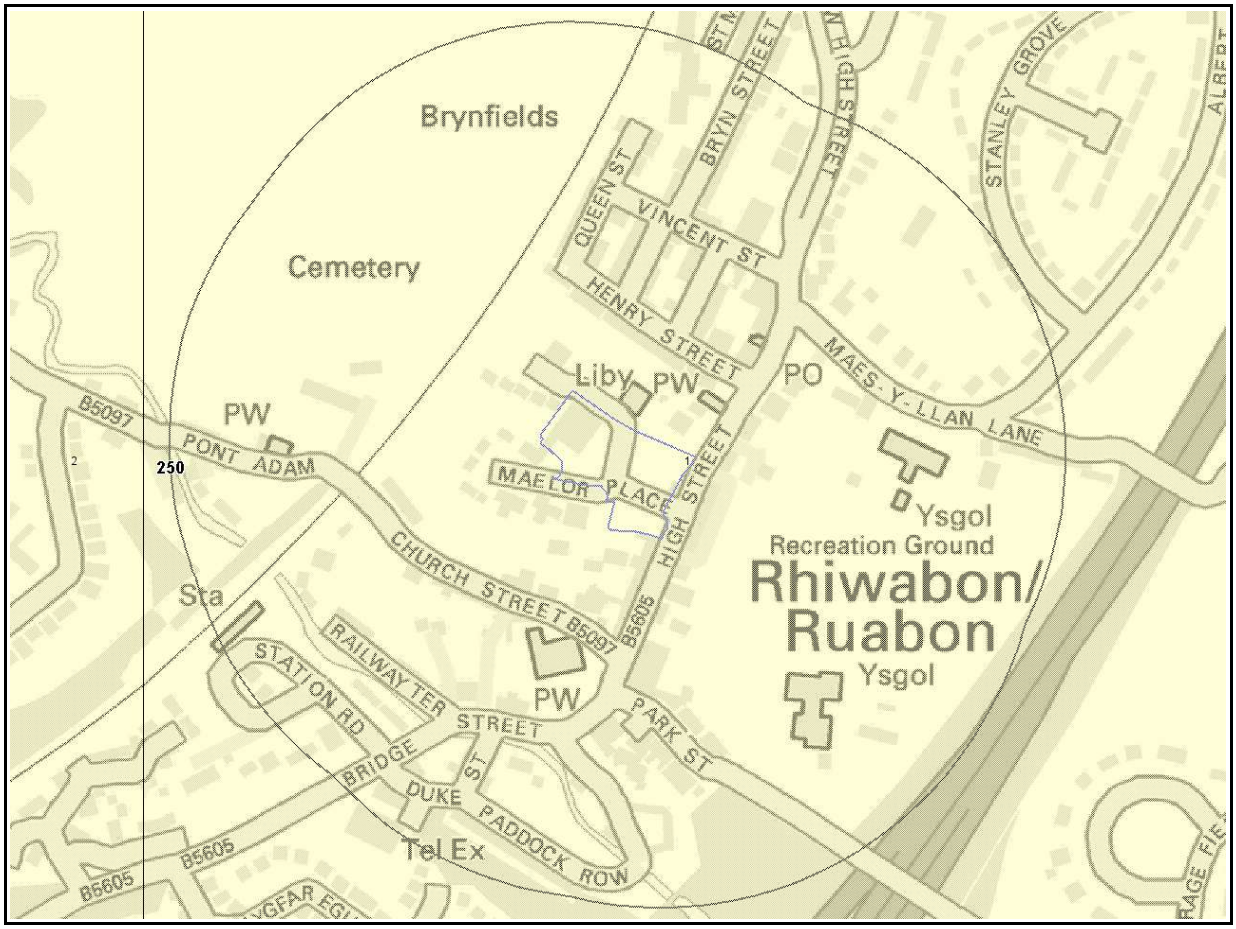
High

4.4 Compressible Deposits Map

NW N NE

W E

SW S SE



Compressible Deposits Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

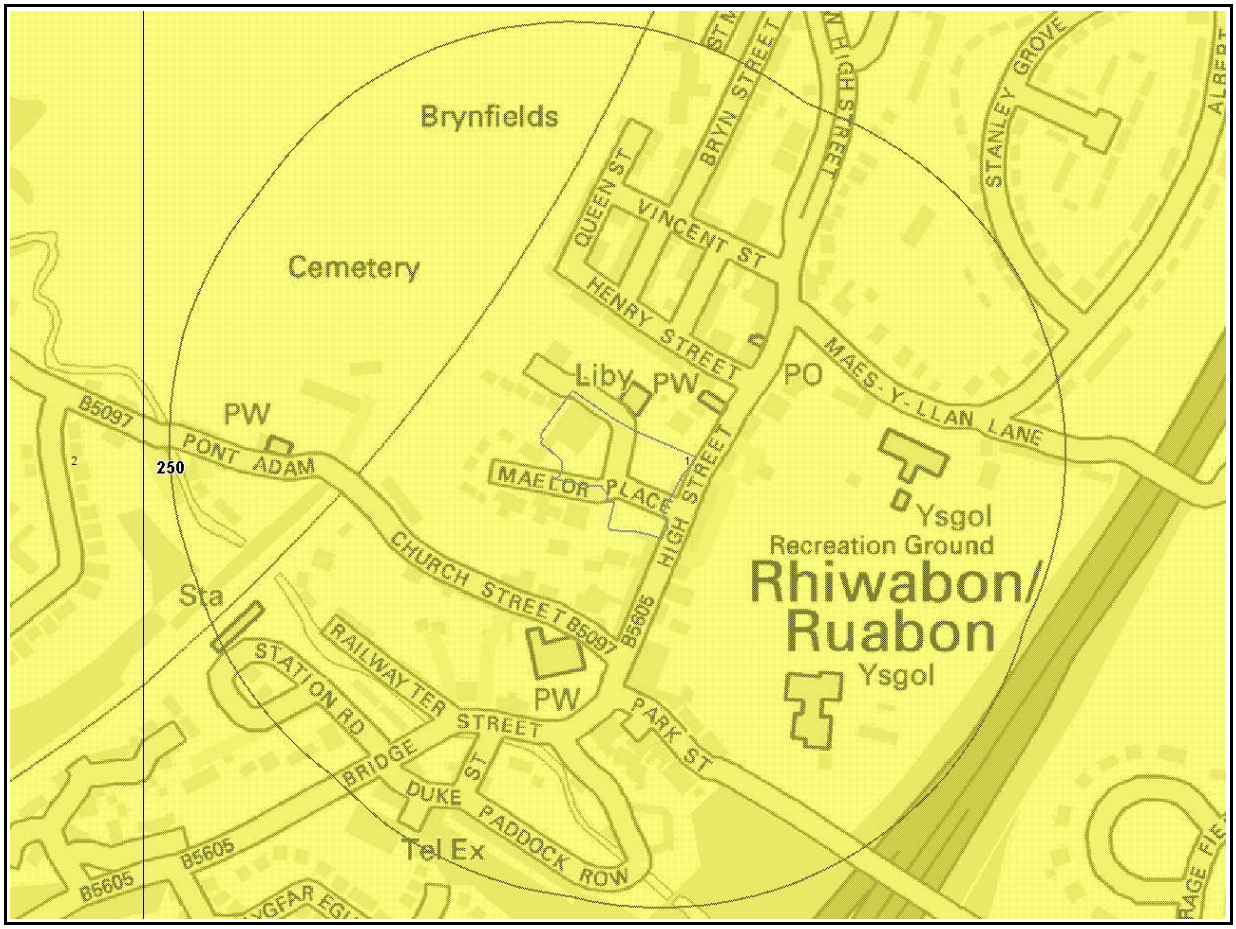
Low
Moderate
High

4.5 Collapsible Deposits Map

NW N NE

W E

SW S SE



Collapsible Deposits Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

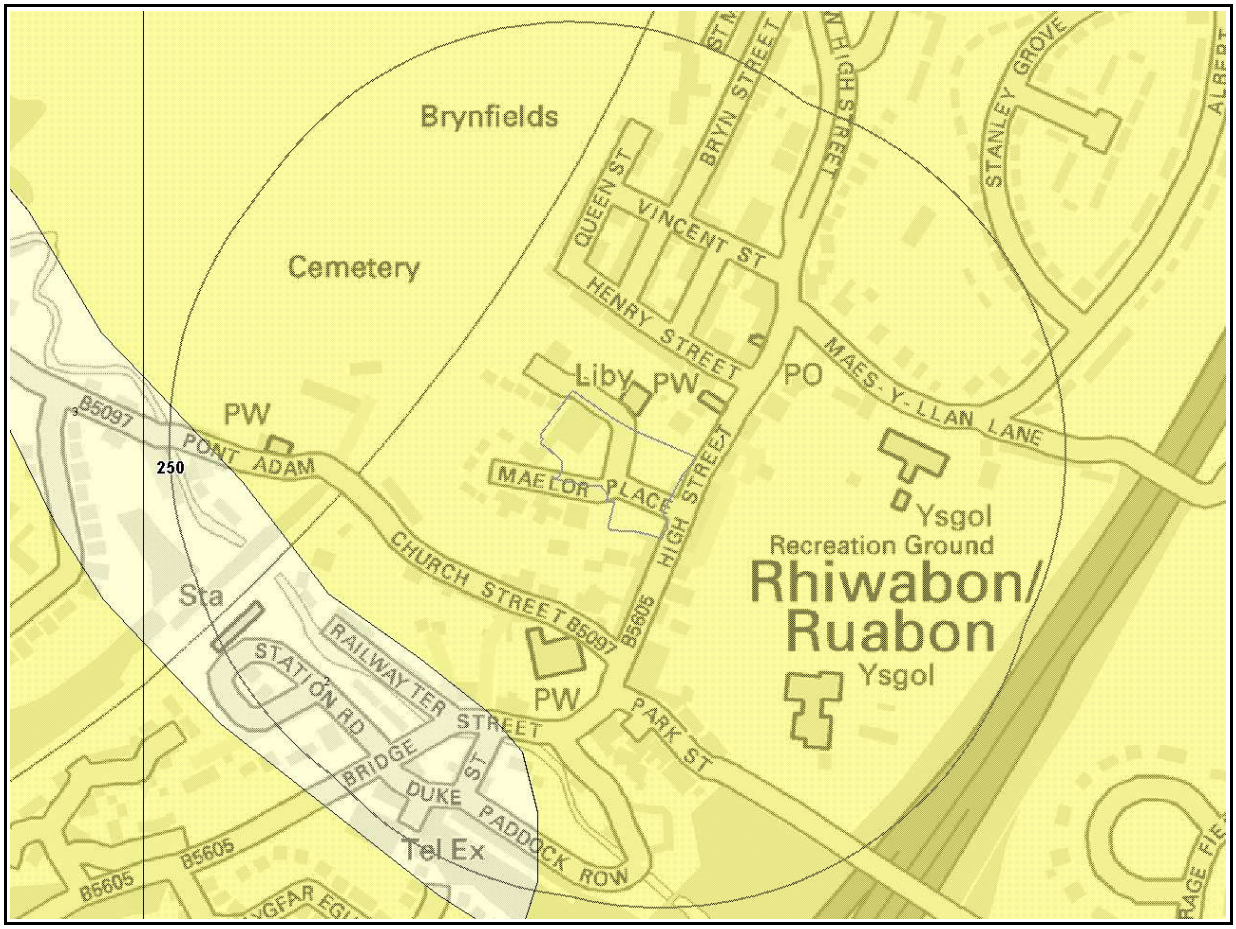
Low
Moderate
High

4.6 Running Sand Map

NW N NE

W E

SW S SE



Running Sand Legend

Mapping sourced from Ordnance Survey

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Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? Very Low

4.1 Shrink – Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m) *	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

4.3 Ground Dissolution of Soluble Rocks

The following Soluble Rocks information provided by the British Geological Survey:

Distance (m)*	Direction	Hazard Rating	Details
0.0	On site	Null-Negligible	Soluble rocks are not present in the search area. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

4.4 Compressible Deposits

*This includes an automatically generated 50m buffer zone around the study site boundary.

