REPORT C3051
OCTOBER 2008

PHASE 1 GEOENVIRONMENTAL APPRAISAL

of land at
RUTHIN ROAD, WREXHAM

prepared for
OPTIMISATION DEVELOPMENTS LTD

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SITE:	RUTHIN ROAD, WREXHAM		
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APPENDICES

APPENDIX A - DRAWINGS

Drawing No	Drawing Title
C3051/01	Site Location Plan
C3051/02	Site Features Plan
C3051/03	Proposed Development Layout
C3051/04	Exploratory Hole Location Plan and Area of Intrusive Investigation
C3051/05	Conceptual Site Model

APPENDIX B - ENVIRONMENTAL DISCLOSURE REPORT

APPENDIX C - CORRESPONDENCE

APPENDIX D - EXPLORATORY HOLE LOGS

APPENDIX E - SOAKAWAY TEST CALCULATIONS

APPENDIX F - LABORATORY TEST RESULTS

1.0 INTRODUCTION.

It is understood that Optimisation Developments Ltd (ODL) intend to purchase land adjacent to Ruthin Road, Wrexham (henceforth referred to as 'The Site') for redevelopment as a food retail outlet (Morrison's supermarket), with associated Petrol Filling Station (PFS), car parking, service yard, soft landscaping and public open space (POS). The proposed development plans are shown on Drawing No. C3051/03, presented in Appendix A.

Sirius Geotechnical and Environmental Ltd (Sirius) were instructed by BSC.P, acting on behalf of ODL, to undertake a Preliminary Investigation (desk study) of the land proposed for the superstore development in its entirety.

Sirius were also commissioned by BSC.P to undertake a limited intrusive investigation and preliminary geoenvironmental appraisal within a selected area of the site. The purpose of the investigation was to consider whether soakaway drainage would prove suitable for the proposed development. The delineated area for the intrusive investigation is outlined on Drawing No. C3051/04 presented in Appendix A.

It is not the intention of this report to fully assess all geoenvironmental issues associated with the site as a whole; it is limited to a preliminary contamination assessment of part of the site and soakaway assessment only. The scope of works was proposed by BSC.P to allow them to complete their detailed drainage design.

The objectives of this investigation were as follows:

- To determine the land use history of the site from an inspection of available historical Ordnance Survey (OS) plans;
- To ascertain the environmental setting of the site, including details of the geology, hydrogeology and hydrology;
- To identify the near surface ground conditions within a limited area of the site;
- To provide an initial assessment of the degree of near surface ground contamination within that limited area, with particular reference to leachate testing;
- To provide preliminary advice on measures to deal with proven contamination, and
- To determine the infiltration properties of natural soils for soakaway design.

The desk-based part of this investigation included the review and assessment of information provided by Wrexham County Borough Council (WCBC), Groundsure Limited (Groundsure) and the British Geological Survey (BGS). Relevant information received from these sources is provided in Appendices B and C.

Fieldworks for the intrusive investigation comprised the drilling of eight window sample boreholes to depths ranging from 5.00m to 9.00m bgl, the excavation of seventeen trial pits to a maximum depth of 3.30m bgl and soakaway tests within three trial pits.

Where the report refers to the potential presence of invasive plants such as Japanese Knotweed or the presence of asbestos containing materials (ACM's), it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

This report presents the factual information obtained during this investigation followed by an interpretation of this data and recommendations relating to the proposed end use.

This report assumes that ground levels will remain similar to those encountered during the Sirius investigation. If this assumption is incorrect, the conclusions and recommendations presented in this report may need to be revised.

The comments and opinions presented in this report are based on the findings of the desk study, ground conditions encountered during the intrusive investigation work, and on the results of tests undertaken in the laboratory.

There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation. Any diagram or opinion of the possible configuration of ground conditions between exploratory holes is conjectural and provided for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

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2.0 SITE DESCRIPTION.

National Grid Ref:	332689, 350106.
Site Location:	The site is located off the A525, Ruthin Road, Wrexham, North Wales, approximately 1.5km west of Wrexham town centre.
Total Site Area:	The site is approximately 4.6 hectares (11 acres). The area of intrusive investigation covers an area of approximately 2.1 hectares (5 acres).
Site Description:	The site is irregular in shape, and comprises two distinct areas. The western area of the site is currently occupied, whilst the area to the east and north comprises overgrown vegetation and is currently undeveloped. The undeveloped area forms historic railway land. Wire and palisade fencing separates both portions of the site, with one access gate allowing entry to the undeveloped area, located centrally along the northern fence. The gate is generally left padlocked, however public access can be gained on foot from the south. The developed area of the site is generally secure. The site (as a whole) is bound by Ruthin Road to the south and an ambulance depot and council offices to the west. The site is bound by Wrexham Maelor Hospital to the north and by railway lines with residential properties beyond to the east. The western area of the site is currently developed and occupied, and generally covered in hardstanding of tarmac and concrete with discrete areas of grassed and vegetated soft landscaping. The area currently comprises several single storey brick and steel framed buildings, storage areas and vehicles, with open areas being generally used for storage of equipment. The buildings on site comprise: a former Highways Laboratory and Trading Standards Offices, four occupied storage units and offices associated with the Corporation Depot and an electric substation, located to the north of the developed area.

	Gas and oil tanks are located adjacent to the southern boundary of the site within the developed western area of the site. Several manhole covers are evident across the whole site, with a main sewer located centrally within the site aligned north/south reportedly discharging from the hospital. The undeveloped portion of the site comprises rough ground, with overgrown vegetation and numerous mature trees, up to approximately 15 to 20m in height. The trees are of varying types including willows, elder, hawthorn, maple and silver birch. Numerous smaller shrubs and bushes have also become well established on this part of the site, including two discreet areas of Japanese Knotweed located centrally along the northern boundary. Bricks, concrete blocks, timber sleepers and deposits of ash and clinker are evident at the surface across this part of the site, indicating made ground associated with the former railway sidings and relic building foundations. The former railway appears to have been named Croesnewydd West Junction.
Topography:	The majority of site is flat and generally level, but is raised towards the west, forming an embankment at the rear of the former Highways Laboratory and Trading Standards offices. The ground within the eastern area of the site is generally flat, with a relatively steep embankment present to the south east corner of the site, associated with the former railway lines.
Adjacent Land Uses:	The site is within a generally residential and light commercial area, with Wrexham Maelor Hospital located to the immediate north of the site. A depot and warehouse are located to the north-east of the site, whilst railway lines form the eastern boundary to the site. Council offices and an ambulance depot are located to the west of the site.

A plan showing the main site features is presented as Drawing No. C3051/02 in Appendix A.

3.0 ENVIRONMENTAL SETTING.

3.1 Site History.

In order to investigate the history of the site, extracts of historical maps and Ordnance Survey (OS) plans dated from 1872 to 2007, obtained as part of the Environmental Disclosure Report provide by Groundsure Limited and contained within Appendix B, have been examined.

The following table provides a summary of the salient points relating to the history of the site from 1872 with respect to the proposed end use. It is not the intention of this report to describe, in detail, all the changes that have occurred on or adjacent to the site, only those pertinent to the development.

Map edition and scale	On-site Features	Off-site Features (approximate distance from boundary of site)
1872 1:10,560 scale and 1874 1:2,500 scale maps.	• The site is shown to comprise open fields to the east and a railway junction to the north and centrally within the site. • The railway junction is labelled Croes-newydd Junction, associated with Great Western Railway. • No other significant features shown.	• Ruthin Road is shown to bound the site to the south, and Great Western Railway lines are shown to be adjacent to the east of the site. • Several terraced residential properties are evident to the south of Ruthin Road. • River Gwenfro is shown 80m to the north-west of the site, whilst Mill Race River is shown 700m to the south. • Wrexham town centre to the east is

Map edition and scale	On-site Features	Off-site Features (approximate distance from boundary of site)
		developed, whilst to the west of the site, the area generally comprises open fields. • A 'Union Workhouse' lies adjacent to the northern most boundary. • 'Cobden Mill (Corn)' is shown 30m to the north east. • A 'well' is shown approximately 350m to the west of the site. • Several 'Brick Fields' and 'Brick Kilns' are denoted between 500m and 700m to the south-east of the site. • No other significant features within 250m.
1898 1:10,560 scale and 1899 1:2,500 scale maps.	• No significant changes.	• Residential development to the east of the site is evident. • A 'Fever Hospital' is denoted 270m to the north of the site. • Breweries are shown 200m to the north-east and 350m to the east of the site. • An 'Iron Works' is shown 550m to the north of the site. • 'Clay Pits' are shown associated with the brick works 700m to the south of the site. • No other significant changes within 250m.
1909 to 1910 1:10,560 scale and 1912 1:2,500 scale maps.	• An 'Engine Shed' is shown to have been developed onsite, located to the east. • Two wells are labelled on site, towards the eastern boundary. • Railway sidings are shown across the north and east of the site associated with the engine shed. • No other significant changes.	• Two 'Wells' and a 'Filter bed' are shown between 110m and 150m to the north-east. • Two 'Tanks' and a 'Filter Bed' are evident between 300m and 450m to the north. • Both 'Old Clay Pits' and 'Gravel Pits' are evident within the area of the former brickfields to the south. • No other significant changes within 250m.
1938 and 1938 to 1939 1:10,560 scale maps.	• No significant changes.	• 'Plas Maelor Institution' is shown to have been developed immediately to the north of the site. • No other significant changes within 250m.
1957 1:1,250 scale and 1958 1:2,500 scale maps.	• Development comprising a 'Depot' of numerous small buildings is shown centrally within the site (east of the railway). • Further development associated with the Engine Shed is evident, including 'Inspection Pits' and a 'Tank'. • Several areas of earthworks (embankments and cuttings) are evident to the north and south east of the site associated with the railway sidings. • No other significant changes.	• Increased development to the hospital is shown to the north of the site. • A 'Goods Yard' is shown between 45m and 55m to the east of the site. • A new 'Works' is shown 50m to the north-east of the site. • A small area labelled as 'ruin' is shown 70m to the west of the site. • No other significant changes within 250m.
1963 1:1,250 and	• The wells are no longer	• The residential properties to the south of the

Map edition and scale	On-site Features	Off-site Features (approximate distance from boundary of site)
1964 1:10,560 scale maps.	labelled on site. • No other significant changes.	site are shown to have been demolished, and replaced with a new housing development and a social club. • New development is shown 180m to the south-east of the site, including a garage and residential properties. • Mills Race River, located 700m to the south of the site, is renamed as River Clywedog. • No other significant changes within 250m.
1970 to 1975 1:1,250 and 1974 to 1977 1:10,000 scale maps.	• A new 'Weights and Measures' office building and a substation are shown to have been developed in the north-western area of the site. • No other significant changes.	• An 'Ambulance Depot' is shown 45m to the west of the site. • Several new 'Warehouses' and 'Depots' are shown to the north of the site. • The 'Works' 100m to the north-east of the site are denoted as 'oil compounds' and tanks and a chimney are shown associated. • No other significant changes within 250m.
1980 1:10,000 scale map.	• No significant changes.	• No significant changes within 250m.
1985 1:10,000 scale, and 1989 to 1992 1:10,000 scale maps.	• The Engine Shed and associated features such as tanks and inspection pits are no longer shown • The buildings forming the area of 'Depot' are no longer labelled. • No other significant changes.	• The hospital to the north of the site is shown to have undergone further development. • A factory is evident 10m to the west of the site. • No other significant changes within 250m.
1993 to 1996 1:1,250 scale map.	• The railway lines are shown to have all been dismantled within the site. • A 'Highways Laboratory' is shown in the west of the site. • New un-named buildings are shown associated with the former Depot, now labelled as a 'Corporation Depot'. • No other significant changes.	• New residential development is shown 30m to the east, parallel to the eastern site boundary. • The hospital is shown to have undergone further development and extensions. • No other significant changes within 250m.
2002 1:10,000 scale map	• No significant changes.	• Further commercial development is evident within the surrounding area, including a 'Technology Park', denoted 550m to the north west. • No other significant changes within 250m.
2005 1:10,000 scale map.	• No significant changes.	• No significant changes within 250m.
2007 1:2,500 scale map.	• The existing tanks are labelled. • No significant changes.	• The works to the north-east of the site are shown to have been demolished. • No other significant changes within 250m.

Historical maps are included with the Environmental Disclosure (Groundsure) Report in Appendix B.

3.2 Published Geology.

Maps/publications referenced:	BGS 1:10,000 Scale Sheets SJ35SW (Wrexham) Drift Edition and Solid Edition.
Made Ground:	Although no made ground is shown beneath the site, the historical activities associated with the site are likely to reveal the presence of made ground. Geological plans indicate made ground to be present 50m to the northwest and 100m to the northeast of the site.
Drift Geology:	The majority of the site is shown to be underlain by Glaciofluvial Sand and Gravel Deposits. Glacial Till deposits are shown to outcrop along the very southern boundary of the site. Alluvium deposits are shown approximately 30m to the northwest of the site, associated with the River Gwenfro.
Solid Geology:	The site is shown to be underlain by strata of Carboniferous, Westphalian C (Upper Coal Measures) comprising Ruabon Marl Formation, which are described by the BGS to comprise *'red and purple sandstones with subordinate green banding and mottling, interbedded with red and grey feldspathic sandstones'.* Several coal seams are recorded to outcrop to the west of the site, dipping to the east, and named as: Alpha Coal (300m to the west, recorded at thicknesses between 0.1-1.27m), Beta Coal (400m to the west, recorded at thicknesses between 1.5-3.7m), Gamma Coal (450m to the west, recorded at a thickness of 0.8m) and Delta Coal (500m to the west, recorded at thicknesses between 0.5-0.6m). These seams would therefore be present at depth beneath the site.
Dip of Solid Strata:	No dip directions are shown close to the site, however, the geological younging direction is to the east.
Geological faults:	The closest major fault (Wrexham Fault) is recorded approximately 500m to the east of the site, shown to be downthrowing strata to the east and orientated north-south. A second fault is located 700m to the north of the site, downthrowing strata to the north, in a general east-west orientation.

3.3 Unpublished Geology.

A borehole located within the west of the site (in the location of the Trading Standards Offices) encountered topsoil to approximately 0.5m depth, underlain by soft sandy clay to 0.9m, overlying sand and gravel, proven to a depth of 8.5m bgl. SPT N values were recorded between 8 and 52, increasing with depth. No groundwater was encountered.