The following Compressible Ground information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

4.5 Collapsible Deposits

The following Collapsible Rocks information is provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

4.6 Running Sands

The following Running Sands information is provided by the British Geological Survey:

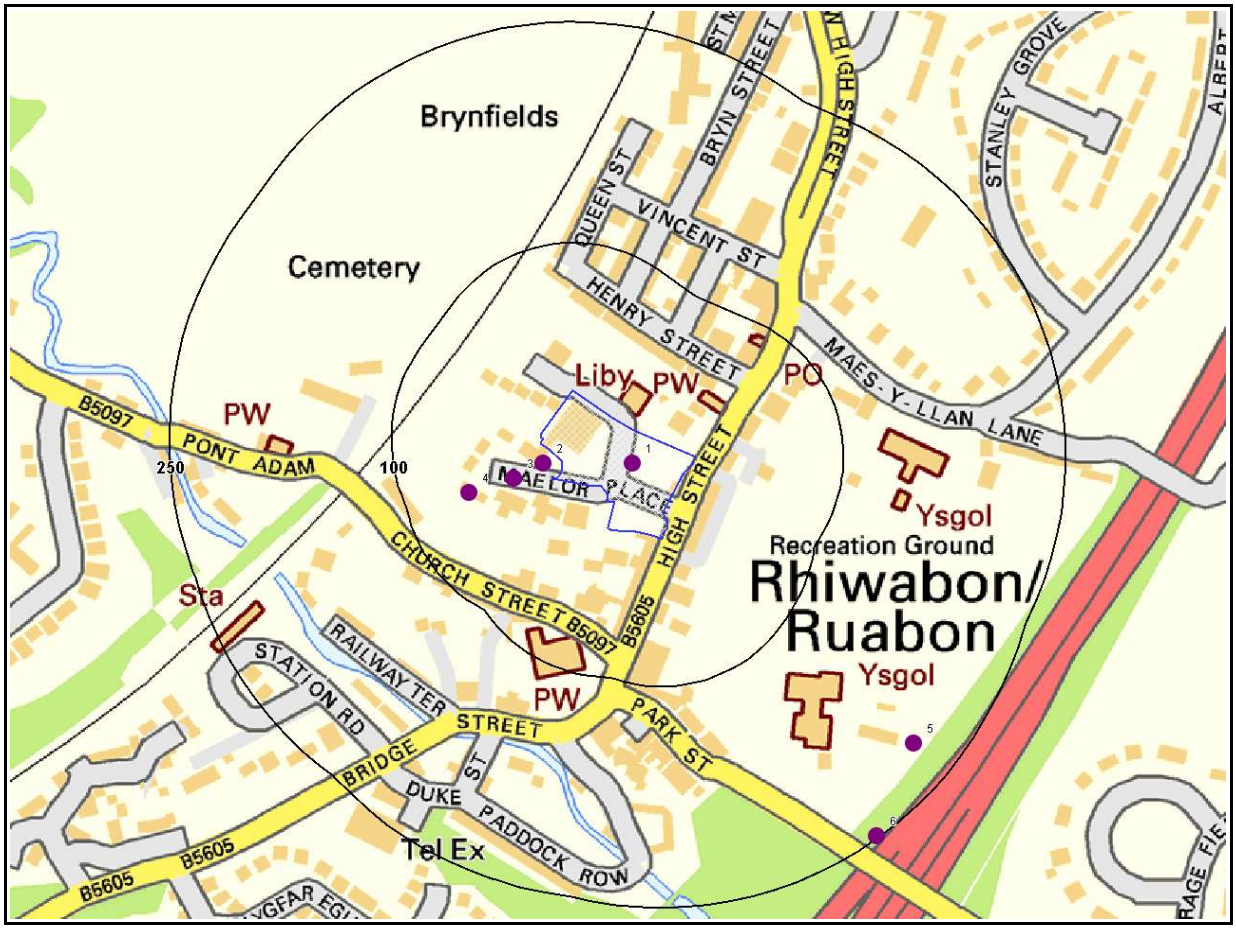
ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

5. Borehole Records Map

NW N NE

W E

SW S SE



Borehole Records Legend

Mapping sourced from Ordnance Survey

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Site Outline

Borehole Locations

125
250
Search Buffers (m)

5.Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 6

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length (m)	Borehole Name
1	0.0	On Site	330330,343930	SJ34SW88	4.87	RUABON 3
2	10.0	SW	330270,343930	SJ34SW86	4.26	RUABON 1
3	26.0	W	330250,343920	SJ34SW89	4.87	RUABON 4
4	57.0	W	330220,343910	SJ34SW87	4.11	RUABON 2
5	220.0	SE	330520,343740	SJ34SW115	8.53	WREXHAM SEWERAGE 11
6	249.0	SE	330495,343677	SJ34SW56	-1.0	RUABON BYPASS 235

Additional online information is available for the following boreholes listed above:

#1: http://scans.bgs.ac.uk/sobi_scans/boreholes/154023
#2: http://scans.bgs.ac.uk/sobi_scans/boreholes/154021
#3: http://scans.bgs.ac.uk/sobi_scans/boreholes/154024
#4: http://scans.bgs.ac.uk/sobi_scans/boreholes/154022
#5: http://scans.bgs.ac.uk/sobi_scans/boreholes/17087486
#6: http://scans.bgs.ac.uk/sobi_scans/boreholes/153991

6.Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary: 5

For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight User Guide, available on request.

			Estimated Geometric Mean Soil Concentrations (mg/kg)				
Distance (m)*	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
13.0	E	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
20.0	N	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
32.0	NE	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

7. Contacts

CENTREMAPS

Telephone: 01886 832972
groundsure@centremaps.co.uk
CENTREMAPS, Brockamin House, Leigh, Worcester, London, WR6 5JU

Directors: M C Walker, MInst C.E.S., C M Walker, S J Hawkins BSc (Hons), S E Stewart BSc (Hons)
Registered No. 1890261 Registered in England and Wales
Registered Company: Laser Surveys Limited
Brockamin House, Leigh, Worcester, WR6 5JU.

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

British Gypsum

British Gypsum Ltd, East Leake, Loughborough, Leicestershire, LE12 6HX
Tel: www.british-gypsum.com

The Coal Authority

200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5 www.coal.gov.uk

Johnson Poole & Bloomer Limited

Harris and Pearson Building, Brettel Lane, Brierley Hill, West Midlands DY5 3LH
Tel: +44 (0) 1384 262 000
Email: enquiries.gs@jpb.co.uk
Website: www.jpb.co.uk

Ordnance Survey

Romsey Road, Southampton SO16 4GU
Tel: 08456 050505

Getmapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Peter Brett Associates

Caversham Bridge House, Waterman Place, Reading
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Tel: +44 (0)118 950 0761 E-mail: reading@pba.co.uk

Acknowledgements

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:
"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.
"Client" means the party or parties entering into a Contract with GroundSure.
"Commercial" means any building or property which is not Residential.
"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than
(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and
(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).
"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.
"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.
"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.
"Data Reports" means reports comprising factual data with no accompanying interpretation.
"Fees" has the meaning set out in clause 5.1.
"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.
"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.
"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.
"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.
"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.
"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.
"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.
"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.
"Residential" means any building or property used as or intended to be used as a single dwelling.
"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.
"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.
"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.
"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.
"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.
2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.
2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.
2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.
2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.
2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and
(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and
(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.
3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.
3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.
3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.
3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.
3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.
4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;
(i) the Beneficiary,
(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
(iv) the first purchaser or first tenant of the Site, and
(v) the professional advisers and lenders of the first purchaser or tenant of the Site.
4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.
4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").
5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.
5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to
(i) full payment of all relevant Fees and
(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.
6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.
6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.
6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:
(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;
(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;
(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
(iv) not combine the Services with or incorporate such Services into any other information data or service;
(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);
(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and
(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,
6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.
6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:
(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;
(ii) any use made of the Reports, Services, Materials or any part of them; and
(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.
7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.
7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.
7.4 GroundSure shall not be liable for
(i) loss of profits;
(ii) loss of business;
(iii) depletion of goodwill and/or similar losses;
(iv) loss of anticipated savings;
(v) loss of goods;
(vi) loss of contract;
(vii) loss of use;
(viii) loss or corruption of data or information;
(ix) business interruption;
(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;
(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
(xiii) loss or damage to a computer, software, modem, telephone or other property; and
(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.
7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.
7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.
8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:
(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or
(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.
9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:
(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and
(ii) the Reports and/or Mapping provided under this Contract are
(a) supplied to the Client's specification(s) and in any event
(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:
(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and
(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract. 11 Anti-Bribery
11.1 The Client warrants that it shall:
(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;
(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and
(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.
11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.
12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.
12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.
12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.
12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:
(i) the Client or Beneficiary's failure to provide facilities, access or information;
(ii) fire, storm, flood, tempest or epidemic;
(iii) Acts of God or the public enemy;
(iv) riot, civil commotion or war;
(v) strikes, labour disputes or industrial action;
(vi) acts or regulations of any governmental or other agency;
(vii) suspension or delay of services at public registries by Third Party Data Providers;
(viii) changes in law; or
(ix) any other reason beyond GroundSure's reasonable control.
In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.
12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.
12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.
12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.
12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.
12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.
12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

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APPENDIX I

These Ordnance Survey maps are not printed to scale and have been reduced to A4 size

A3 1/10,000 plans are available upon request



Ordnance Survey®
Historical Mapping Extract

www.centremaps*live*.com

Site Details:

MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: MasterMap

Map date: **2012**

Scale: 1:1,250

Printed at: 1:2,500

N
W E
S

2012

GroundSure

Produced by
GroundSure Environmental Insight
www.groundsure.com

Ordnance Survey® Licensed Partner

Supplied by:
www.centremapslive.com
groundsure@centremaps.com

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Production date: 15 October 2013

To view map legend click here *Legend*

Ordnance Survey®
Historical Mapping Extract

www.centremaps*live*.com

Site Details:

MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A

Produced by
GroundSure Environmental Insight
www.groundsure.com

Supplied by:
www.centremapslive.com
groundsure@centremaps.com

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Production date: 15 October 2013

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Ordnance Survey®
Historical Mapping Extract

www.centremaps*live*.com

Site Details:

MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1995
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 15 October 2013

To view map legend click here *Legend*

Ordnance Survey®
Historical Mapping Extract

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Site Details:

MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

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Site Details:

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1992-1994**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

Surveyed 1960
Revised 1992
Edition N/A
Copyright 1992
Levelled 1960

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1989-1992**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1989
Levelled 1960