Two boreholes located approximately 400m to the south west of the site encountered topsoil over a varying sequence of clayey sand/gravel and sandy clays. Sandy silt/clay was proven to a depth of 4.1m bgl. SPT N values were recorded between 5 and 7. No groundwater was encountered.

3.4 Mining, Quarrying and Natural Cavities.

The historical plans and BGS data referenced do not indicate any historical mining or quarrying activity within the site. Two wells are evident however on available historic plans, within the east of the site, which appear to have been associated with the former Engine Shed.

The Groundsure Report states that the site is located within the specified search distance of an identified mining area. However, the report also states that the risk of subsidence relating to shallow mining is 'negligible'.

In order to determine the risk to the site from recorded coal mining, a mining report was commissioned and obtained from the Coal Authority (CA). A copy of the mining report is included in Appendix C.

Salient points pertinent to the site are summarised below:

- *The property is in the likely zone of influence from workings in 2 seams of coal at 240m to 360m depth, and last worked in 1922. Any ground movement from these coal workings should have stopped by now".*
- *"The property is not within the likely zone of influence of any present underground coal workings."*
- *"No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991."*
- *"There are no known coal mine entries within, or within 20m of, the boundary of the property".*
- *"At the surface, there are no known faults or other lines of weakness due to coal mining that have made the property unstable."*
- *"The property is not within the boundary of an opencast site from which coal has been removed by opencast methods."*
- *"There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property".*

Discussions with the Coal Authority indicates the seams to be named as the Quaker Coal seam and Main Coal seam. The BGS map indicates recorded thicknesses of the seams to be between 1.14m to 1.52m and 1.82m to 4.09m respectively.

Based on the stratigraphic column given on the 1:10,000 geological map the distance between the Quaker Coal and the Alpha Coal would indicate that the Alpha Coal may be at shallow depth beneath the site.

The Planning and Development department at Wrexham County Borough Council states that they have *"no records of any past minerals extraction, quarrying or underground mining beneath or within the vicinity of the site".*

A request for information has been made to the Building Control Department at WCBC. A reply is currently outstanding, which will follow under separate cover upon receipt.

3.5 Hydrology and Hydrogeology.

Surface Waters

Nearest Surface Water Features:	• The Groundsure Report and Ordnance Survey maps of the area indicate that the nearest surface water feature is the River Gwenfro, located 80m to the north-west of the site. • River Quality records for the River Gwenfro indicate that the river has a chemical grade of 'B' (good) and a biological grade of 'D' (fair). The records are stated to have been taken 20m to the north-east of the site.
Indicative Floodplains:	• According to the Groundsure Report the site is partly located within Zone 2 and 3 indicative floodplains. A Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%), or greater from rivers, whereas a Zone 3 floodplain estimates the annual probability of flooding as one in one hundred (1%), or greater from rivers. • There are no areas benefiting from flood defences within 250m of the site boundary, and no areas used for flood storage.
Recorded Pollution Incidents:	• The Groundsure Report states that there are two discharge consents within 500m of the site; both are located 266m to the north at Maesgwyn Sewage Pumping Station. One relates to 'Emergency Discharges' and the other as 'Pumping Station – Water Company'. Both were effective from March 2002. • The Groundsure Report states that there have been no EA recorded pollution incidents to controlled waters within 250m of the site boundary.
Surface Water Abstractions:	• The Groundsure Report states that there are three surface water abstractions within 1km of the site; the closest is recorded to be located 139m to the west, taken from the River Gwenfro for spray irrigation. • The Groundsure report states that there are two potable water abstraction licenses within 2km of the site. Both licences are located 1674m and 1870m to the south-east and south respectively, and are used for 'Drinking, Cooking, Sanitary, Washing – Household'. • Both water abstraction licences are sourced from springs, and were issued in 1968.

Groundwater

Hydrogeology of Drift Deposits and Bedrock:	• The site is recorded as being underlain by Glaciofluvial Sand and Gravel deposits, overlying Ruabon Marl Formation. • The information obtained as part of the Groundsure Report indicate that these formations are classified as a minor aquifer, which are defined as: "*Fractured or potentially fractured rocks which do not have a high primary permeability and other formations of variable permeability including unconsolidated deposits. Although these formations will seldom produce large quantities of water for abstraction, they are important both for local supplies and in supplying base flow to rivers*". • The soils underlying the site are classified as having a high leaching potential with respect to groundwater vulnerability.
Groundwater Abstractions:	• The Groundsure report states that there are no records of groundwater abstractions within 2km of the site.
Source Protection Zones:	• The site does not lie within a Source Protection Zone; however, Zone 2 (outer catchment) and Zone 1 (inner catchment) Source Protection Zones are recorded by Groundsure to be located 265m and 286m respectively to the north-west of the site.

The Environmental Health Department at WCBC state that they are *"not aware of any private water abstractions within a 1km radius of the site".*

3.6 Landfill.

Environment Agency (EA) Historic Landfill Sites:	• The Groundsure Report states there is one EA historic landfill site within 1km of the site boundary. This lies 295m to the east at a location described as 'Parciau'. The waste type is described as 'Inert, Industrial, Commercial, Household'. This site is also recorded by Groundsure to be a Local Authority Landfill Site. • The Local Authority Environmental Health Department at WCBC state that this landfill site is an *"uncontained and unlicensed domestic waste landfill site".* The approximate waste depth is stated as being '4 metres' and the date of the final input was December 1972. • The correspondence from the LA states that: *"not all the landfill shown on the plan actually received domestic waste; the area which did is highlighted (*on the drawing accompanying the correspondence*) and this waste was deposited by the Council. Other areas of the site have also been used to deposit waste prior to its use by the Council (this waste is primarily ashy material)….the records state that the Council developed the landfill to reclaim the site from marshland for recreational purposes and that the majority of the fill is likely to be clinker. Some remedial works have been undertaken in the south east corner of the site, the works comprise a gas vent trench. The site is owned by WCBC and is currently a town park known as Bellevue Park."* • The Groundsure Report states that three other landfills are recorded to be located within 1.5km of the site.
Operational Waste Treatment, Transfer and Disposal Sites:	• One Operational Waste Treatment, Transfer and Disposal Site lies within 500m of the site boundary. This is located 349m to the north, at 'Jacques Garage (Vehicle Dismantlers)'. The waste type is described as 'non-hazardous (scrap yard)' and there are 'no known restrictions on the source of waste'. The size is stated to be 'very small' with an input rate of less than 10,000 tonnes per year. The license was recorded as being 'surrendered' on 1st September 1992. • This site and operator also appear twice as an Environment Agency (REGIS) waste site. No further relevant details are provided.
Non-operational Waste Transfer or Disposal Sites:	• The Groundsure report states that there are two registered non-operational Waste Transfer or Disposal Sites within 500m of the site boundary. The closest lies 161m to the northwest at Ysbyty Maelor Wrexham Hospital. The waste type is described as 'difficult' and is stated as being restricted to 'waste produced/controlled by the license holder'. The site was recorded as being 'exempt from licensing' on 1st October 1992. No further relevant details are provided. • The second site lies 479m to the west at Victor Fultons Transfer Station. The Groundsure report states that the waste type is described as 'difficult' and that there are 'no known restrictions on the source of waste'. The license was recorded as being 'surrendered' on 1st September 1992. No further relevant details are provided.

Copies of the Groundsure report and correspondence received from the Local Authority are included in Appendix B and C respectively.

3.7 Potentially Contaminative Sources.

The Local Authority Environmental Health Department (LAEHO) at WCBC state that *"the site has not been occupied by an authorised process and there are no Part A or Part B authorised processes within a 250m radius of the site."*

The LAEHO at WCBC has not yet determined any sites as 'contaminated land'; however, they provided the following information:

"…the site is on land that was formerly an engine shed, railway and a corporation depot, all of which may give rise to contamination and, therefore, at some time will have to be considered under Part IIA. In addition, the following land uses in the immediate area may also give rise to contamination and at some time will be considered under Part IIA:

- *Goods yard with railway sidings*
- *Ambulance Depot*
- *Factory (with electricity substation)*
- *Depot and Warehouses."*

The Environmental Health Department at WCBC state their records indicate that:

"There are no reported spillages or other instances associated with the site or neighbouring premises"; and *"There are no records of any instances of nuisance associated with the site or immediate surrounding premises and no formal notices have been issued by the Authority".*

According to the Environmental Data Report there are forty two potentially contaminative industrial sites within 150m of the property, including three on site. These include the following operations:

Activity/Category	Distance from site (m) (compass direction)
Railway Stations, Junctions and Halts	On Site; 44m (E); 112m (S)
Electricity Sub-station	On Site; 6m (N); 126m (W); 130m (SW)
Transport Storage and Delivery	On Site; 26m (N); 31m and 34m (NW); 88m (SE)
Vehicle Parts and Accessories	24m (N)
Medical Equipment, Supplies and Pharmaceuticals.	31m (NW)
Ambulance Station and Workshop	40m (NW)
Tanks	58m (NE); 105m (N); 113m (NE); 144m (NW)
Water Tower (Pumping Stations)	85m (N)
Works or Factories	94m (E); 121m (W);
Chimneys	109m (N)
Industrial Repairs and Services (Plumbing and Heating)	136m (SE)

3.8 Miscalleaneous.

Radioactive Substance (RAS) Licenses:	• The Groundsure Report states that there are three records of Radioactive Substance (RAS) licenses on site. One is registered to Jacobs UK Ltd Engineering Services Laboratory and was effective from 8th May 2002. This is now described as 'revoked/cancelled'. • Another license on site is held by Wrexham Borough Council Engineering Services Laboratory for the 'keeping and use of mobile radioactive sources'. This was first effective from 31st March 1991 and has been superseded by two subsequent variations before being 'revoked/cancelled' in April 1997. • The third license is held by 'Babtie Group Ltd', Engineering Services Laboratory has been effective from 1st September 2003. Another twenty two category 3 and 4 RAS licenses lie within 250m of the site boundary, all of which are located at Wrexham Maelor Hospital, 198m to the northwest.
Recorded Petrol and Fuel Sites:	• The Trading Standards Enforcement Officer at Wrexham County Borough Council stated that although they hold no formal records of any underground petroleum storage tanks on site *"above ground Diesel and LPG Storage Tanks and a freestanding Petroleum Store constructed of brick and an LPG caged cylinder store in the open air"*

	are currently situated within the site area.
Fuel Storage Tanks:	• Two above ground gas oil tanks, one diesel tank and LPG tanks are located on site, which appear in general good order. No visual evidence of spillages was noted around the tanks. • Correspondence from the Petroleum Licensing Officer (PLO) stated the following: *'As the area includes our old Trading Standards Office, I can inform you that as far as I am aware that there has never been any underground petroleum storage tanks on that site, however that does not mean that there has never been any form of UST say for Diesel etc. In fact as far as I am aware there are above ground Diesel and LPG Storage Tanks on the Highways site, whilst our old office in the same area has a freestanding Petroleum Store constructed of brick and an LPG caged cylinder store in the open air…'* Information received from the PLO is included in Appendix C.
Local Authority Pollution and Prevention Control (LAPPC) and IPC Processes:	• The Groundsure Report states there are no IPC or IPPC holding licenses or authorisations within 1km of the site boundary.
Natural Ground Subsidence:	• The Groundsure Report records the maximum risk of natural ground subsidence to the site is 'very low'. • The Groundsure Report states that the site is classified as a 'very low' to 'negligible' shrink-swell clay hazard (predominantly low plasticity). • The site area is classified as 'negligible' risk from compressible deposits and 'very low' risk from running sand hazards.

Copies of correspondence and drawings received from the Local Authority and PLO are included in Appendix C.

4.0 PROPOSED DEVELOPMENT.

It is understood that the proposed superstore will cover an area of approximately 1 hectare with an associated Petrol Filling Station to the south, areas of car parking to the east, a service yard to the west of the site and soft landscaping. An area of public open space (POS) is proposed to the northeast and east of the site.

No detailed design drawings or structural loadings have been provided at this stage although a plan indicating the position of the proposed development layout is shown detailed on Drawing No. C3051/03, included in Appendix A.

5.0 FIELDWORK.

5.1 Introduction.

The area delineated by the client for the intrusive investigation comprises an area covering approximately 2.1 hectares within the proposed car park, as shown on Drawing No. C3051/04, presented in Appendix A.

The fieldwork was undertaken between the 5th and 7th August 2008 and comprised:

- Eight window sample boreholes (WS's) drilled to depths of between 5.00m bgl and 9.00m bgl;

- Seventeen trial pits (TP's) excavated by a JCB with backhoe excavator to depths between 0.60m and 3.80m bgl; and
- Soakaway tests within natural strata in three trial pits (TP1, TP2 and TP4).

The above scope of works was based on the client's requirements for drainage design.

The fieldwork was undertaken under the direct supervision of a Sirius Geoenvironmental Engineer. The JCB excavator was sourced externally.

Window sampling was carried out using a tracked window sample rig equipped with a drop weight. The weight was used to drive steel tubes into the ground to obtain a continuous sample; the samples being recovered in uPVC liners. Sub samples were then taken from the liners.

The installation of gas and groundwater monitoring wells in window sample boreholes was outside the remit of work specified by the client. As no wells were installed, the monitoring of groundwater and hazardous gases lies outside the scope of this report.

5.2 Exploratory Hole Locations.

The exploratory hole positions were determined on site by a representative from Sirius in conjunction with a site operative. The exploratory positions are shown on Drawing No. C3051/04, contained within Appendix A.

At the request of the client, exploratory holes were located within an area located in the eastern part of the site as shown on Drawing C3051/04, in Appendix A. Exploratory holes were located where possible to maximise coverage within the designated area, minimise disruption to operations and to avoid known underground services.

Guidance presented in BS10175 and CLR4 was followed in determining exploratory hole locations.

Each exploratory hole position was scanned for services in advance of excavation using a cable avoidance tool (CAT scan).

5.3 Strata Description.

Depths and descriptions of strata encountered together with details of the samples recovered are presented in the exploratory hole logs in Appendix D.