Surveyed 1960
Revised 1992
Edition N/A
Copyright 1992
Levelled 1960

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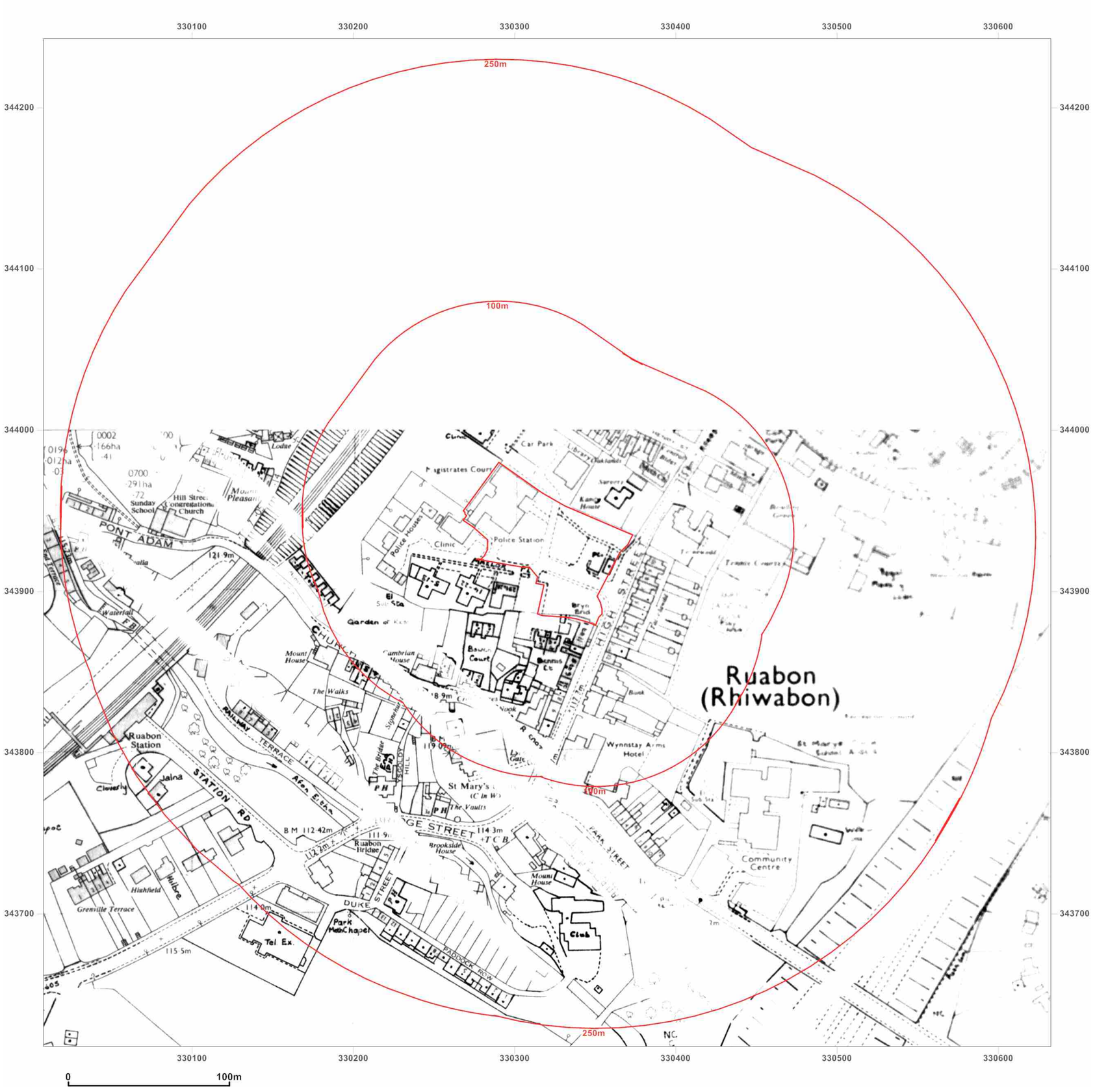
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1992**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1985-1989**

Scale: 1:2,500

Printed at: 1:2,500

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

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

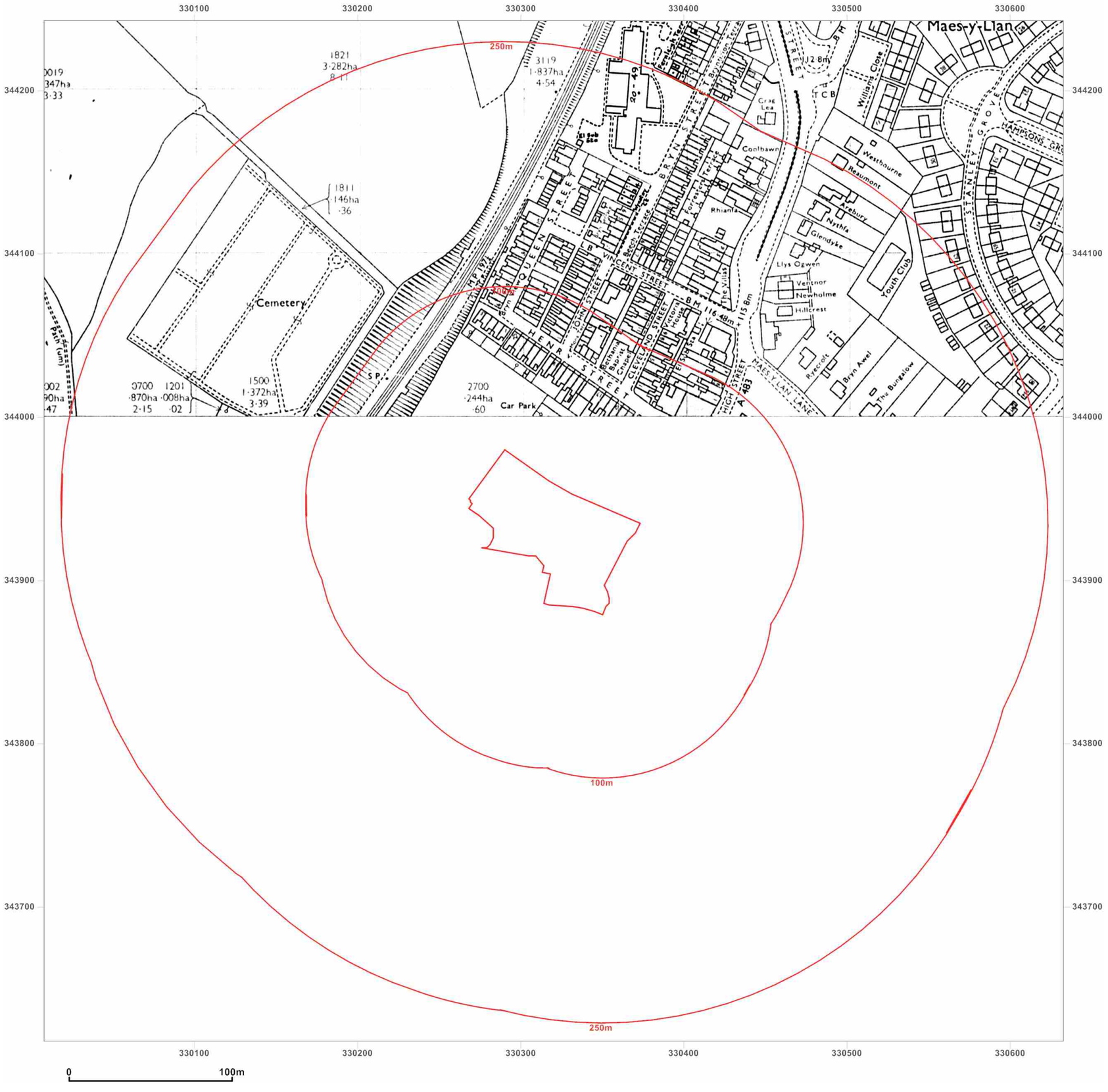
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1985**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1985
Levelled 1960

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1974-1978**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1974
Revised 1974
Edition N/A
Copyright 1975
Levelled 1960

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

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1978**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1978
Levelled 1960

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1961**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

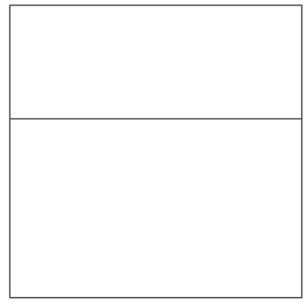
Map date: **1960**

Scale: 1:2,500

Printed at: 1:2,500

N W E S

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1960



Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1954

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: County Series
Map date: **1912**
Scale: 1:2,500
Printed at: 1:2,500

N W E S

Surveyed 1912
Revised 1912
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1912
Revised 1912
Edition N/A
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: County Series
Map date: **1899**
Scale: 1:2,500
Printed at: 1:2,500

N W E S

Surveyed 1899
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1899
Revised 1899
Edition N/A
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

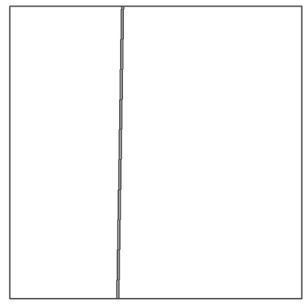
Map Name: County Series

Map date: **1873**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1873
Revised 1873
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1873
Edition N/A
Copyright N/A
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **2012**

Scale: 1:10,000

Printed at: 1:10,000

N W E S

2012

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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2002

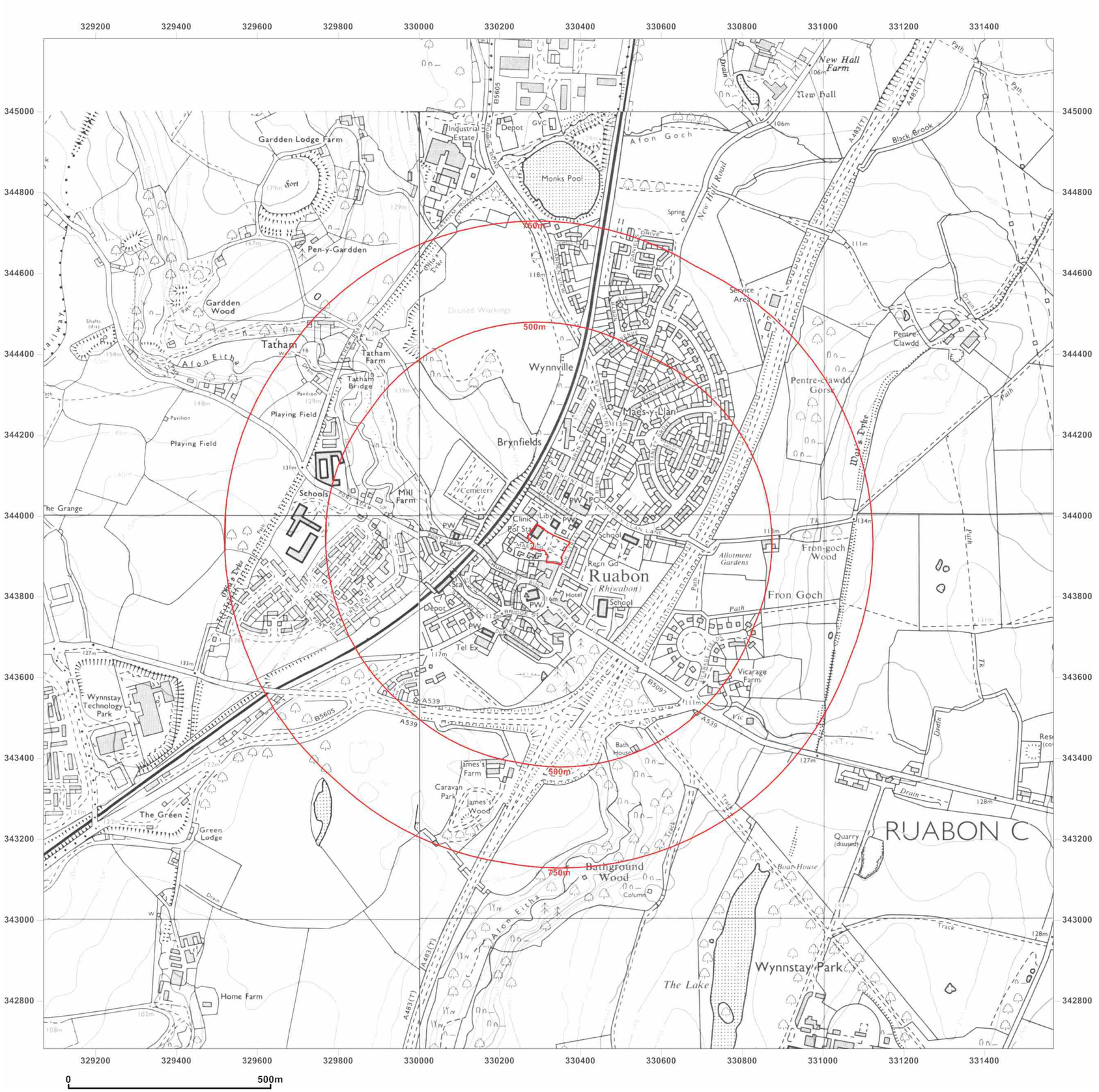
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1992-1994**