Strata descriptions are based on an examination of the strata encountered together with consideration of the in situ and laboratory test data. Procedures and principles contained in BS5930 (1999), BS10175 (2001), BS1377 (1990) and Eurocode 7 have been followed.

The depth of strata on the record sheets are recorded from current ground levels at each location. The information contained in this report is limited to that contained within the locality of each exploratory hole, as indicated on Drawing No C3051/04, included in Appendix A.

5.4 Sampling.

Disturbed samples of all strata encountered were selected from each exploratory hole by a representative of Sirius during the intrusive investigation works.

Samples of soil for chemical analysis were placed into 1 litre plastic and glass jar containers, as appropriate and dispatched to a UKAS/MCERTs accredited laboratory on the same day of fieldwork under appropriate Duty of Care. Samples for chemical testing were stored at approximately 4°C using cool boxes to maintain sample integrity.

5.5 Soakaway Tests.

Soakaway tests were carried out in general accordance with the test method specified in BRE Digest 365 - Soakaway Design. Water was added to the excavation, to fill the test zone, using a 5000 litre bowser, towed by a tractor. The soakaway tests were repeated three times per trial pit (excluding TP4 due to time constraints) as defined within BRE 365.

Plots of water level against time are provided on the soakaway result sheets, presented in Appendix E, and are discussed further in Section 7.8.

6.0 LABORATORY TESTING.

6.1 Chemical.

Six soil and four leachate samples of made ground were tested for a range of potential contaminants under subcontract with Derwentside Environmental Testing Services (DETS), a UKAS and MCERTS accredited laboratory.

The analytes tested are listed in Section 8.1 of this report. The results of the tests, as received from the laboratory, are included in Appendix E, and discussed in Section 8.0 of this report.

6.2 Geotechnical.

Geotechnical testing was not carried out as part of this investigation other than sulphates as part of the chemical testing. Geotechnical testing was outside the scope of the original remit.

7.0 GROUND CONDITIONS AND MATERIAL PROPERTIES.

7.1 General.

A complete record of all strata encountered is provided on the exploratory hole logs contained within Appendix D. These show the area investigated to be generally underlain by a sequence of made ground, overlying sand and gravel deposits proven to a depth of 9.0m bgl. A silty, sandy, slightly gravelly clay (locally reworked) was present below the made ground in several exploratory holes. Bedrock was not proven in any of the exploratory holes.

The made ground was found to be deeper within the eastern portion of the site where relic foundations associated with the former structures were also encountered.

Please note that the exploratory holes were limited to the designated area of investigation, and as such, ground conditions may vary elsewhere across the whole site.

Table 1: Summary of Ground Conditions

Strata description	Depth to top of strata (m bgl)	Thickness of strata (m)
Tarmacadam. (WS1-WS4, WS6-WS8).	GL	0.10 to 0.25
Grey sandy fine to coarse angular to very angular GRAVEL of limestone (WS5).	GL	0.50
[HARDSTANDING] (Council Depot area only)		
Western area (council depot) of investigation. (WS1-WS8)		
Grey brown black coarse sandy angular GRAVEL of brick, limestone and quartzite. Sand is of ash. Occasional slag and ACM's.	0.10 to 0.25	0.20 to 0.70
Firm brown black sandy, slightly gravelly, organic rich in parts CLAY. Sand partly of ash.		
Eastern/north eastern area of investigation ('undeveloped area')		
Black/brown gravelly SAND, locally of ash. Gravel is fine to coarse angular of clinker, sandstone, limestone, brick and occasional slag (TP3, TP5, TP6, TP7, TP9, TP10, TP11, and TP12).	GL	0.40 to 2.80
Black/red sandy cobbles of brick. Sand is of ash. Asbestos lagging locally identified. Concrete obstructions identified in TP's 8A – 8C and TP13. (TP1, TP2, TP4, TP8A to D, TP13 and TP14).	GL	Up to 1.80 (TP1)
[MADE GROUND]		
Firm consistency, brown, silty, sandy, slightly gravelly CLAY [low plasticity]. Sand is fine. Gravel is fine to coarse subrounded to angular of quartzite, sandstone and occasional coal.	0.90 to 2.80	0.10 to 0.80
(WS1, WS3, WS8, TP6, TP7, TP8D, TP10 and TP14).		
[NATURAL COHESIVE DEPOSIT]		
Light brown very gravelly fine to coarse SAND. Gravel is fine to coarse rounded to subangular of sandstone, quartzite and limestone.	0.30 to 3.60	Proven to 9.00
Brown sandy fine to coarse subangular to angular GRAVEL with occasional cobbles and boulders of sandstone, quartzite and limestone.		
(All exploratory holes except TP3, TP8A, TP8B and TP13).		
[GLACIO-FLUVIAL SAND AND GRAVEL DEPOSITS]		

7.2 Made Ground.

Made ground was proven to depths of between 0.30m (WS6) and >2.50m bgl (TP3) across the area of investigation.

Made ground was generally found deepest within the south-eastern corner of the site, where the topography was raised to form an embankment for the former railway. Made ground was generally found to depths of between 1.0m and 2.0m bgl within the open, undeveloped northern area of the investigation, and to depths between 0.5m to 1.0m bgl within the developed council depot area of the investigation.

Window sample probeholes located within the council depot area generally identified surface hard standing, comprising tarmacadam, to a maximum depth of 0.25m bgl (WS7). This was

underlain by a fine to coarse sand and gravel sub-base comprising limestone, sandstone, concrete, brick and occasional slag. Sand was recorded to be partly of ash. Bands of slightly organic (in parts) clay were encountered within WS1-WS4 and WS8 to a maximum depth of 0.70m bgl (WS1). Possible asbestos containing materials were encountered within WS1.

Trial pits located in the east and north-east of the area of investigation encountered grass/rough ground at the surface, underlain by granular made ground comprising brown black sandy fine to coarse gravel of ash, brick, coal, clinker, slag and concrete. Frequent pieces of asbestos sheeting and lagging were encountered, together with timber.

Demolition rubble was encountered which was recovered as sandy gravel of ash and brick with cobbles of brick and concrete together with relic foundations. TP8A, TP8B, TP8C and TP13 refused on slabs of concrete within this strata. The base of the made ground was not proven in TP3.

Granular made ground toward the west and northwest comprised generally black brown gravelly sand of ash to sandy gravel of clinker, sandstone, limestone and brick. Slag fragments were locally identified in TP5, TP6, TP7, TP8D, TP9 and TP10.

Cohesive made ground was locally encountered underlying the granular materials and comprised orange brown, sandy, gravelly reworked clay with lenses of ash.

7.3 Natural Cohesive Deposits.

Firm consistency, brown, silty, sandy, slightly gravelly clay was encountered within several trial pits, generally located to the east of the site, and also within WS1, WS3 and WS8, located within the north western area of the council depot. The cohesive deposits were encountered at a maximum depth of 2.80m and at a maximum thickness of 0.80m in TP10.

7.4 Glaciofluvial Sand and Gravel Deposits.

Deposits ranging from gravelly fine to coarse sand to brown sandy, cobbly fine to coarse, rounded to subrounded gravel of sandstone and quartzite were encountered. Occasional boulders were identified (TP5, TP6, TP7 and TP9) of sandstone generally 0.3mx0.3m in size. The sands and gravels were encountered underlying the base of the made ground or where it occurred, by natural cohesive strata, in all exploratory holes. The sand and gravel deposits were proven to a maximum depth of 9.00m bgl in WS1 and WS3. Pockets/bands of firm consistency red clay were present within this strata. The granular material generally became coarser with depth, with cobbles and boulders becoming more frequent from approximately 2.0m depth.

Bedrock was not encountered in any exploratory hole.

7.5 Groundwater.

No groundwater seepages were observed in any of the exploratory hole locations during the site investigation, however, dampness was encountered in WS1, WS3, WS5, WS6, TP5, TP7, TP8D, TP9, TP11 and TP12 at depths between 0.8m and 3.0m bgl.

It should be borne in mind that water levels are likely to fluctuate with seasonal/rainfall influences and may, therefore, be substantially higher at wetter times of year than those found

during this investigation. Groundwater monitoring wells are required to determine equilibrium groundwater levels.

7.6 Visual/olfactory Evidence of Contamination.

A slight hydrocarbon odour was observed within made ground between 0.10m and 0.20m depth in WS6. Ash was observed as a major constituent of the made ground within the majority of exploratory holes, possibly indicating PAH and heavy metal contamination. No other visual/olfactory evidence of hydrocarbon contamination was encountered.

Suspected asbestos was encountered within several exploratory holes in the form of cement sheeting and lagging.

7.7 Geotechnical Properties.

Samples were tested as part of the chemical testing regime, for water soluble sulphate and pH. Water soluble sulphates in the range of <0.01g/l to 0.08g/l and pH values in the range of 8.9 to 10.4 have been recorded. In accordance with BRE Special Digest 1 (2005) for the design of buried concrete, the preliminary design sulphate class is DS1 and ACEC class of AC1 based on brownfield site designation and mobile groundwater conditions.

No other geotechnical testing was carried out.

7.8 Soakaway Test Results.

Seven soakaway tests were carried out in three trial pits, reference TP1 (SW01-SW03), TP2 (SW04-SW06) and TP4 (SW07). The trial pits were excavated using a JCB 3CX back hoe excavator, to a maximum depth of 2.85m. All soakaway tests were undertaken within natural sand and gravel deposits, below the base of the made ground. The soakaway tests were supervised by a Sirius engineer, who logged the trial pits in accordance with Eurocode 7. The trial pit logs are presented in Appendix D to this report.

The tabulated results, together with a plot of water level versus time, are included as Appendix E to this report.

Infiltration rates for each trial pit are tabulated in Table 2 below:

Table 2: Soil Infiltration Rates

Trial Pit	Soil Infiltration Rates (m/s)			Lowest Recorded Infiltration Rate (m/s)
TP1	**SW01**	**SW02**	**SW03**	$1.07E^{-04}$
	$1.48E^{-04}$	$1.69E^{-04}$	$1.07E^{-04}$	
TP2	**SW04**	**SW05**	**SW06**	$9.11E^{-05}$
	$4.66E^{-04}$	$1.96E^{-04}$	$9.11E^{-05}$	
TP4	**SW07**	**SW08**	**SW09**	$3.41E^{-05}$
	$3.41E^{-05}$	N/A	N/A	

Note, SW08 and SW09 not completed due to time constraints

8.0 CHEMICAL CONTAMINATION.

8.1 General/Conceptual Site Model.

The desk study has revealed that the site has developed as a railway yard with associated engine shed, tanks, wells and chimneys in the central and eastern parts of the site from at least 1909. The railway buildings are shown to have been demolished by 1985, when a council depot is shown in the western part of the site.

To determine the possible contaminants associated with the known site uses, reference was made to the following document:

- DEFRA R & D Publication CLR 8.

Based on the above, contaminants that may be found on site include, but are not necessarily limited to:

- Toxic and phytotoxic metals
- Sulphates
- PAH's
- Oil/fuel hydrocarbons (Aromatic/Aliphatic)
- Asbestos.

The known historical and present uses of the site are considered to give rise to a moderate/high potential for significant ground contamination.

The site is considered to lie within a setting of moderate environmental sensitivity with respect to controlled waters.

Factors which are considered pertinent to this conclusion are:

- The site is located above a minor aquifer with soils of a high leaching potential,
- There are three surface water abstractions within 1km of the site (the closest being 139m to the west),
- The River Gwenfro lies 80m to the north west, and
- Source Protection Zones 1 and 2 are located approximately 270m to the north west of the site.

The development proposals indicate the future end use of the site to be commercial, and that the surface cover across areas of buildings and car parking will generally comprise hardstanding. The area of POS is likely to be landscaped. This is considered to represent a low to moderate sensitivity end use to occupiers and users of the superstore, since their direct exposure to any ground contamination will be mitigated by hard cover and their exposure time on site will be limited.

Three soil samples of made ground (two granular and one cohesive) and one natural were tested for the following determinants:

pH, arsenic, cadmium, chromium, copper, lead, mercury, selenium, nickel, zinc, water soluble and total sulphate, total phenols (monohydric), total and speciated polyaromatic hydrocarbons (PAH) and, total organic carbon (TOC).

Two soil samples of made ground was tested for total and speciated TPH (aliphatic/aromatic split) and one sample for BTEX and MTBE.

Three of the made ground samples were also screened for presence of asbestos fibres.

The leachable concentrations of the following analytes were determined from three samples of made ground and one natural:

pH, arsenic, cadmium, chromium, copper, lead, mercury, selenium, nickel, zinc, sulphate, total phenol, total and speciated PAH.

The results, as provided by the laboratory, are presented in Appendix E.

A conceptual site model is presented as Drawing No. C3051/05, included in Appendix A.

8.2 Current Guidance and the Interpretation of Analytical Data.

Contaminated land is defined under law through Part 2A of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995. This supports a 'suitable for use' based approach to the risk assessment of contaminated land. The site specific risk assessment is based upon an assessment of plausible pollutant linkages, referred to as the contaminant → pathway → receptor model, based upon the current or proposed use of the site.

The first stage comprises the development of a preliminary conceptual site model (CSM), usually based on desk top study data. This is undertaken in order to identify potential contaminants, pathways and targets. This initial model can then be used to scope an effective/targeted intrusive ground investigation.

Following completion of the investigation, the findings are used to refine the preliminary CSM, in order that a suitable cost effective remediation strategy can be devised or further investigation and risk assessment undertaken.

The process of refining the preliminary CSM, involves semi quantitative risk assessment, which is split into two parts:

- The comparison of the soil analysis results against generic soil screening values, to establish sources of contamination (Generic Quantitative Risk Assessment); and,

- A qualitative risk assessment to identify any plausible pollutant linkages from contaminant through to receptor.

If the screening levels are exceeded and the qualitative risk assessment identifies a plausible pollutant linkage, then assessment could move onto another stage, which could include additional investigation, a more sophisticated Detailed Quantitative Risk Assessment (DQRA), or remedial action taken to break the pollutant linkages. The benefits of undertaking a DQRA

must be weighed against the likelihood that it will bring about cost savings in the proposed remediation.

The initial screening criteria currently used by Sirius are as follows:

CLEA (2002)
The current best practice soil screening values for use in UK are derived using CLEA (2002) published by DEFRA. A number of standard land uses are defined within CLEA (2002) for which generic soil guideline values (SGVs) can be derived. Currently, published SGVs have been withdrawn.

Sirius In House SSVs (Soil Screening Values)
In the absence of published SGVs, Tier 1 generic Soil Screening Values (SSVs) have been derived by Sirius for selected contaminants of concern. SSVs have been calculated for standard land uses in accordance with the current UK best practice guidelines set out within DEFRA 'CLEA' publication CLR10 and the subsequent supporting briefing notes using an appropriate risk assessment model.

The human health GAC values used were derived on the basis of the CLR7-10 guidance. In the absence of complete updated guidance and a validated version of the revised CLEA model, these have been retained temporarily for screening purposes.

LQM/CIEH (2007) Generic Assessment Criteria for Human Health Risk Assessment
In the absence of published SGVs, reference is made to the Tier 1 generic assessment criteria published by LQM. This data was derived using the CLEA UK software and is fully compliant with UK contaminated land policy.

The generic quantitative risk assessment carried out as part of this report assumes a **commercial** end use.

8.3 Results.

Total Soil Concentrations

The results of the soils analysis are presented in Appendix F of this report, and are summarised in the table below.

Table 3: Summary of Total Soil Concentrations and Generic Semi-Quantitative Risk Assessment for Commercial End Use

Parameter	Screening value (mg/kg, unless otherwise stated)	No. of samples above screening value	No. of samples tested	Maximum concentration above Screening Value (mg/kg, unless otherwise stated)
Metals/Metalloids				
Arsenic	500 (1)	0	4	
Cadmium	1,400 (1)	0	4	
Chromium (Total)	5,000 (1)	0	4	
Lead	750 (1)	0	4	
Mercury	480 (1)	0	4	
Selenium	8,000 (1)	0	4	
Copper	45,700 (2)	0	4	

Parameter	Screening value (mg/kg, unless otherwise stated)	No. of samples above screening value	No. of samples tested	Maximum concentration above Screening Value (mg/kg, unless otherwise stated)
Nickel	5,000 [1]	0	4	
Zinc	188,000 [2]	0	4	
Inorganics				
pH	<5	0	4	
Total Sulphate	2,400 [3]	0	4	
Water Soluble Sulphate	0.5 g/l [3]	0	4	
Organics				
PAHs				
Acenaphthene	88,000*[4]	0	4	
Anthracene	440,000*[4]	0	4	
Acenaphthylene	74,000*[4]	0	4	
Benzo(a)anthracene+	293*[4]	0	4	
Benzo(b)fluoranthene+	295*[4]	0	4	
Benzo(k)fluoranthene+	980*[4]	0	4	
Benzo(g,h,i)perylene+	980*[4]	0	4	
Benzo(a)pyrene	29.7[2]	0	4	
Chrysene+	980*[4]	0	4	
Dibenz(a,h)anthracene	29.7[2]	0	4	
Fluoranthene	58,000*[4]	0	4	
Fluorene	59,000[2]	0	4	
Indeno(1,2,3-cd)pyrene+	370*[4]	0	4	
Naphthalene	290[2]	0	4	
Pyrene	44,000*[4]	0	4	
Phenanthrene	30,900*[4]	0	4	
TPH				
Aliphatic EC 5-6	95.3[2]	0	2	
Aliphatic EC >6-8	242[2]	0	2	
Aliphatic EC >8-10	65.9[2]	0	2	
Aliphatic EC >10-12	29,900[2]	0	2	
Aliphatic EC >12-16	29,900[2]	0	2	
Aliphatic EC >16-35^	617,000[2]	0	2	
Aromatic EC 5-7	26.9[2]	0	2	
Aromatic EC >7-8	30.4[2]	0	2	
Aromatic EC >8-10	107[2]	0	2	
Aromatic EC >10-12	625[2]	0	2	
Aromatic EC >12-16	12200[2]	0	2	
Aromatic EC >16-21	9190[2]	0	2	
Aromatic EC >21-35	9250[2]	0	2	
Miscellaneous Organics				
Monohydric Phenol	21,900[1]	0	4	
Benzene	1.66[4]	0	1	
Ethlybenzene	48000[1]	0	1	
Toluene	150[1]	0	1	
Xylene	341[4]	0	1	
MTBE	2110[4]	0	1	
Others				
TOC	3 w/w%[5]	2	4	7.8% TP5 at 0.50m; 3.7% TP2 0.50m depth.
Asbestos	ND	0	3	

[1] DEFRA, Soil Guideline Values – for commercial end use
[2] LQM/CIEH (2007) Generic Assessment Criteria for Human Health Risk Assessment (for a sandy soil with 1% SOM and pH 7.0)

[3] BRE (2005) Special Digest 1, 3rd Edition, Concrete in aggressive ground. Upper limits for DS-1 Design Sulphate Class concrete.
[4] CLEA UK software has been used to calculate a number of Sirius In House GACs, based on a 1% SOM in this instance.
[5] The Hazardous Waste (England and Wales) Regulations 2005. 'Inert' waste threshold.
[6] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the fire hazards of contaminated land.
+ Contaminants where a TEF has been applied. Reference chemical: benzo(a)pyrene.
*Values not integrated based on direct contact / ingestion.
** Values not integrated based on inhalation.
^ Laboratory results for bandings C16-C21 and C21-C35 combined for GAC C16-C35.
SSV based on most conservative reported value.

Total Organic Carbon (TOC) was recorded to exceed 3 w/w% in two of the samples tested, with a maximum concentration of 7.8%w/w in TP5 at 0.50m. Both exceedences were encountered within made ground soils.

No other determinants tested were found to exceed their relevant guideline values.

No asbestos fibres were detected in the samples screened.

Soil Leachate Testing

The results of the leachability testing of the soils are summarised in the table below. The results have been compared to both the Environment Agency Freshwater Environmental Quality Standards (EQS's), and the Water Supply (Water Quality) (Amendment) Regulations 2001 and 2007 based on the receiving waters being the nearby River Gwenfro and the underlying minor aquifer respectively. Analytical test results are presented in Appendix F.

Table 4: Summary of Soil Leachate Concentrations and Generic Semi-Quantitative Risk Assessment

Parameter	Generic Assessment Criterion (µg/l unless otherwise stated)	No. of samples above screening value	No. of samples tested	Maximum concentration above Screening Value (µg/l, unless otherwise stated)
Metals/Metalloids				
Arsenic	50 [(a)] 10 [(b)]	0	4	
Cadmium	5 [(a, b)]	0	4	
Chromium+	250 [(a)] 50 [(b)]	0	4	
Lead+	250 [(a)] 25 [(b)]	0	4	
Mercury	1 [(a, b)]	0	4	
Selenium	10 [(b)]	0	4	
Copper+	28 [(a)] 2,000 [(b)]	0	4	
Nickel+	200 [(a)] 20 [(b)]	0	4	
Zinc+	500 [(a)] 5,000 [(b)]	0	4	
Naphthalene	8 [(a)]	0	4	
Benzo(a)pyrene	0.01 [(b)]	0	4	
Benzo(b)fluoranthene*	0.1 [(b)]	0	4	
Benzo(k)fluoranthene*	0.1 [(b)]	0	4	
Benzo(ghi)perylene*	0.1 [(b)]	0	4	
Indeno(1,2,3-cd)pyrene*	0.1 [(b)]	0	4	
Sum PAH-4*	0.1 [(b)]	0	4	
Phenol	0.5 [(b)]	0	4	
pH	6-9 pH units [(c)]	0	4	

(a) Environment Agency (2002) Environment Agency technical advice to third parties on pollution of controlled waters for Part IIA of the EPA 1990. Freshwater Environmental Quality Standards (EQS).
(b) The Water Supply (Water Quality) (Amendment) Regulations 2001 and 2007.
(c) The Surface Waters (Fishlife) (Classification) Regulations 1997.
* The sum of all 4 individual PAHs marked with an asterisk (*)
+ Hardness related (Published hardness of River Gwenfro used (349), sampled in 2006 by Environment Agency).

No determinands were found to exceed their relevant guideline value.

8.4 Qualitative Risk Assessment.

The site has previously been subject to uses that are deemed to have a moderate/high potential for contamination. Historical uses have included railway sidings, a goods shed, tanks, wells and a chimney.

End Users

Based on the source>pathway>target philosophy, the limited chemical results obtained from the area of investigation and the proposed development, the risk to end users is likely to be low. Further site investigation and a comprehensive chemical testing regime is however required to confirm the risk to end users.

It is likely however, given that visual evidence of asbestos was encountered within several exploratory holes, that a capping layer of clean cover will be required within any area of soft landscaping or POS.

Controlled Waters

Given the results of the limited leachate testing undertaken, the environmental setting of the site and the proposed development, the impact to controlled waters from the tested soils is considered to be low/negligible. Extensive further site wide sampling/testing, including groundwater testing, is required to corroborate the site wide situation. Given the recorded history of the site, and the geological profile, some groundwater contamination is anticipated.

It is recommended that additional intrusive investigation and chemical laboratory testing be undertaken to confirm the contamination profile of the site, and the current contamination status of groundwater. From this, the need for any remediation can be determined.

Built Development

Based on the limited number of samples tested for water soluble sulphate and pH, and in accordance with BRE Special Digest 1, a preliminary Design Sulphate Class of DS-1 and an ACEC Class of AC-1 could be used for buried concrete in contact with soils at the site, which should be corroborated as part of any future detailed intrusive investigation.

9.0 PRELIMINARY CONCLUSIONS.

9.1 Flooding

According to the Groundsure Report, the site is partly located within Zone 2 and 3 indicative floodplains.

A flood risk assessment was beyond the scope of this report. It is recommended that consultation be undertaken with the Environment Agency to determine implications of potential flooding on the proposed redevelopment.

9.2 Mining, Quarrying and Natural Cavities.

The findings of the desk study, undertaken as part of this investigation, indicate the site to be in an area where the risk to the site from hazards associated with natural cavities and mining are considered to be **low**. Although the Groundsure report indicates the potential for shallow mining

to be negligible, there is a potential risk for seams outcropping to the west of the site (comprising Alpha, Beta, Gamma and Delta seams) to underlie the site at influencing depth. Intrusive investigation comprising rotary probing is recommended to be undertaken during any future site investigation to confirm the depth to any coal seams within influential distance to the site.

Two wells have been identified on the site from available historical plans. Further investigation should be undertaken to identify the locations of the wells to establish their stability.

9.3 Excavations.

Underground obstructions are likely to be encountered, such as former foundations and timber associated with former railway sidings. Obstructions will be required to be locally broken and grubbed out.

No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA 97 Trenching Practice should be made to establish suitable means of support or battering of excavation sides during construction.

Based upon the results of the ground investigation, seepage of groundwater from made ground and shallow natural soils within excavations is expected to be negligible. If groundwater is encountered then it is considered likely that pumping from sumps should be sufficient to control inflows.

It is recommended that an adequate drainage system for surface water be installed by a competent contractor in order to prevent surface water ponding or collecting during and post construction, which may in turn lead to deterioration of the founding stratum.

9.4 Contamination Constraints to Development.

It is understood that the site is to be developed with a commercial superstore with service area to the west, petrol filling station and associated areas of car parking. An area of POS is to be located within the north east of the site.

Based on the contaminant > pathway > receptor philosophy and the chemical results obtained as part of this investigation, a preliminary assessment of the soils tested appears to indicate a low risk to proposed end users and controlled waters. However, only limited testing was carried out in the area of intrusive investigation which was also limited in extent. It is therefore recommended that a fully scoped site investigation be undertaken (including groundwater sampling / testing) in order to confirm the contamination profile of the whole site, and the current contamination status of groundwater. From this, the need for any remediation can be determined.

Given that visual evidence of asbestos was encountered within several exploratory holes, a capping layer of clean cover is likely to be required within any areas of soft landscaping / POS.

It is possible that areas of significant contamination not identified to date may be encountered onsite during redevelopment. If any areas of noxious odorous, brightly coloured, fibrous, liquid etc contamination are encountered further advice should be sought from a suitably qualified consultant.

Any material removed from site should be undertaken in accordance with the Duty of Care Regulations 1991 and the Landfill Directive.

Normal health and safety procedures should be adopted by groundworkers including no eating, drinking or smoking on-site, designated clean and wash areas and protective clothing. Additional precautions will be required to cater for the suspected ACM's.

An appropriately qualified consultant / contractor should assess the site for invasive plants such as Japanese Knotweed. Should any known/suspected Japanese Knotweed be identified then, the areas should be treated / over excavated by a suitably qualified specialist contractor.

9.5 Soakaway Infiltration Tests.

Seven soakaway tests were undertaken within three trial pits within natural strata (TP1, TP2 and TP4), with the lowest recorded infiltration rates of between $1.07E^{-04}$ and $9.11E^{-05}$. These should be used in final soakaway design to be undertaken by the clients chosen contractor. The effectiveness of any final soakaway is a function of the size, depth, anticipated discharge rates and the infiltration rate provided.

9.6 Regulatory Approval.

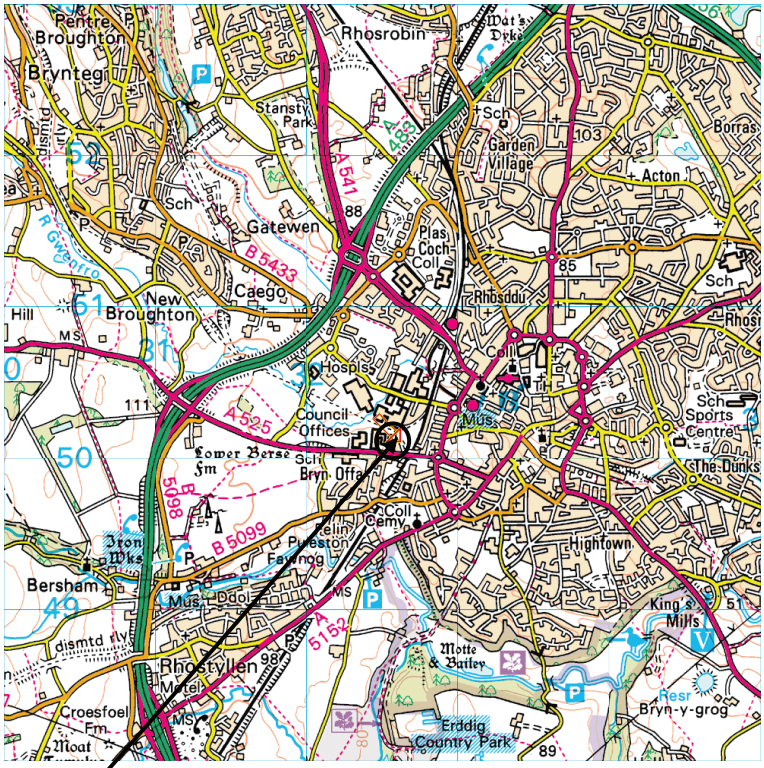
The conclusions and recommendations presented above are considered practical based on the findings of the preliminary phase 1 site investigation. However, the conclusions and recommendations are not intended to gain regulatory approval and, therefore, the report should be used as an addendum to any final fully scoped site investigation report for regulatory approval.