Scale: 1:10,000

Printed at: 1:10,000

N W E S

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

Surveyed 1971
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1991
Revised 1993
Edition N/A
Copyright N/A
Levelled N/A

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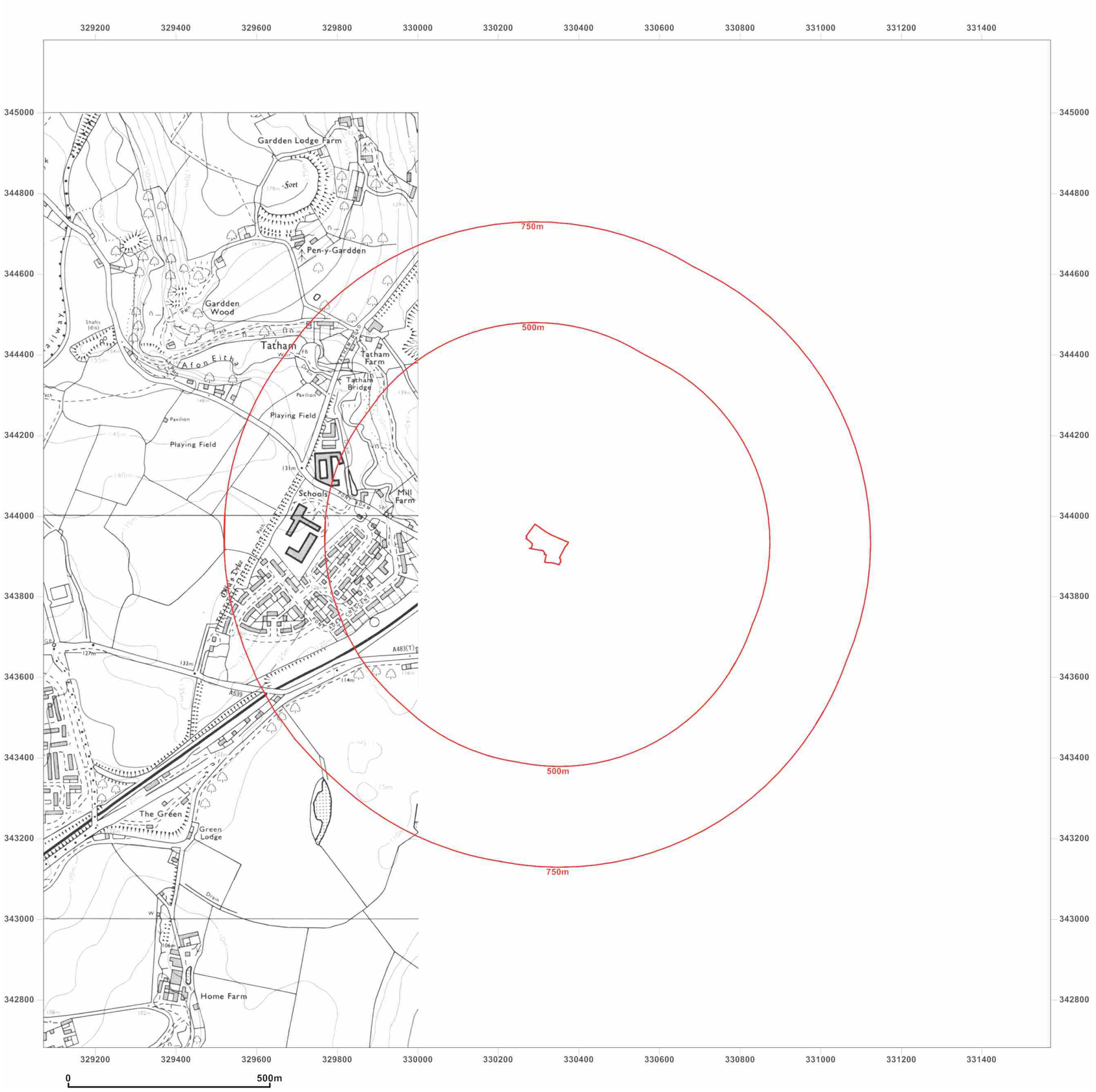
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1985**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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Surveyed 1971
Revised 1985
Edition N/A
Copyright N/A
Levelled N/A

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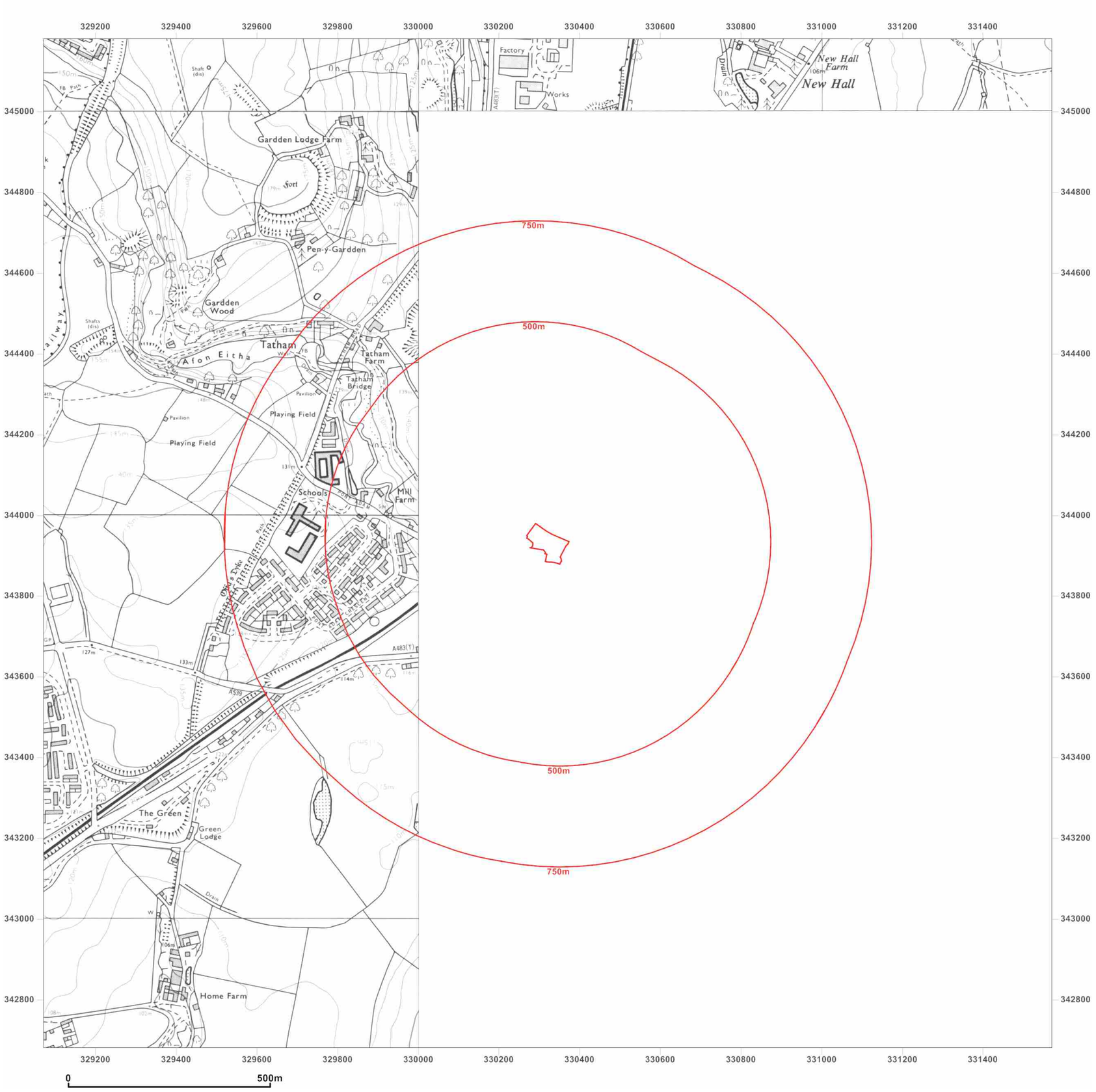
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: National Grid

Map date: **1974-1977**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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Surveyed 1973
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1975
Revised 1977
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1971
Revised 1974
Edition N/A
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

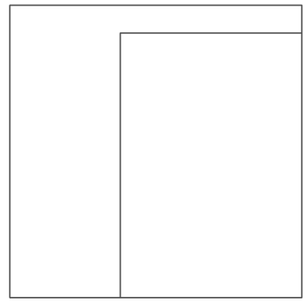
Map Name: Provisional

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

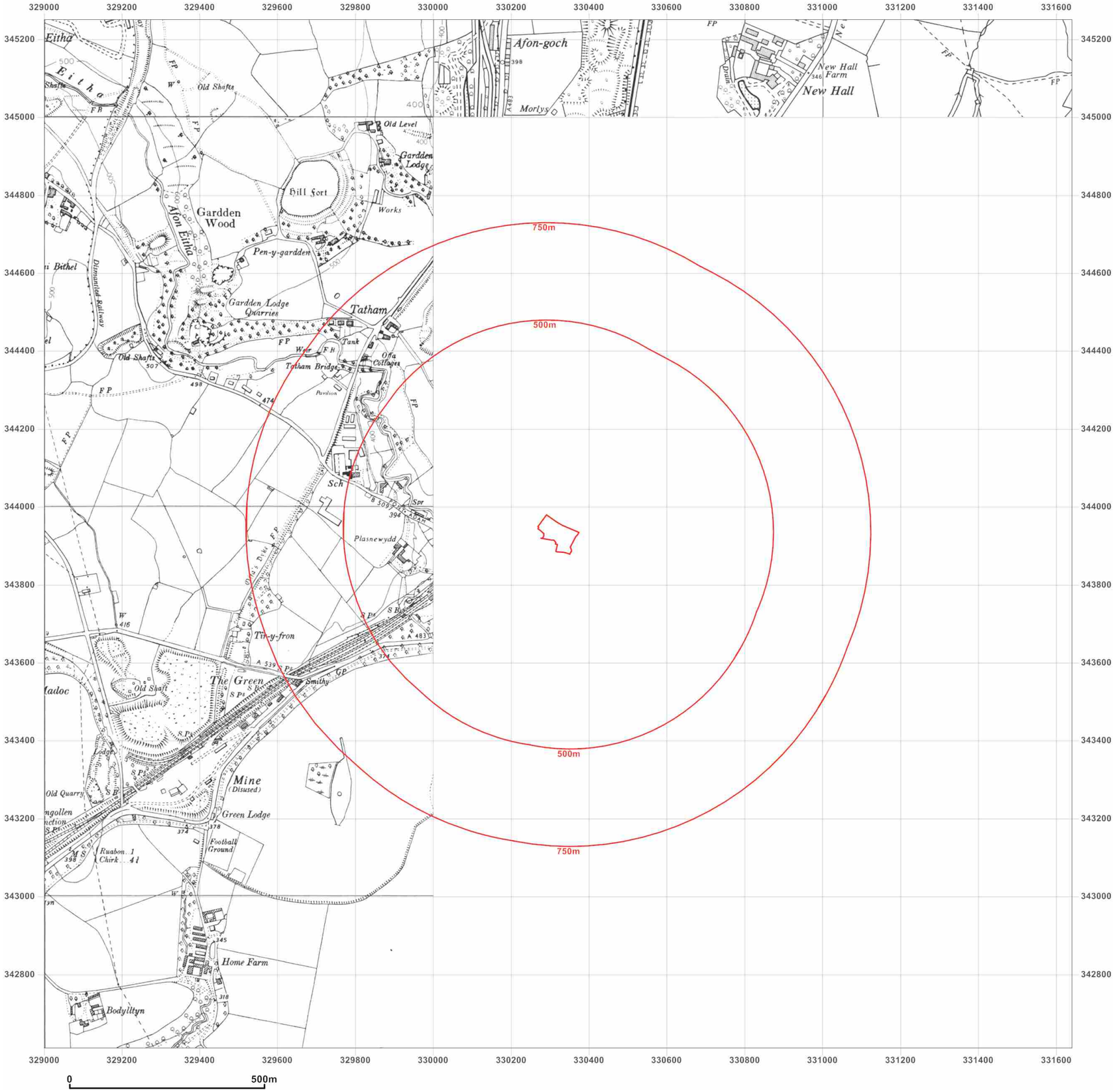
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: Provisional

Map date: **1960-1964**

Scale: 1:10,560

Printed at: 1:10,560

N W E S

Surveyed 1960
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 1960
Revised 1960
Edition N/A
Copyright N/A
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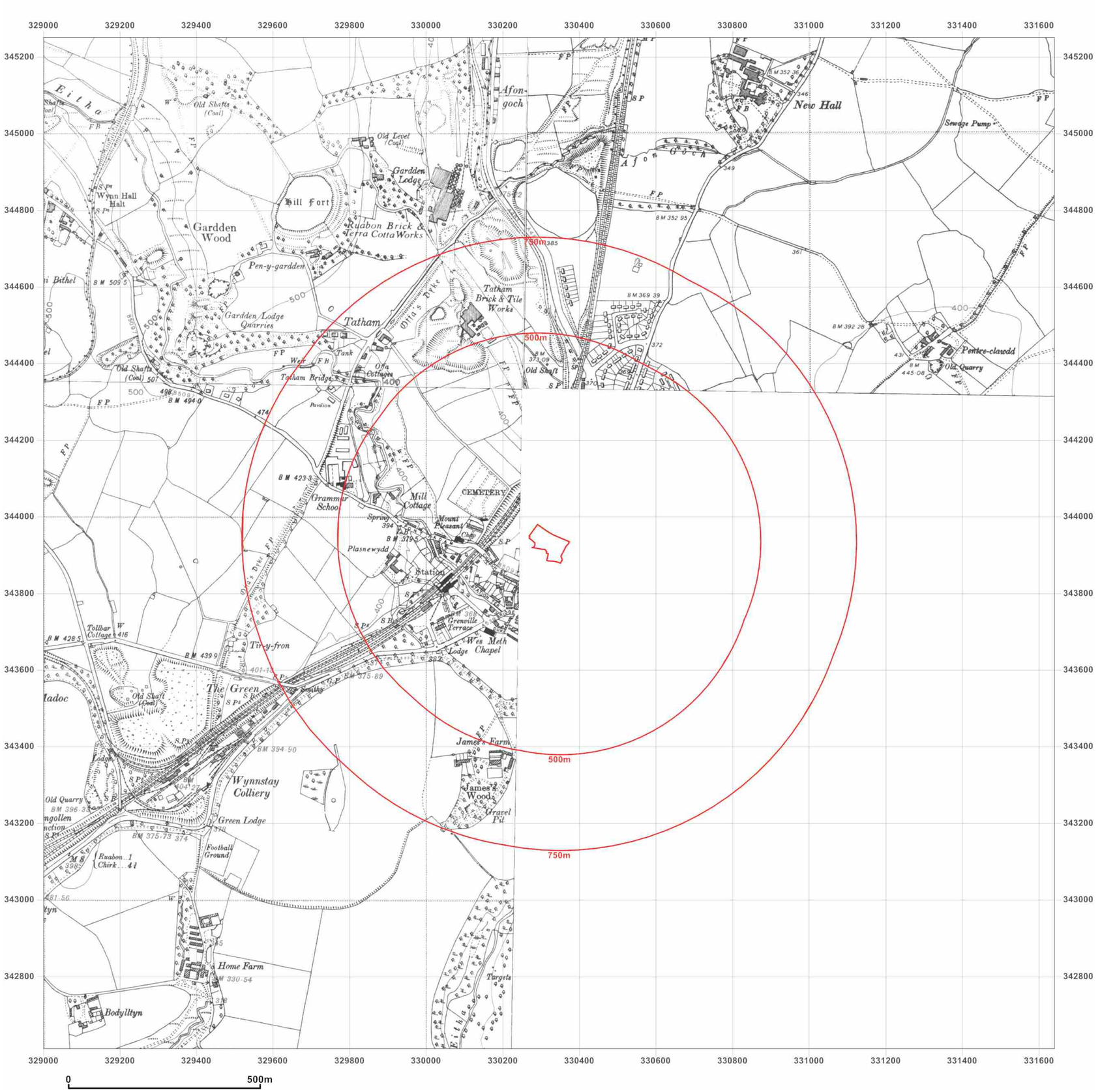
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: County Series

Map date: **1949**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1872
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1871
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1872
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

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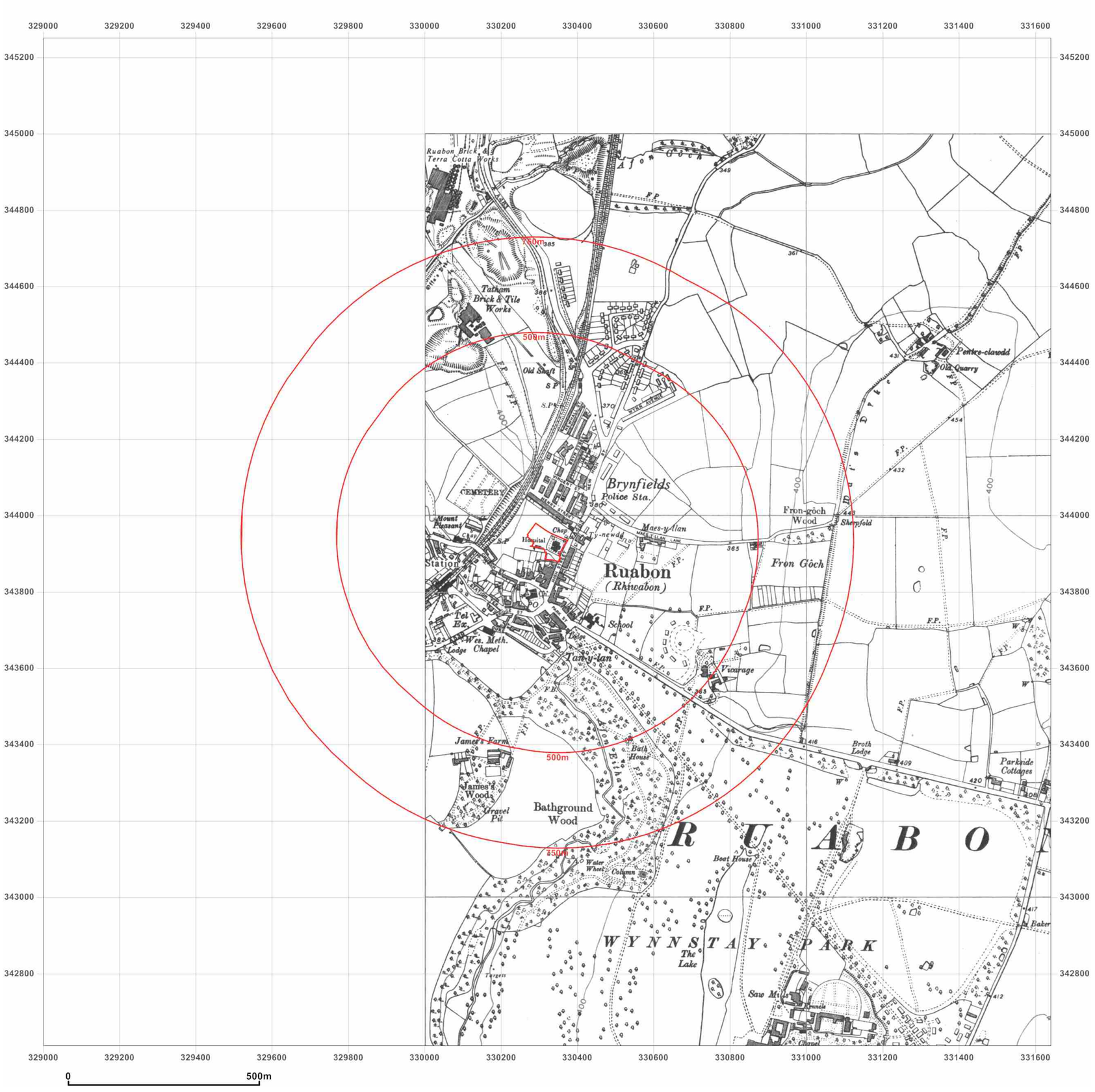
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Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