APPENDIX A

DRAWINGS

Site Location Plan

Contract Number	C3051
Contract	Ruthin Road, Wrexham, LL13 7TU
Client	ODL



N

THE SITE

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Sirius Geotechnical & Environmental Ltd, Suite 2, Russel House, Mill Road, Langley moor, Durham DH7 8HJ.
Licence No. 100042005

Scale	1:50,000	
Drawn by GC		**Approved** GC
Drawing Number	C3051/01	



NOTES

Site Boundary

REVISION

0	For Information
A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL & ENVIRONMENTAL

TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT

ODL

SITE

Ruthin Road, Wrexham

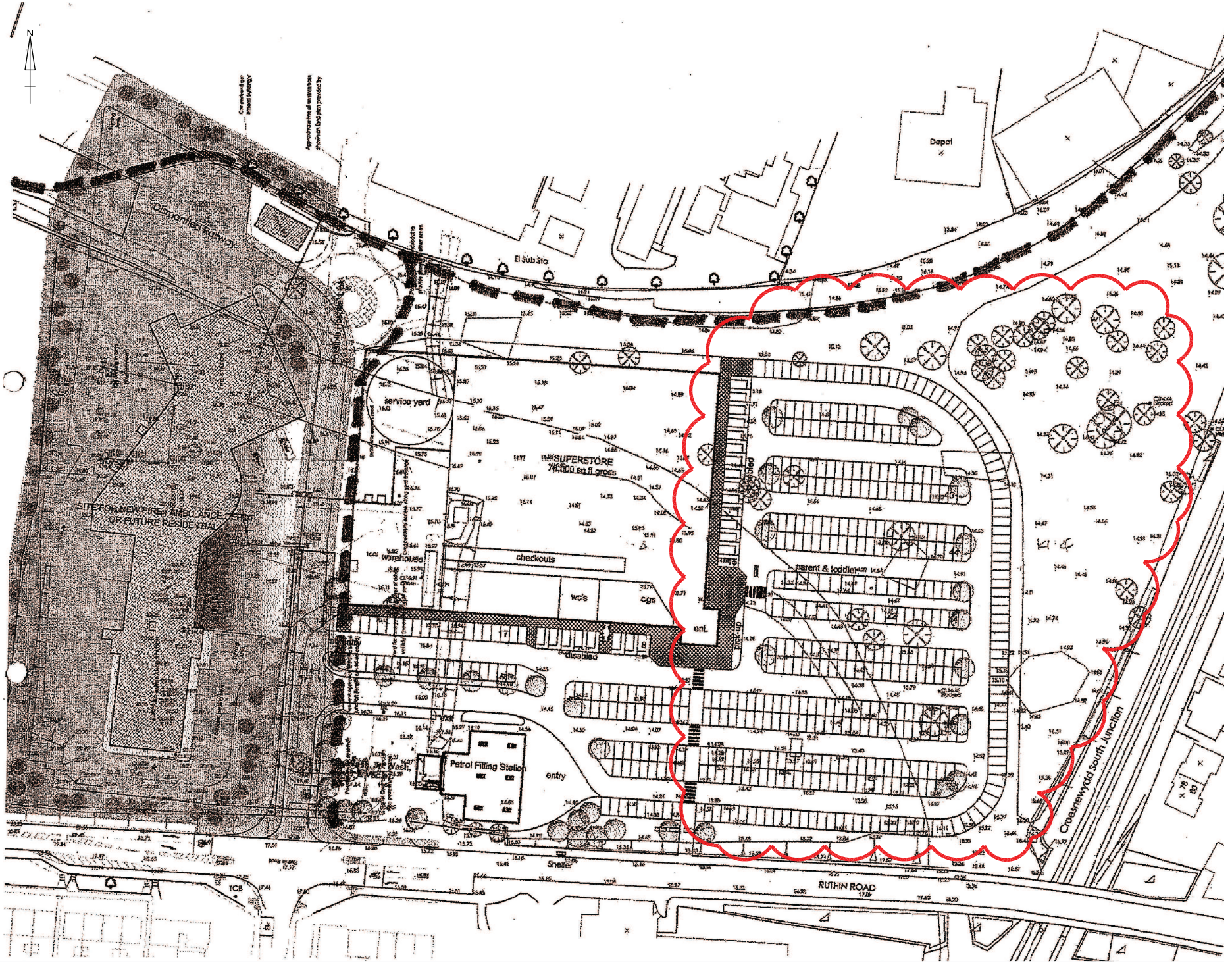
DRAWING TITLE

Site Features Plan

DRAWING NO.	REVISION NO.
C3051/02	0

DRAWN BY	APPROVED BY
MS	GC

DATE	SCALE	PAPER SIZE
02/09/08	1:2000	A3



NOTES

Approximate area of investigation

Drawing Information taken from SMC Gower Architects Drawing: A07390/sk/01 Dated: Jan 08

REVISION

0	For Information
A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL & ENVIRONMENTAL

TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT

ODL

SITE

Ruthin Road, Wrexham

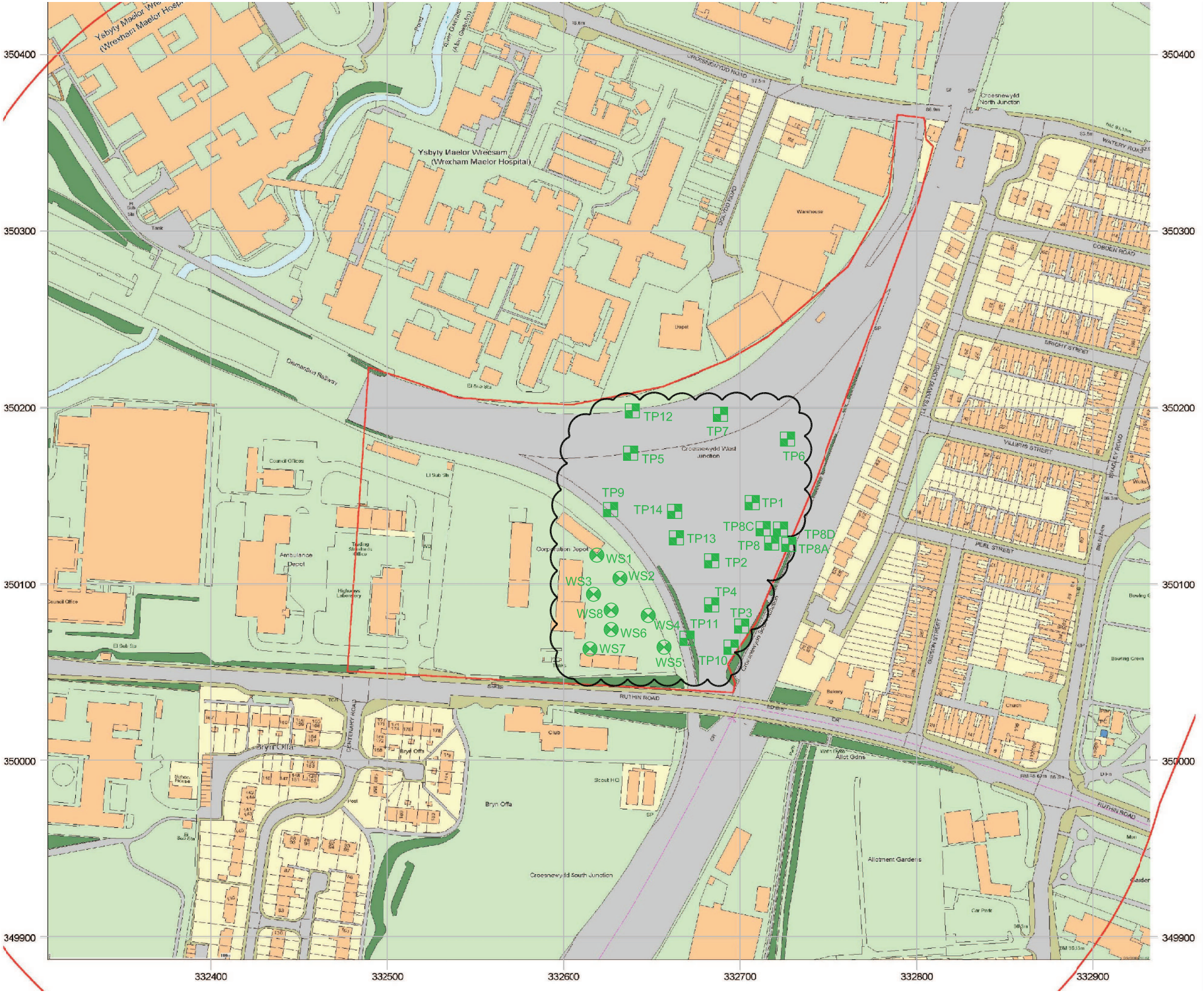
DRAWING TITLE

Proposed Development Layout

DRAWING NO.	REVISION NO.
C3051/03	0

DRAWN BY	APPROVED BY
MS	GC

DATE	SCALE	PAPER SIZE
03/09/08	1:1000	A3



NOTES

- Sirius Window Sample Location
- Sirius Trial Pit Location
- Area of Soakaway and Leachate testing
- Site Boundary

REVISION	
0	For Information
A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL & ENVIRONMENTAL

TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT

ODL

SITE

Ruthin Road, Wrexham

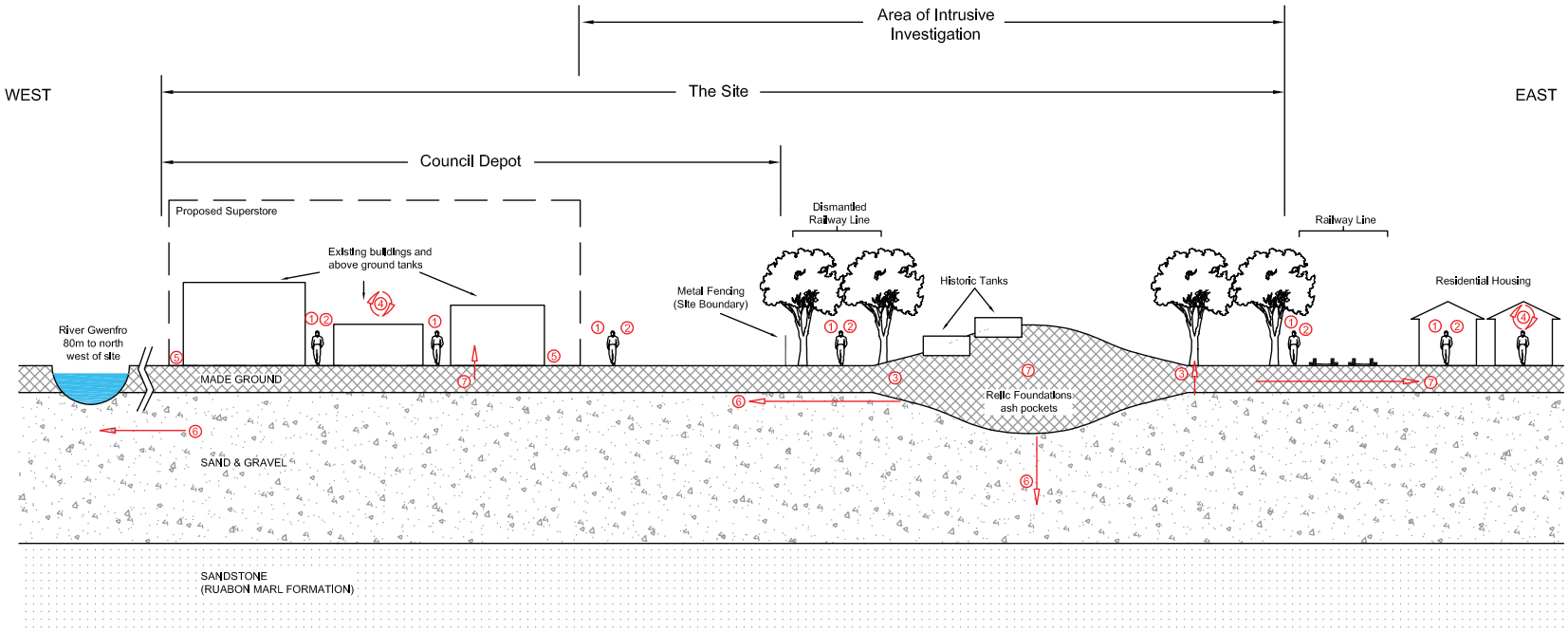
DRAWING TITLE

Exploratory Hole Location Plan

DRAWING NO.	REVISION NO.
C3051/04	0

DRAWN BY	APPROVED BY
MS	GC

DATE	SCALE	PAPER SIZE
13/08/08	1:2000	A3



Pathways

1. Ingestion
2. Dermal contact
3. Plant uptake
4. Inhalation
5. Direct contact with building materials
6. Vertical and lateral migration to controlled waters
7. Migration of hazardous gas