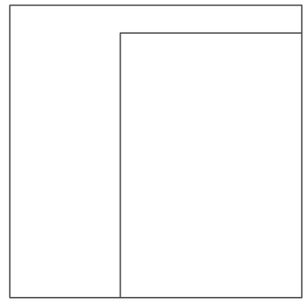
Map Name: Provisional

Map date: **1949**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S



Surveyed 1949
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

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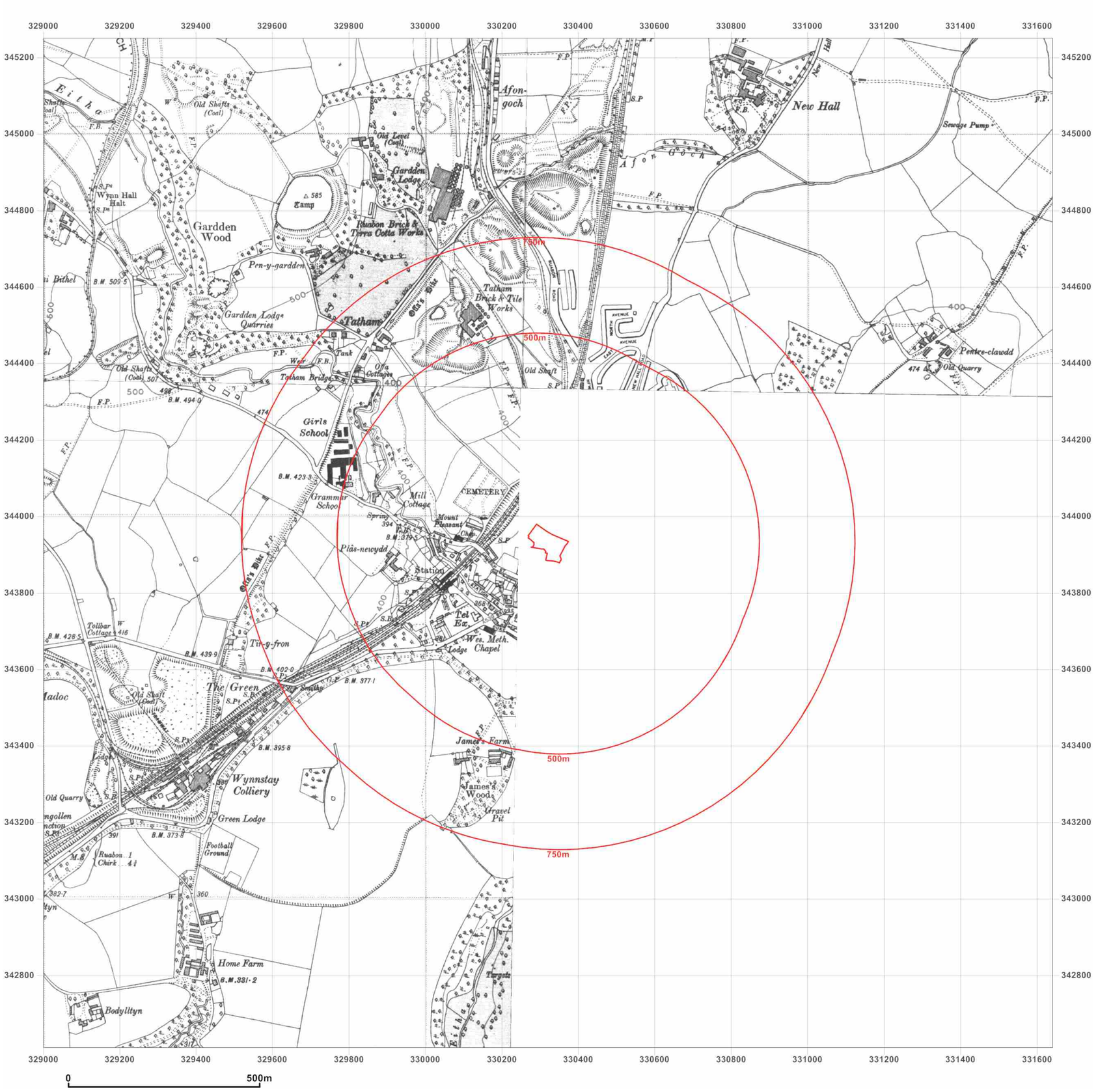
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Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1872
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
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Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

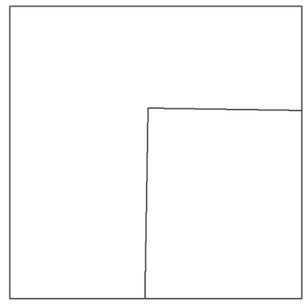
Map Name: County Series

Map date: **1914**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1872
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A

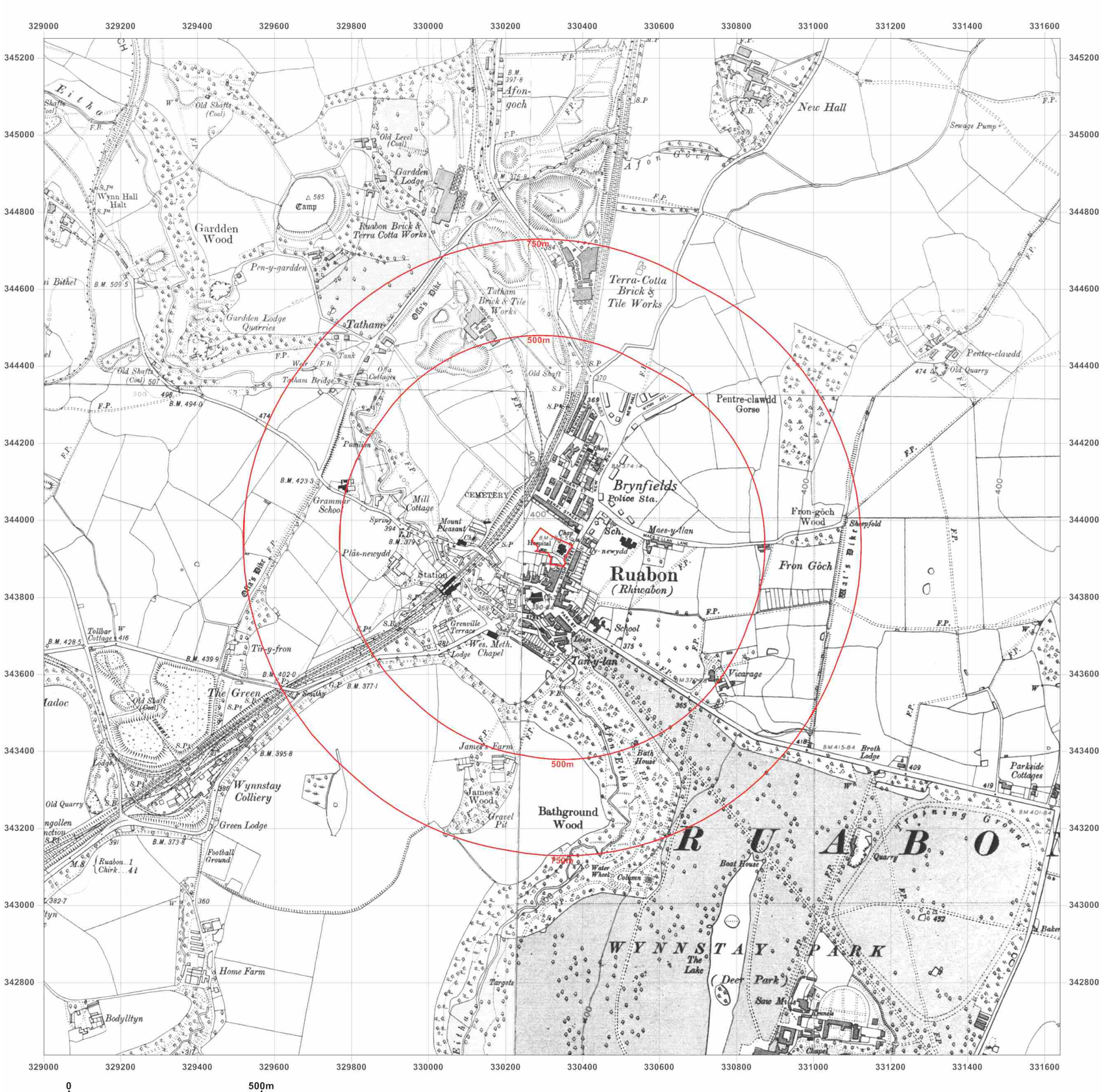
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Site Details:

MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: County Series

Map date: **1909-1910**

Scale: 1:10,560

Printed at: 1:10,560

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

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

Surveyed 1872
Revised 1910
Edition N/A
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Surveyed 1872
Revised 1909
Edition N/A
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Site Details:

MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: County Series

Map date: **1898-1900**

Scale: 1:10,560

Printed at: 1:10,560

N W E S

Surveyed 1873
Revised 1898
Edition N/A
Copyright N/A
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Surveyed 1873
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

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

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

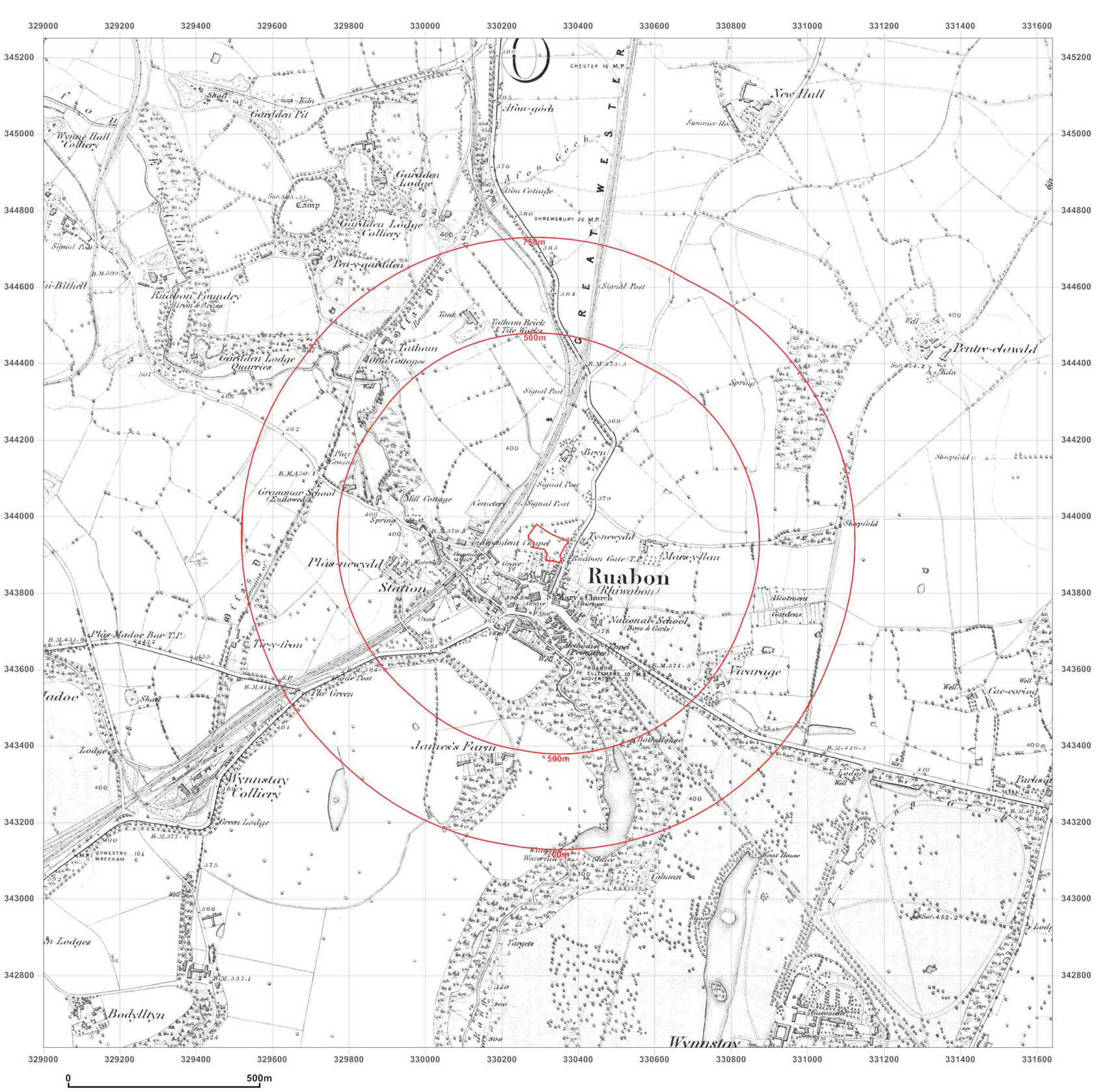
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Site Details:

MAELOR PLACE,HIGH STREET,RUABON,WREXHAM, LL14 6NN

Client Ref: 7904
Report Ref: CMAPS-CM-265373-7904-151013HIS
Grid Ref: 330320, 343930

Map Name: County Series

Map date: **1873**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1873
Revised 1873
Edition N/A
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Levelled N/A

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APPENDIX J

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Test Certificate

Client: Robert E Fry & Associates Ltd
45 Bridgeman Terrace, Wigan, Lancashire, WN1 1TT
Site: 13104 - Maelor Place, Ruabon
Date Tested: 25/11/13, 27/11/13, 28/11/13, 29/11/13, 05/12/13
Date Reported: 5 December, 2013
Date Received: 22 November, 2013
Sample Type: Solid

Certificate No: 13/3083/R/S$/C1
File No: 13/3083/R/S$
Client Ref:

					Lab sample ref:	**B456318**	**B456319**	**B456320**	**B456321**	**B456322**
					Client sample ref:	**WS2 0.2m**	**WS3 0.5m**	**WS4 0.2m**	**WS5 0.2m**	**WS5 0.5m**
					Date sampled:	**Not Stated**	**Not Stated**	**Not Stated**	**Not Stated**	**Not Stated**
					Sample matrix (see notes page):	**S**	**OS**	**S**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**					
Deviation Assessment										
Deviation(s)	C. Review	N/A	N/A	N/A	N/A	5	5	5	5	5
MCERTS Sample Prep										
% Stones	Stones	%	N	N/A	0	11.9	22.4	11.3	9.7	19.8
Moisture Content @ 35°	CTP01	% w/w	N	N/A	0.1	13.6	6.7	16.9	20.7	9.6
Sample Description^	SGP5		N	N/A		4A	7A	4A	4A	5A
Misc										
pH	CTP07		Y	Y		7.1	8.3	7.1	7.1	7.9
Sulphate (water soluble)	CTP29	g/l	Y	Y	0.01	0.01	0.02	<0.01	0.02	<0.01
Sulphide M	CTP16	mg/kg	N	N	2	67	<2	2	4	<2
Cyanide (total) M	CTP18c	mg/kg	Y	Y	10	<10	<10	<10	<10	<10
Phenols (screen) M	CTP20	mg/kg	Y	N	1	<1	<1	<1	<1	<1
Organic Matter	CTP22b	%	N	N	0.1	5.51	0.81	4.70	8.38	0.91
Arsenic	CTP11A 2	mg/kg	Y	Y	2	14	9	10	11	7
Cadmium	CTP11A 0.5	mg/kg	Y	Y	0.5	1.1	<0.5	0.6	1.2	<0.5
Chromium (total)	CTP11A 3	mg/kg	Y	Y	3	29	17	19	16	20
Copper	CTP11A 3	mg/kg	Y	Y	3	53	12	26	31	12
Lead	CTP11A 1	mg/kg	Y	Y	1	179	45	95	252	41
Mercury	CTP11A 0.5	mg/kg	Y	Y	0.5	1.1	<0.5	<0.5	<0.5	<0.5
Nickel	CTP11A 2	mg/kg	Y	Y	2	22	17	16	17	16
Selenium	CTP11A 2	mg/kg	Y	Y	2	<2	<2	<2	<2	<2
Zinc	CTP11A 2	mg/kg	Y	Y	2	305	55	110	284	77
Moisture Content @ 105°	CTP01	%	N	N/A	0.1	19.4	9.83	19.9	31.5	14.3
PAH (USEPA16)										
Acenaphthene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene M	GCM 501	mg/kg	Y	Y	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene M	GCM 501	mg/kg	Y	Y	0.1	1.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene M	GCM 501	mg/kg	Y	Y	0.1	1.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene M	GCM 501	mg/kg	Y	Y	0.1	1.2	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene M	GCM 501	mg/kg	Y	Y	0.1	0.7	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene M	GCM 501	mg/kg	Y	Y	0.1	0.6	<0.1	<0.1	<0.1	<0.1
Chrysene M	GCM 501	mg/kg	Y	Y	0.1	1.2	<0.1	<0.1	0.4	<0.1
Dibenz(a,h)anthracene M	GCM 501	mg/kg	Y	Y	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene M	GCM 501	mg/kg	Y	Y	0.1	1.9	<0.1	0.1	0.1	<0.1
Fluorene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene M	GCM 501	mg/kg	Y	Y	0.1	0.6	<0.1	<0.1	<0.1	<0.1
Naphthalene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene M	GCM 501	mg/kg	Y	Y	0.1	0.5	<0.1	<0.1	<0.1	<0.1
Pyrene M	GCM 501	mg/kg	Y	Y	0.1	1.9	<0.1	0.1	0.1	<0.1

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Test Certificate

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Date Received: 22 November, 2013
Sample Type: Solid

Certificate No: 13/3083/R/S$/C1
File No: 13/3083/R/S$
Client Ref:

					Lab sample ref:	**B456318**	**B456319**	**B456320**	**B456321**	**B456322**
					Client sample ref:	**WS2 0.2m**	**WS3 0.5m**	**WS4 0.2m**	**WS5 0.2m**	**WS5 0.5m**
					Date sampled:	**Not Stated**	**Not Stated**	**Not Stated**	**Not Stated**	**Not Stated**
					Sample matrix (see notes page):	**S**	**OS**	**S**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**					
TPH Banded(Ali/Aro)										
EC>5-6 Aliphatic M	SOP05	µg/kg	Y	N	10		<10			
EC>6-8 Aliphatic M	SOP05	µg/kg	Y	N	10		<10			
EC>8-10 Aliphatic M	SOP05a	µg/kg	Y	N	1000		<1000			
EC>10-12 Aliphatic M	SOP05a	µg/kg	Y	N	1000		<1000			
EC>12-16 Aliphatic M	SOP05a	µg/kg	Y	N	1000		1890			
EC>16-35 Aliphatic M	SOP05a	µg/kg	Y	N	1000		46500			
EC>35-44 Aliphatic M	SOP05a	µg/kg	Y	N	1000		20100			
Total Aliphatics M	SOP05a	µg/kg	Y	N	1000		68400			
EC>5-7 Aromatic M	SOP05	µg/kg	Y	N	10		<10			
EC>7-8 Aromatic M	SOP05	µg/kg	Y	N	10		<10			
EC>8-10 Aromatic M	SOP05a	µg/kg	Y	N	1000		<1000			
EC>10-12 Aromatic M	SOP05a	µg/kg	Y	N	1000		<1000			
EC>12-16 Aromatic M	SOP05a	µg/kg	Y	N	1000		1330			
EC>16-21 Aromatic M	SOP05a	µg/kg	Y	N	1000		4770			
EC>21-35 Aromatic M	SOP05a	µg/kg	Y	N	1000		15600			
EC>35-44 Aromatic M	SOP05a	µg/kg	Y	N	1000		9980			
Total Aromatics M	SOP05a	µg/kg	Y	N	1000		31700			
Methyl t-butyl ether M	SOP05	µg/kg	Y	N	10		<10			
Benzene (VPH) M	SOP05	µg/kg	Y	N	10		<10			
Toluene (VPH) M	SOP05	µg/kg	Y	N	10		<10			
Ethylbenzene (VPH) M	SOP05	µg/kg	Y	N	10		<10			
m&p-Xylene (VPH) M	SOP05	µg/kg	Y	N	10		<10			
o-Xylene (VPH) M	SOP05	µg/kg	Y	N	10		<10			
Total VPH M	SOP05	µg/kg	Y	N	10		<10			
TPH M	SOP05a	µg/kg	Y	N	1000		100000			

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Date Reported: 5 December, 2013
Date Received: 22 November, 2013
Sample Type: Solid

Certificate No: 13/3083/R/S$/C1
File No: 13/3083/R/S$
Client Ref:

					Lab sample ref:	**B456323**	**B456324**	**B456325**	**B456326**	**B456327**
					Client sample ref:	**WS6 0.2m**	**WS6 0.5m**	**WS7 0.5m**	**WS8 0.5m**	**WS10 0.5m**
					Date sampled:	**Not Stated**	**Not Stated**	**Not Stated**	**Not Stated**	**Not Stated**
					Sample matrix (see notes page):	**S**	**S**	**S**	**OS**	**OS**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**					
Deviation Assessment										
Deviation(s)	C. Review	N/A	N/A	N/A	N/A	5	5	5	5	5
MCERTS Sample Prep										
% Stones	Stones	%	N	N/A	0	7.8	9.8	30.1	16.3	16.0
Moisture Content @ 35°	CTP01	% w/w	N	N/A	0.1	18.3	14.1	9.6	18.4	20.2
Sample Description^	SGP5		N	N/A		4AC	4AC	5A	7AC	7AC
Misc										
pH	CTP07		Y	Y		6.8	8.0	7.2	8.6	9.1
Sulphate (water soluble)	CTP29	g/l	Y	Y	0.01	0.02	0.01	0.04	0.03	0.07
Sulphide M	CTP16	mg/kg	N	N	2	4	4	<2	4	7
Cyanide (total) M	CTP18c	mg/kg	Y	Y	10	<10	<10	<10	<10	<10
Phenols (screen) M	CTP20	mg/kg	Y	N	1	<1	<1	<1	<1	<1
Organic Matter	CTP22b	%	N	N	0.1	6.13	3.08	2.49	1.73	3.06
Arsenic	CTP11A 2	mg/kg	Y	Y	2	18	14	10	33	59
Cadmium	CTP11A 0.5	mg/kg	Y	Y	0.5	2.1	2.6	0.5	1.5	2.3
Chromium (total)	CTP11A 3	mg/kg	Y	Y	3	22	21	20	24	33
Copper	CTP11A 3	mg/kg	Y	Y	3	49	45	23	128	123
Lead	CTP11A 1	mg/kg	Y	Y	1	169	487	73	78	153
Mercury	CTP11A 0.5	mg/kg	Y	Y	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	CTP11A 2	mg/kg	Y	Y	2	26	22	19	37	50
Selenium	CTP11A 2	mg/kg	Y	Y	2	<2	<2	<2	<2	<2
Zinc	CTP11A 2	mg/kg	Y	Y	2	439	498	99	140	181
Moisture Content @ 105°	CTP01	%	N	N/A	0.1	22.4	19.2	14.9	27.4	25.4
PAH (USEPA16)										
Acenaphthene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene M	GCM 501	mg/kg	Y	Y	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene M	GCM 501	mg/kg	Y	Y	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene M	GCM 501	mg/kg	Y	Y	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene M	GCM 501	mg/kg	Y	Y	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene M	GCM 501	mg/kg	Y	Y	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene M	GCM 501	mg/kg	Y	Y	0.1	0.4	<0.1	0.1	<0.1	0.1
Fluorene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene M	GCM 501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene M	GCM 501	mg/kg	Y	Y	0.1	0.4	<0.1	0.1	<0.1	0.1