NOTES

REVISION

0	For Information
A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL & ENVIRONMENTAL

TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT

ODL

SITE

Ruthin Road, Wrexham

DRAWING TITLE

Conceptual Site Model

DRAWING NO.	REVISION NO.
C3051/05	0

DRAWN BY	APPROVED BY
MS	GC

DATE	SCALE	PAPER SIZE
02/09/08	NTS	A3

APPENDIX B

ENVIRONMENTAL DISCLOSURE REPORT

GroundSure Environmental Data Report

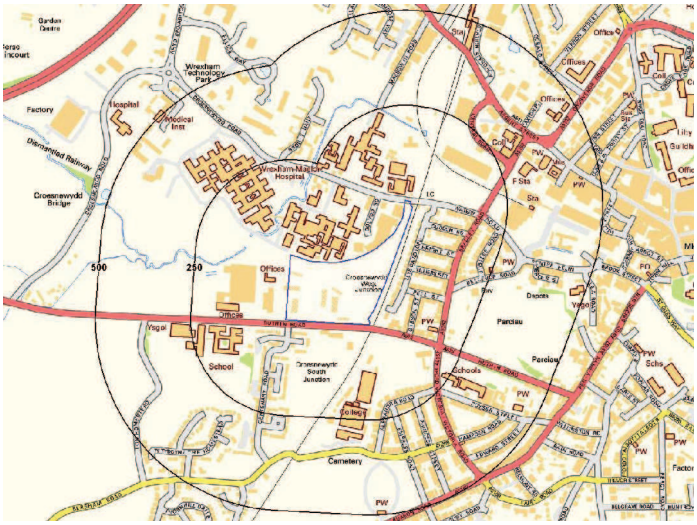
Address: Ruthin Road, Wrexham, LL13 7TU

Date: Jul 16, 2008

GroundSure Reference: HMD-231-167033

Your Reference: C3051/GC

Client: Sirius Geotechnical and Environmental Limited



Brought to you by GroundSure

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: Ruthin Road, Wrexham, LL13 7TU
Grid Reference: 332689,350106

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. Authorisations, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Licenses and/or Authorisations						
Records of IPC Authorisations	0	0	0	0	0	-
Records of IPPC Authorisations	0	0	0	0	0	-
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	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 LAPPC (LAPC) Authorisations	0	0	0	0	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	5	0	22	0	-	-
Records of Licensed Discharge Consents	0	0	0	2	-	-
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	0	-	-	-
National Incidents Recording System, List 1	0	0	0	-	-	-
1.4 Sites Determined as Contaminated Land under Part IIA 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	0	0	1	0
Landfill Data – Operational Landfill Sites	0	0	0	0	0	0
Environment Agency Historic Landfill Sites	0	0	0	1	0	3
Landfill Data – Non-Operational Landfill Sites	0	0	0	0	1	0
BGS/DoE Landfill Site Survey	0	0	0	0	0	0
GroundSure Local Authority Landfill Sites Data	0	0	0	1	0	0
2.2 Landfill and Other Waste Sites Findings						
Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	1	-	-
Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	1	1	-	-
Environment Agency (REGIS) Waste Sites	0	0	0	2	3	2
3. Current Land Uses	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	3	8	31	42	-	-
3.2 Records of Petrol and Fuel Sites	0	0	1	1	-	-
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? *	Yes
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 Environment Agency Groundwater Vulnerability and Soil Classification						
Minor Aquifer (within 200m)	Yes	Yes	Yes	-	-	-
Major Aquifer (within 200m)	No	No	No	-	-	-
Soil Classification (within 200m)	Yes	Yes	Yes	-	-	-
5.2 Groundwater Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.3 Surface Water Abstraction Licences (within 1000m of the study site).	0	0	1	1	1	-
5.4 Source Protection Zones						
Source Protection Zones within 500m of the study site.	0	0	0	2	-	-
5.5 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	2
5.6 River Quality						
Is there any Environment Agency information on river quality within 500m of the study site?	Yes	Yes	No	No	-	-
5.7 Main Rivers						
Main Rivers within 500m of the study site.	0	0	0	0	-	-

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 Areas benefiting from Flood Defences within 250m of the study site?	No
6.4 Are there any Areas used for Flood Storage within 250m of the study site?	No
6.5 What is the maximum BGS groundwater flooding susceptibility within 50m of the study site?	High
6.6 What is the BGS confidence rating for the groundwater flooding susceptibility areas?	Moderately Low

7. Ecological Designated Sites

	on-site	0-50	51-250	251-500	501-1000	1001-1500
7.1 Records of Sites of Special Scientific Interest (SSSI):	0	0	0	0	1	-
7.2 Records of National Nature Reserves (NNR) :	0	0	0	0	0	-
7.3 Records of Local Nature Reserves (LNR):	0	0	0	0	0	-
7.4 Records of Special Areas of Conservation (SAC):	0	0	0	0	0	-
7.5 Records of Special Protection Areas (SPA):	0	0	0	0	0	-
7.6 Records of Ramsar sites:	0	0	0	0	0	-
7.7 Records of World Heritage Sites:	0	0	0	0	0	-

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

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. Authorisations, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by the Environment Agency, and sites determined as Contaminated Land. This search is conducted using radii up to 1000m.

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 artificial and superficial deposits and bedrock beneath the study site. These searches are conducted onsite and includes a 50m buffer zone.

4. Geology

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

5. Hydrogeology and Hydrology

Provides information on groundwater vulnerability, soil leaching potential, abstraction licenses, Source Protection Zones (SPZ) 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. Ecological Designated 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) and World Heritage Sites. These searches are conducted using radii of up to 1000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These searches are conducted using radii of up to 75m.

9. Mining

Provides information on areas of coal and shallow mining. These searches are conducted using radii of up to 150m.

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 (01273 819700) 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".

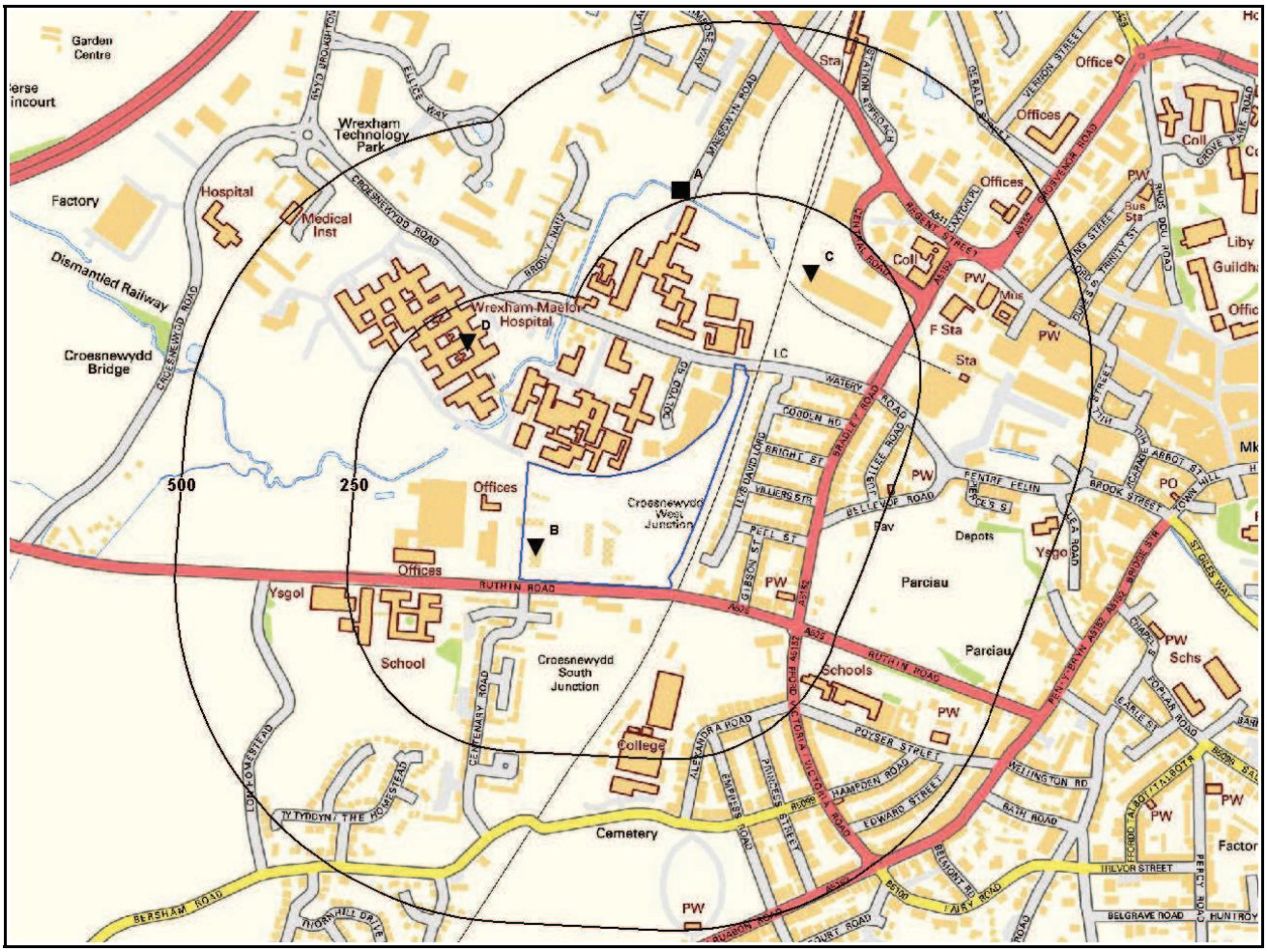
All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Authorisations, Incidents and Registers Map

NW N NE

W E

SW S SE



Incidents and Registers Legend

Enabled by Ordnance Survey

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Licence Number: 100035207

- Site Outline
- Search Buffers (m) 250 / 500
- 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
- IPPC & IPC Authorisations
- LAPPC Authorisations
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land

1. Authorisations, 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 Part A Licences (IPC Processes) within 1000m of the study site: **0**

Database searched and no data found.

Records of Part A Licences (IPPC Processes) within 1000m 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: **0**

Database searched and no data found.

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 LAPPC (LAPC) Authorisations 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: **27**

The following RAS Licence (3 or 4) records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
3B	0.0	On Site	332500,350100	Address: Jacobs Uk Ltd, Engineering Services Laboratory, Ruthin Road, Wrexham, LL13 7TU Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: BR8581 Original Permission Number: BR8581	Status: Revoked/cancelled Date Approved: 8-5-2002 Effective Date: 8-5-2002
4B	0.0	On Site	332500,350100	Address: Wrexham County Borough Council, Engineering Services Laboratory, Ruthin Road, Wrexham, LL13 7TU Type: Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3) Permission Number: AE9026 Original Permission Number: AE9026	Status: Superseded By Variation Date Approved: 31-3-1991 Effective Date: 31-3-1991

5B	0.0	On Site	332500,350100	Address: Wrexham County Borough Council, Engineering Services Laboratory, Ruthin Road, Wrexham, LL13 7TU Type: Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3) Permission Number: AQ9464 Original Permission Number: AE9026	Status: Superseded By Variation Date Approved: 3-5-1995 Effective Date: 3-5-1995
6B	0.0	On Site	332500,350100	Address: Wrexham County Borough Council, Engineering Services Laboratory, Ruthin Road, Wrexham, LL13 7TU Type: Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3) Permission Number: AY2311 Original Permission Number: AE9026	Status: Revoked/cancelled Date Approved: 21-4-1997 Effective Date: 21-4-1997
7B	0.0	On Site	332500,350100	Address: Babtie Group Ltd, Engineering Services Laboratory, Ruthin Road, Wrexham, LL13 7TU Type: Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3) Permission Number: BV3561 Original Permission Number: BV3561	Status: Effective Date Approved: 1-9-2003 Effective Date: 1-9-2003
8C	166.0	NE	332900,350500	Address: Carlsberg Tetley Brewing Ltd, Central Road, Wrexham, Clwyd, LL13 7SS Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AQ8336 Original Permission Number: AQ8336	Status: Superseded By Variation Date Approved: 31-3-1991 Effective Date: 31-3-1991
9C	166.0	NE	332900,350500	Address: Carlsberg Tetley Brewing Ltd, Central Road, Wrexham, Clwyd, LL13 7SS Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AQ8883 Original Permission Number: AQ8336	Status: Revoked/cancelled Date Approved: 21-4-1995 Effective Date: 21-4-1995
10D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: AR1108 Original Permission Number: AI4131	Status: Superseded By Variation Date Approved: 24-7-1995 Effective Date: 24-8-1995
11D	198.0	NW	332400,350400	Address: North East Wales Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: CB8570 Original Permission Number: BF4768	Status: Effective Date Approved: 6-11-2007 Effective Date: 4-12-2007
12D	198.0	NW	332400,350400	Address: North East Wales Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: BW8607 Original Permission Number: BF4768	Status: Superseded By Variation Date Approved: 1-12-2003 Effective Date: 1-1-2004
13D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Maelor Wrexham Hospital, Wrexham, Clwyd, LL13 7TD Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: AG2057 Original Permission Number: AG2057	Status: Revoked/cancelled Date Approved: 31-3-1991 Effective Date: 31-3-1991
14D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Ysbyty Maelor, Wrexham, Clwyd Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: AG9612 Original Permission Number: AG9612	Status: Revoked/cancelled Date Approved: 31-3-1991 Effective Date: 31-3-1991
15D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: AO4518 Original Permission Number: AI4131	Status: Superseded By Variation Date Approved: 4-11-1994 Effective Date: 2-12-1994

16D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: AT7626 Original Permission Number: AI4131	Status: Superseded By Variation Date Approved: 5-12-1995 Effective Date: 5-1-1996
17D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: AX6141 Original Permission Number: AI4131	Status: Revoked/cancelled Date Approved: 6-10-1997 Effective Date: 6-11-1997
18D	198.0	NW	332400,350400	Address: North East Wales Nhs Trust, Wrexham Maelor Hospital, Croesnewydd Road, Wrexham, Clwyd, LL13 7TD Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: BM6816 Original Permission Number: BF4857	Status: Effective Date Approved: 17-12-2001 Effective Date: 17-12-2001
19D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AO7932 Original Permission Number: AI4107	Status: Superseded By Variation Date Approved: 31-10-1994 Effective Date: 31-10-1994
20D	198.0	NW	332400,350400	Address: North East Wales Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: BF4768 Original Permission Number: BF4768	Status: Superseded By Variation Date Approved: 31-3-1999 Effective Date: 1-4-1999
21D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Croesnewydd Road, Wrexham, Clwyd, LL13 7TD Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AI4115 Original Permission Number: AI4115	Status: Superseded By Variation Date Approved: 15-7-1993 Effective Date: 15-7-1993
22D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Croesnewydd Road, Wrexham, Clwyd, LL13 7TD Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AP6281 Original Permission Number: AI4115	Status: Superseded By Variation Date Approved: 7-3-1995 Effective Date: 7-3-1995
23D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Croesnewydd Road, Wrexham, Clwyd, LL13 7TD Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AU4657 Original Permission Number: AI4115	Status: Superseded By Variation Date Approved: 26-1-1996 Effective Date: 26-1-1996
24D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Croesnewydd Road, Wrexham, Clwyd, LL13 7TD Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AZ1647 Original Permission Number: AI4115	Status: Revoked/cancelled Date Approved: 30-7-1997 Effective Date: 30-7-1997
25D	198.0	NW	332400,350400	Address: North East Wales Nhs Trust, Wrexham Maelor Hospital, Croesnewydd Road, Wrexham, Clwyd, LL13 7TD Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: BF4857 Original Permission Number: BF4857	Status: Superseded By Variation Date Approved: 31-3-1999 Effective Date: 1-4-1999

26D	198.0	NW	332400,350400	Address: North East Wales Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: BF4865 Original Permission Number: BF4865	Status: Effective Date Approved: 31-3-1999 Effective Date: 1-4-1999
27D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Maelor Wrexham Hosptal, Wrexham, Clwyd, LL13 7TD Type: Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3) Permission Number: AG2065 Original Permission Number: AG2065	Status: Revoked/cancelled Date Approved: 6-6-1991 Effective Date: 6-6-1991
28D	198.0	NW	332400,350400	Address: Conwy And Denbighshire Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3) Permission Number: AT2438 Original Permission Number: AI4123	Status: Revoked/cancelled Date Approved: 1-2-1996 Effective Date: 1-2-1996
29D	198.0	NW	332400,350400	Address: Wrexham Maelor Hospital Nhs Trust, Wrexham Maelor Hospital, Wrexham, Clwyd, LL13 7NT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AT1962 Original Permission Number: AI4107	Status: Revoked/cancelled Date Approved: 2-2-1996 Effective Date: 2-2-1996

Records of Licenced Discharge Consents within 500m of the study site: **2**

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

ID	Distance	Direction	NGR	Details	
1A	266.0	N	332710,350620	Address: Measgwyn Sewage Pumping Station, Maesgwyn Pumping Station, Measgwyn Road, Wrexham Effluent Type: Miscellaneous Discharges - Emergency Discharges Permit Number: CM0194101 Permit Version: 2	Receiving Water: Afon Gwenfro Status: Varied By Application - (wra 91 Sched 10 - As Amended By Env Act 1995) Issue date: 28-3-2002 Effective Date: 29-3-2002 Revocation Date: -
2A	266.0	N	332710,350620	Address: Measgwyn Sewage Pumping Station, Maesgwyn Pumping Station, Measgwyn Road, Wrexham Effluent Type: Sewage Discharges - Pumping Station - Water Company Permit Number: CM0194101 Permit Version: 2	Receiving Water: Afon Gwenfro Status: Varied By Application - (wra 91 Sched 10 - As Amended By Env Act 1995) Issue date: 28-3-2002 Effective Date: 29-3-2002 Revocation Date: -

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: **0**

Database searched and no data found.

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 IIA EPA 1990[1]

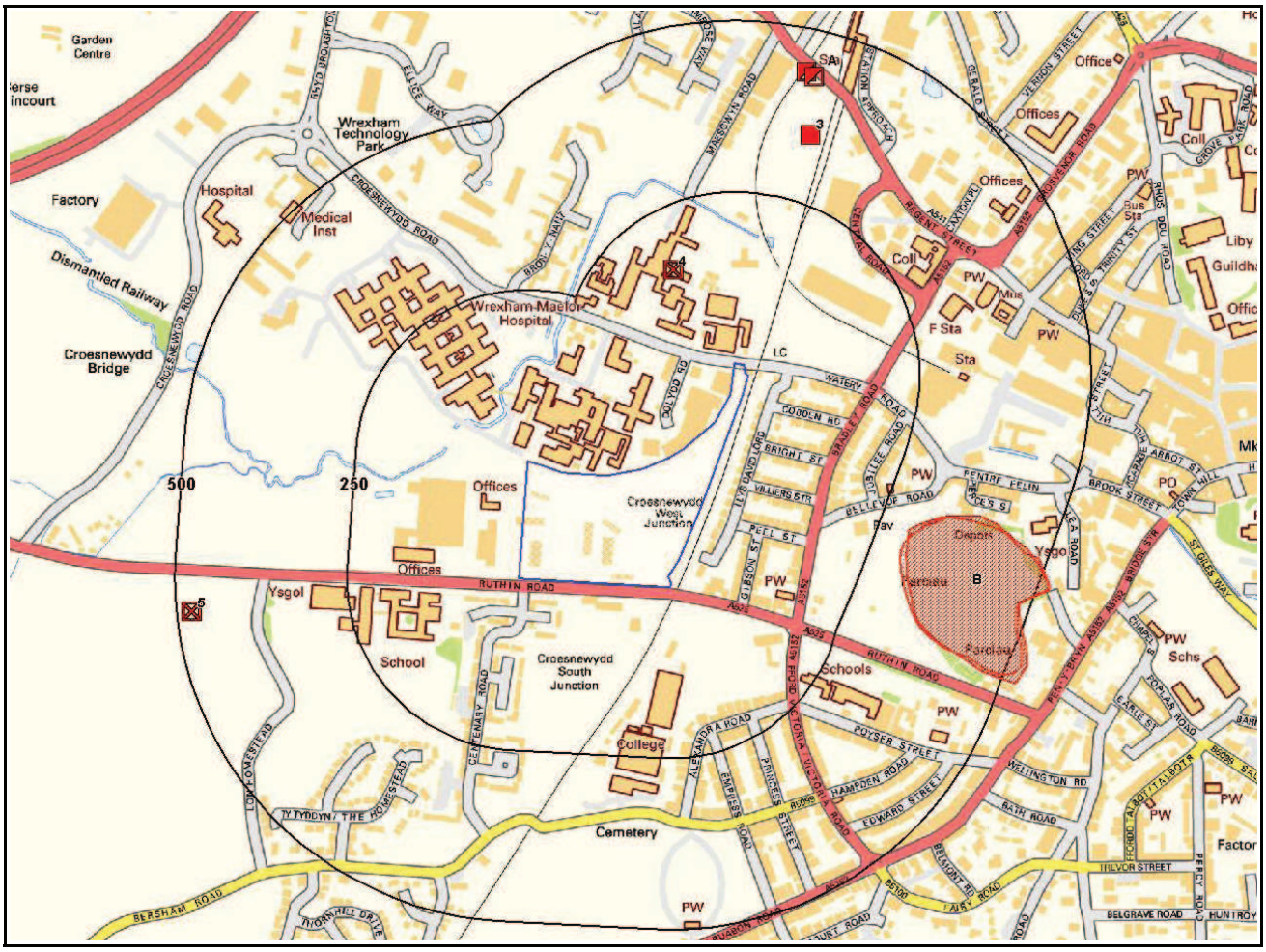
How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

[1]Further information on sites that have been determined under the Contaminated Land Regime is maintained by Local Authorities under Section 78R of the Environmental Protection Act 1990. Information should be available on both sites currently determined as Contaminated Land and Special Sites.

2. Landfill and Other Waste Sites Map

NW N NE



W E

SW S SE

Landfill & Other Waste Sites Legend

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- Site Outline
- Search Buffers (m): 250, 500
- E.A. Active Landfill
- E.A. Historic Landfill (Area Data)
- E.A. Historic Landfill (Point Data)
- BGS / DoE Survey Landfill
- Local Authority Landfill (Area Data)
- Local Authority Landfill (Point Data)
- Operational Waste Treatment Licence
- Closed Waste Treatment Licence
- REGIS Waste Licence
- Operational Landfill
- Closed Landfill

2. Landfill and Other Waste Sites

2.1 Landfill Sites[1]

Records from Environment Agency landfill data within 1000m of the study site: 1

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

ID	Distance	Direction	NGR	Details	
Not shown	861.0	SW	331988.0,349265.0	Address: Esless Farm, Esless Lane, Rhostyllen, Wrexham, Clwyd, LL14 4DG Landfill Reference: 37057.0 Regis Reference: WIL001 Landfill Type: A6 - Landfill taking other wastes	Operator: Williams R L Status: Closure & Aftercare IPPC Reference:

Records of operational landfill sites sourced from Landmark within 1500m of the study site: 0

Database searched and no data found.

Records of Environment Agency historic landfill sites within 1500m of the study site: 4

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

ID	Distance	Direction	NGR	Details	
6B	295.0	E	333100,350000	Site Address: Parciau, Wrexham, Clwyd Waste Licence: - Site Reference: - Waste Type: Inert, Industrial, Commercial, Household Regis Reference: -	Data Type: Polygon Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Wrexham Borough Council
Not shown	1031.0	NW	331500,350700	Site Address: Berse Drelincourt, Berse Road, Wrexham, Lower Berse Waste Licence: Yes Site Reference: WMBC L/34 Waste Type: Inert Regis Reference: -	Data Type: PolygonLow Licence Issue: 29-May-1981 Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1238.0	SE	333500,349000	Site Address: Sontley Road, Hightown, Cardiff Waste Licence: - Site Reference: - Waste Type: Inert, Industrial, Commercial, Household Regis Reference: -	Data Type: Polygon Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1467.0	E	334300,349900	Site Address: The Dunks No.2, Rear Of Benjamin Road, Queens Park Waste Licence: Yes Site Reference: - Waste Type: Inert, Industrial, Commercial, Household, Special Regis Reference: -	Data Type: Polygon Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

Records of non-operational landfill sites sourced from Landmark within 1500m of the study site: 1

[1]This information is gathered from a wide range of sources including, the Environment Agency (Agency), The British Geological Survey (BGS) and under licence from Landmark Information Group Limited®. Data supplied by Landmark Information Group Limited® and the Agency refers to waste management licences required (under either the Control of Pollution Act 1974 and/or the Environmental Protection Act 1990) by anyone involved in waste disposal. A survey by the BGS undertaken in 1972/3 provides data on some older landfill sites that were not subject to legislation. Environment Agency data on historic waste / landfill sites is still being updated by the Agency as part of an ongoing project. GroundSure use this data because more accurate data is not yet publicly available and will use enhanced Environment Agency data when it is released.

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

ID	Distance	Direction	NGR	Details	
Not shown	976.0	SW	332000,349200	Site Address: Esless Farm, Esless Lane, Rhostyllen, WREXHAM, Clwyd, Landfill Licence: W1FAMYAL Agency Reference: EAWML37057 Waste Type: Inert Waste Description: Inert Landfill Known Restrictions: No known restriction on source of waste	Record Date: 01-Jun-1994 Transfer Date: Modification Date: Status: Site closed Category: LANDFILL Regulator: EA - Welsh Region - Northern Area (Buckley) Size: Medium (← 75,000 tonnes/year)

Records of BGS/DoEnon-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: **1**

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

ID	Distance	Direction	Site Address	Source	Data Type
17B	295.0	E	Parciau	Wrexham Council	Polygon

2.2 Other Waste Sites[1]

Records of operational waste treatment, transfer or disposal sites within 500m of the study site: **1**

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	
3	349.0	N	332900,350700	Site Address: Jacques Garage (Vehicle Dismantlers), Mold Road, WREXHAM, Clwyd, LL11 2AD Landfill Licence: W1FAMEAL EA Reference: EAWML37037 Waste Type: Non-Hazardous Rating: Non-Hazardous Scrapyard Known Restrictions: No known restriction on source of waste	Record Date: 01-Sep-1992 Transfer Date: Modification Date: 01-Mar-1999 Status: Operational as far as is known Category: SCRAPYARD Regulator: EA - Welsh Region - Northern Area (Buckley) Size: Very Small (←10,000 tonnes/year)

Records of non-operational waste treatment, transfer or disposal sites within 500m of the study site: **2**

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	
4	161.0	NW	350500,350500	Site Address: Ysbyty Maelor Wrexham Hospital, Watery Road, WREXHAM, Clwyd, LL13 TTD Landfill Licence: W1FAMNAL EA Reference: - Waste Type: Difficult Waste Description: Difficult Known Restrictions: Waste produced/controlled by licence holder	Record Date:01-Oct-1992 Transfer Date: Modification Date: Status: Site now exempt from licencing Category: STORAGE - with transfer Regulator: EA - Welsh Region - Northern Area (Buckley) Size: Undefined

[1]This information is gathered from a wide range of sources including, the Environment Agency (Agency), The British Geological Survey (BGS) and under licence from Landmark Information Group Limited®. Data supplied by Landmark Information Group Limited® and the Agency refers to waste management licences required (under either the Control of Pollution Act 1974 and/or the Environmental Protection Act 1990) by anyone involved in waste disposal. A survey by the BGS undertaken in 1972/3 provides data on some older landfill sites that were not subject to legislation. Environment Agency data on historic waste / landfill sites is still being updated by the Agency as part of an ongoing project. GroundSure use this data because more accurate data is not yet publicly available and will use enhanced Environment Agency data when it is released.