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Certificate No: 13/3083/R/S$/C1
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Client Ref:

					Lab sample ref:	**B456323**	**B456324**	**B456325**	**B456326**	**B456327**
					Client sample ref:	**WS6 0.2m**	**WS6 0.5m**	**WS7 0.5m**	**WS8 0.5m**	**WS10 0.5m**
					Date sampled:	**Not Stated**	**Not Stated**	**Not Stated**	**Not Stated**	**Not Stated**
					Sample matrix (see notes page):	**S**	**S**	**S**	**OS**	**OS**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**					
TPH Banded(Ali/Aro)*										
EC>5-6 Aliphatic M	AN15-1	µg/kg	Y	N	10			<10	<10	
EC>6-8 Aliphatic M	AN15-1	µg/kg	Y	N	10			<10	<10	
EC>8-10 Aliphatic M	SOP05a	µg/kg	Y	N	1000			<1000	<1000	
EC>10-12 Aliphatic M	SOP05a	µg/kg	Y	N	1000			<1000	<1000	
EC>12-16 Aliphatic M	SOP05a	µg/kg	Y	N	1000			1530	2480	
EC>16-35 Aliphatic M	SOP05a	µg/kg	Y	N	1000			35000	63400	
EC>35-44 Aliphatic M	SOP05a	µg/kg	Y	N	1000			17600	25900	
Total Aliphatics M	SOP05a	µg/kg	Y	N	1000			54200	91700	
EC>5-7 Aromatic M	AN15-1	µg/kg	Y	N	10			<10	<10	
EC>7-8 Aromatic M	AN15-1	µg/kg	Y	N	10			<10	<10	
EC>8-10 Aromatic M	SOP05a	µg/kg	Y	N	1000			<1000	<1000	
EC>10-12 Aromatic M	SOP05a	µg/kg	Y	N	1000			<1000	<1000	
EC>12-16 Aromatic M	SOP05a	µg/kg	Y	N	1000			<1000	2200	
EC>16-21 Aromatic M	SOP05a	µg/kg	Y	N	1000			4000	6610	
EC>21-35 Aromatic M	SOP05a	µg/kg	Y	N	1000			11900	20400	
EC>35-44 Aromatic M	SOP05a	µg/kg	Y	N	1000			6580	11600	
Total Aromatics M	SOP05a	µg/kg	Y	N	1000			22400	40800	
Methyl t-butyl ether M	AN15-1	µg/kg	Y	N	10			<10	<10	
Benzene (VPH) M	AN15-1	µg/kg	Y	N	10			<10	<10	
Toluene (VPH) M	AN15-1	µg/kg	Y	N	10			<10	<10	
Ethylbenzene (VPH) M	AN15-1	µg/kg	Y	N	10			<10	<10	
m&p-Xylene (VPH) M	AN15-1	µg/kg	Y	N	10			<10	<10	
o-Xylene (VPH) M	AN15-1	µg/kg	Y	N	10			<10	<10	
Total VPH M	AN15-1	µg/kg	Y	N	10			<10	<10	
TPH M	SOP05a	µg/kg	Y	N	1000			76600	133000	

Notes

1. All analyses performed on the sample dried at 35ºC, except analyses suffixed with 'M'.
2. Analyses suffixed 'M' were performed on the sample as received and corrected for '% moisture at 35ºC' where applicable.
3. All results are expressed as dry weight.
4. MCERTS accreditation applicable to Sample Matrix 'S' only.
5. Natural stones (pebbles, gravels etc.) which do not pass a 2mm sieve are excluded from dried analyses.
6. Tests marked * indicate subcontracted analyses.
7. The laboratory has tested the material/items supplied by the client as sampled in accordance with the client's own requirements.
8. ^Sample Description key: 1. - Sand, 2. Loam, 3. Clay, 4. Sandy loam, 5. Sandy clay, 6. Clayey loam, 7. Other.
   suffixed with: A - Stones, B - Construction rubble, C - Visible Hydrocarbons
9. Dates of testing for all parameters are available on request.
10. Where a deviation has been found in relation to the sample(s) submitted for testing, the test result may be compromised. Reasons for deviating samples are denoted by means of a number 1, 2, 3, 4, 5, 6 or 7 under the analyte 'Deviation(s)'. Explanation of this number coding as follows: 1. Sample was not cooled, 2. Sample not submitted in an appropriate container (organic testing), 3. Sample not submitted in an appropriate container (inorganic testing), 4. Sample not submitted in an appropriate container (all testing), 5. Sample lacks the date and time of sampling, 6. Sample has exceeded the maximum preservation time and, 7. Other, (e.g. inappropriate headspace).
11. Please note subcontracted tests have been analysed at Exova (Hillington). This laboratory holds UKAS accreditation (UKAS No. 0568).

Signed for, and on behalf of Exova (UK) Ltd.

Prepared by:

M Parry
Section Leader

Approved by:

A Young
Operations Manager

0871

The contents of this document are governed by the terms and conditions overleaf.
Registered Office: Exova (UK) Ltd. Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL United Kingdom. Reg No. SC 70429

APPENDIX K

PSL
Professional Soils Laboratory

LABORATORY REPORT

UKAS TESTING
4043

Contract Number: PSL13/4777

Client's Reference: Report Date: 05 December 2013

Client Name: Robert E Fry & AssociatesLtd
45 Bridgeman Terrace
Wigan

WN1 1TT

For the attention of: Rob Fry

Contract Title: Maelor Place, Ruabon

Date Received: 26/11/2013
Date Commenced: 26/11/2013
Date Completed: 5/12/2013

Notes: Observations and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson	A Watkins	M Beastall
(Director)	(Director)	(Laboratory Manager)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
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fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Depth m	Description of Sample
WS4		D	1.50	Brown very sandy clayey GRAVEL.
WS7		D	1.50	Brown mottled dark grey very gravelly very sandy CLAY.
WS7		D	2.50	Brown clayey very sandy GRAVEL.

PSL
Professional Soils Laboratory

Compiled by	Date	Checked by	Date	Approved by	Date
	05/12/13		05/12/13		05/12/13

MAELOR PLACE, RUABON.

Contract No: PSL13/4777

Client Ref: 13104

SUMMARY OF SOIL CLASSIFICATION TESTS

(B.S. 1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Depth m	Moisture Content % Clause 3.2	Bulk Density Mg/m^3 Clause 7.2	Dry Density Mg/m^3 Clause 7.2	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4.4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	% Passing .425mm	Remarks
WS4		D	1.50	12					NP			
WS7		D	1.50	21				35	16	19	72	Intermediate plasticity MI.
WS7		D	2.50	11					NP			

SYMBOLS : NP : Non Plastic *** : Liquid Limit and Plastic Limit Wet Sieved.**

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Compiled by	Date	Checked by	Date	Approved by	Date
	05/12/13		05/12/13		05/12/13

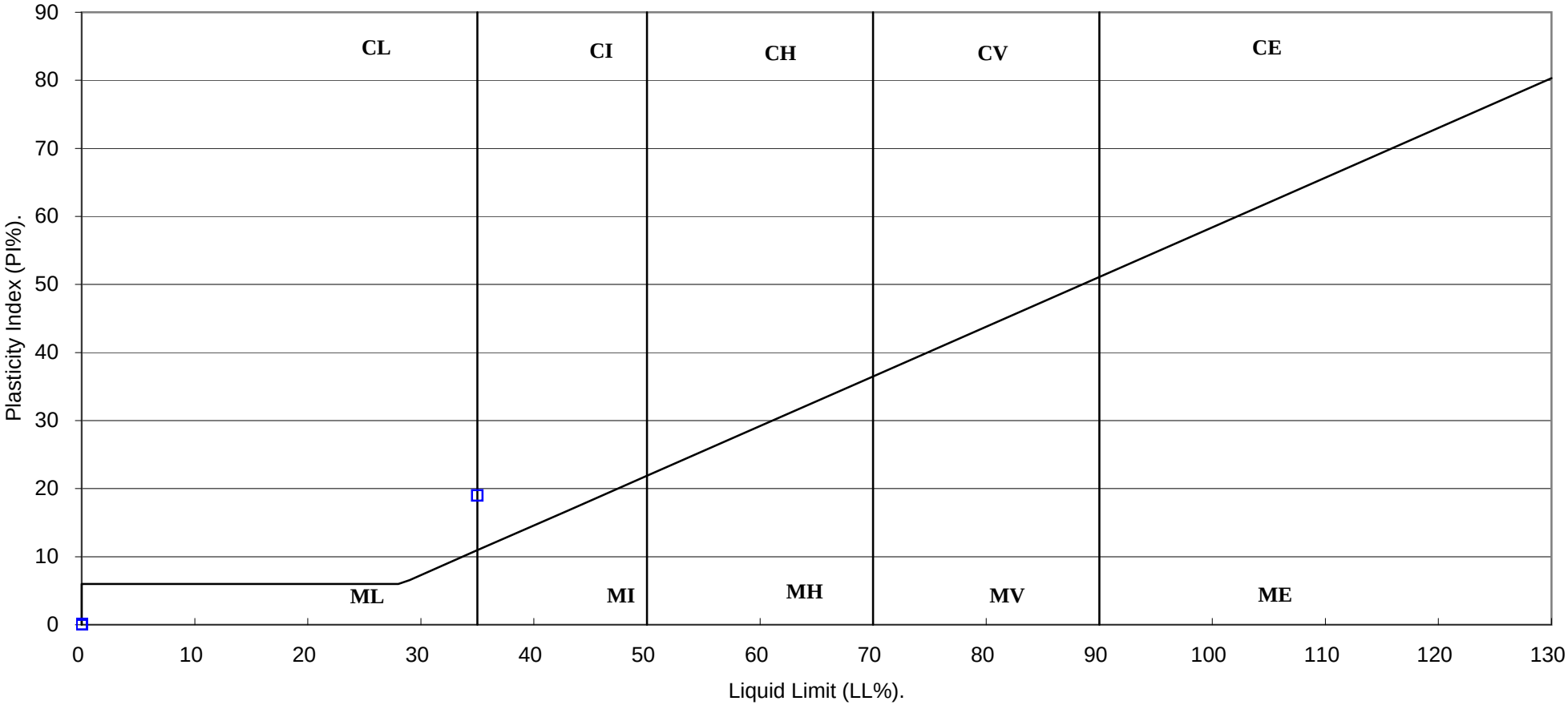
MAELOR PLACE, RUABON.

Contract No: **PSL13/4777**

Client Ref: **13104**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



PSL Professional Soils Laboratory	Compiled by	Date	Checked by	Date	Approved by	Date
		05/12/13		05/12/13		05/12/13
	MAELOR PLACE, RUABON.				Contract No:	PSL13/4777
					Client Ref:	13104