5	479.0	W	350001,350001	Site Address: Victor Fultons Transfer Station, WREXHAM, Clwyd, Landfill Licence: W1FAMFAL EA Reference: - Waste Type: Difficult Waste Description: Difficult Known Restrictions: No known restriction on source of waste	Record Date:01-Sep-1992 Transfer Date: Modification Date: Status: Licence lapsed/cancelled/defunct/not applicable/surrendered Category: TRANSFER Regulator: EA - Welsh Region - Northern Area (Buckley) Size: Undefined

Records of Environment Agency (REGIS) waste sites within 1500m of the study site: 7

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	
10A	433.0	N	332905,350785	Site Address: Mold Road, Wrexham, Clwyd, LL11 2AD Type: Metal recycling sites (vehicle dismantlers) Size: ← 25000 tonnes Regis Licence Number: JAC001 Operator: Jacques Garage Surrendered Date: Waste Management licence No: 37037 Annual Tonnage: 5000	Issue Date: 29/09/1992 Expiry Date: Effective Date: Status: Expired Modified: 30/11/2001 Site Name: Jacques Garage Cancelled Date: Correspondence Address: Jaques Garage, Mold Road, Wrexham, Clwyd, LL11 2AD
11A	437.0	N	332894,350792	Site Address: - Type: Metal recycling sites (vehicle dismantlers) Size: ← 25000 tonnes Regis Licence Number: JAC001 Operator: Jacques Garage Surrendered Date: - Waste Management licence No: 37037 Annual Tonnage: 5000	Issue Date: 29/09/1992 Expiry Date: - Effective Date: - Status: Modified Modified: 30/11/2001 Site Name: Jacques Garage Cancelled Date: - Correspondence Address: -
Not shown	913.0	SW	332015,349263	Site Address: Esless Lane, Rhostyllen, Wrexham, LL14 4DG Type: Landfills taking other wastes (construction, demolition, dredgings) Size: →= 25000 tonnes ← 75000 tonnes Regis Licence Number: WIL001 Operator: Williams R L Surrendered Date: - Waste Management licence No: 37057 Annual Tonnage: No Data	Issue Date: 16/02/1993 Expiry Date: - Effective Date: - Status: Closure Modified: - Site Name: Esless Farm Cancelled Date: - Correspondence Address: Esless Lane, Rhostyllen, Wrexham, LL14 4DG
Not shown	959.0	SW	331995,349222	Site Address: Esless Lane, Rhostyllen, Wrexham, LL14 4DG Type: Landfills taking other wastes (construction, demolition, dredgings) Size: ← 25000 tonnes Regis Licence Number: WIL001 Operator: Williams R L Surrendered Date: - Waste Management licence No: 37057 Annual Tonnage: No Data	Issue Date: 16/02/1993 Expiry Date: - Effective Date: - Status: Closure Modified: - Site Name: Esless Farm Cancelled Date: - Correspondence Address: Esless Lane, Rhostyllen, Wrexham, LL14 4DG
Not shown	959.0	SW	331993,349223	Site Address: Esless Farm, Esless Lane, Rhostyllen, Wrexham, Clwyd, LL14 4DG Type: Landfills taking other wastes (construction, demolition, dredgings) Size: ← 25000 tonnes Regis Licence Number: WIL001 Operator: Williams R L Surrendered Date: Waste Management licence No: 37057 Annual Tonnage: 100000	Issue Date: 16/02/1993 Expiry Date: Effective Date: Status: Closure Modified: Site Name: Esless Farm Cancelled Date: Correspondence Address: Esless Farm, Esless Lane, Rhostyllen, Wrexham, Clwyd, LL14 4DG

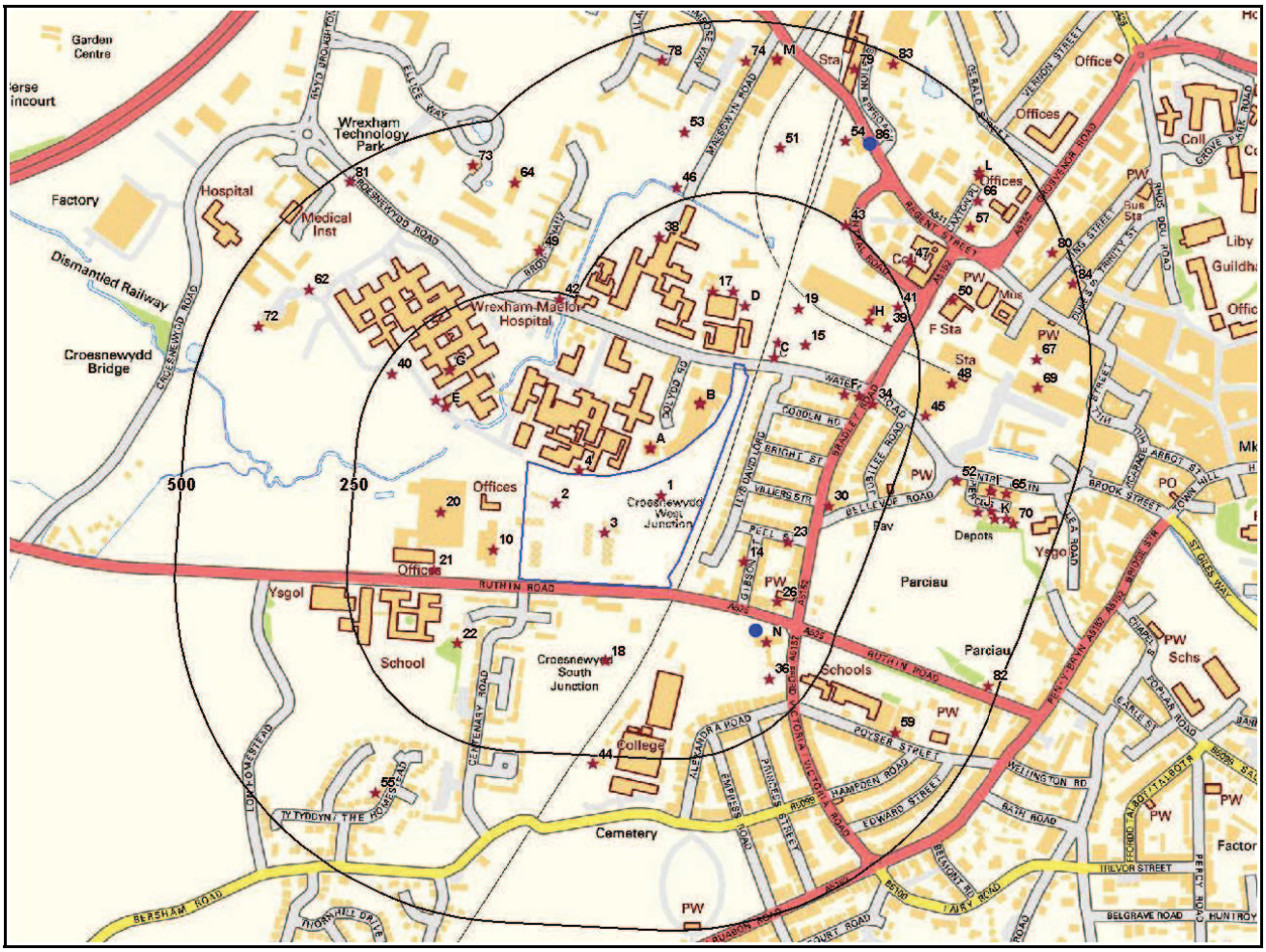
Not shown	1381.0	E	334099,349846	Site Address: 49, Rivulet Road, Wrexham, Clwyd, LL13 8DU Type: Metal recycling sites (mixed MRSs) Size: ← 25000 tonnes Regis Licence Number: MCD001 Operator: H McDermott & Son Surrendered Date: 26/10/2006 Waste Management licence No: 37159 Annual Tonnage: 30000	Issue Date: 22/03/1999 Expiry Date: Effective Date: Status: Surrendered Modified: Site Name: H Mcdermott & Son Cancelled Date: Correspondence Address: 49, Rivulet Road, Wrexham, Clwyd, LL13 8DU
Not shown	1383.0	E	334107,349862	Site Address: - Type: Metal recycling sites (mixed MRSs) Size: ← 25000 tonnes Regis Licence Number: MCD001 Operator: H McDermott & Son Surrendered Date: - Waste Management licence No: 37159 Annual Tonnage: No Data	Issue Date: 22/03/1999 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: H Mcdermott & Son Cancelled Date: - Correspondence Address: -

3. Current Land Use Map

NW N NE

W E

SW S SE



Current Land Use Legend

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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 500m of the study site: 84

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

ID	Distance	Direction	Company	Address	Activity	Category
1	0.0	On Site	Croesnewydd West Junction	-	Railway Stations, Junctions and Halts	Transport Access Points
2	0.0	On Site	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
3	0.0	On Site	Corporation Depot	-	Container and Storage	Transport, Storage And Delivery
4	6.0	N	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
5A	24.0	N	ATS Euromaster Ltd	Dolydd Road, Wrexham, LL13 7TE	Vehicle Parts and Accessories	Motoring
6A	26.0	N	Depot	-	Container and Storage	Transport, Storage And Delivery
7B	31.0	NW	Phoenix Healthcare Distribution Ltd	Dolydd Road, Wrexham, LL13 7TF	Distribution and Haulage	Transport, Storage And Delivery
8B	31.0	NW	Phoenix Healthcare Distribution Ltd	Dolydd Road, Wrexham, LL13 7TF	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products
9B	34.0	NW	Warehouse	-	Container and Storage	Transport, Storage And Delivery
10	40.0	W	Wrexham Ambulance Station & Workshop	Ruthin Road, Wrexham, LL13 7TU	Ambulance Services	Health Support Services
11C	44.0	E	Croesnewydd North Junction	-	Railway Stations, Junctions and Halts	Transport Access Points
12C	58.0	NE	Tanks	-	Tanks (Generic)	Industrial Features
13D	85.0	N	Water Tower	-	Water Pumping Stations	Industrial Features
14	88.0	SE	Wiseman Transport Services	24-26, Gibson Street, Wrexham, LL13 7TS	Distribution and Haulage	Transport, Storage And Delivery
15	94.0	E	Works (Disused)	-	Unspecified Works Or Factories	Industrial Features
16D	105.0	N	Tanks	-	Tanks (Generic)	Industrial Features
17	109.0	N	Chimney	-	Chimneys	Industrial Features
18	112.0	S	Croesnewydd South Junction	-	Railway Stations, Junctions and Halts	Transport Access Points
19	113.0	NE	Tanks	-	Tanks (Generic)	Industrial Features
20	121.0	W	Factory	-	Unspecified Works Or Factories	Industrial Features
21	126.0	W	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
22	130.0	SW	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
23	136.0	SE	A M Plumbing & Heating	5, Peel Street, Wrexham, LL13 7TR	Industrial Repairs and Servicing	Repair And Servicing
24F	143.0	E	Wrexham Pine Workshops	45, Watery Road, Wrexham, LL13 7SY	Furniture	Consumer Products
25E	144.0	NW	Tank	-	Tanks (Generic)	Industrial Features

26	155.0	SE	Bridges Work Opportunities	106, Bradley Road, Wrexham, LL13 7TP	Garden Goods	Consumer Products
27N	161.0	SE	Park View Garage	Ruthin Road, Wrexham, LL13 7TT	Secondhand Vehicles	Motoring
28E	161.0	NW	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
29F	163.0	E	Chances Pine Furniture	2, Bradley Road, Wrexham, LL13 7TL	Furniture	Consumer Products
30	172.0	E	Works	-	Unspecified Works Or Factories	Industrial Features
31G	175.0	NW	David Ormerod Hearing Aid Specialists Ltd	Croesnewydd Road, Wrexham Technology Park, Wrexham, LL13 7TD	Disability and Mobility Equipment	Consumer Products
32G	175.0	NW	Wrexham Maelor Hospital	Croesnewydd Road, Wrexham Technology Park, Wrexham, LL13 7TD	Hospitals	Health Practitioners And Establishments
33G	175.0	NW	Wrexham Maelor Hospital	Croesnewydd Road, Wrexham Technology Park, Wrexham, LL13 7TD	Accident and Emergency Hospitals	Health Practitioners And Establishments
34	186.0	E	A S A P Sign Services	9, Bradley Road, Wrexham, LL13 7TG	Plate Makers, Print Finishers and Type Setters	It, Advertising, Marketing And Media Services
35H	192.0	E	Tank	-	Tanks (Generic)	Industrial Features
36	196.0	SE	Civic Amenity Site	-	Refuse Disposal Facilities	Infrastructure And Facilities
37H	203.0	NE	Chimney	-	Chimneys	Industrial Features
38	215.0	NW	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
39	215.0	E	Tanks	-	Tanks (Generic)	Industrial Features
40	236.0	NW	Tank	-	Tanks (Generic)	Industrial Features
41	238.0	E	Tanks	-	Tanks (Generic)	Industrial Features
42	242.0	N	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
43	251.0	NE	Tanks	-	Tanks (Generic)	Industrial Features
44	263.0	S	Tank	-	Tanks (Generic)	Industrial Features
45	264.0	E	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
46	270.0	N	Pumping Station	-	Water Pumping Stations	Industrial Features
47	282.0	NE	Tank	-	Tanks (Generic)	Industrial Features
48	296.0	E	Wrexham Central Station	-	Railway Stations, Junctions and Halts	Transport Access Points
49	307.0	N	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
50	317.0	E	North Wales Fire Service	Wrexham Fire Station, Bradley Road, Wrexham, LL13 7SU	Fire Brigade Stations	Central And Local Government
51	320.0	N	Scrap Yard	-	Scrap Metal Merchants	Recycling Services
52	334.0	E	G J Carr	25, Pentrefelin, Wrexham, LL13 7NB	Construction Completion Services	Construction Services
53	346.0	N	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
54	357.0	NE	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
55	375.0	SW	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
56J	379.0	E	Depot	-	Container and Storage	Transport, Storage And Delivery
57	384.0	NE	Wrexham Carpets	Regent House, Regent Street, Wrexham, LL11 1PR	Construction Completion Services	Construction Services
58I	386.0	E	Depot	-	Container and Storage	Transport, Storage And Delivery
59	389.0	SE	J Browse	11, Poyser Street, Wrexham, LL13 7RP	Vehicle Components	Industrial Products

60I	389.0	E	Ansa Tyres Ltd	17, Pierces Square, Wrexham, LL13 7NE	Vehicle Parts and Accessories	Motoring
61J	398.0	E	Fast Optical Services	Unit 7, Pierces Square, Wrexham, LL13 7NE	Photographic and Optical Equipment	Consumer Products
62	405.0	NW	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
63K	406.0	E	Depot	-	Container and Storage	Transport, Storage And Delivery
64	408.0	N	Higgi Ltd	Suite 2b Edison Court, Ellice Way, Wrexham Technology Park, Wrexham, LL13 7YT	Colours, Chemicals and Water Softeners and Supplies	Industrial Products
65	410.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
66	415.0	NE	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
67	421.0	E	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
68K	422.0	E	Depot	-	Container and Storage	Transport, Storage And Delivery
69	422.0	E	Jessops	Island Green Shopping Centre, Wrexham, LL13 7LW	Photographic and Optical Equipment	Household, Office, Leisure And Garden
70	434.0	E	Tank	-	Tanks (Generic)	Industrial Features
71L	438.0	NE	Depot	-	Container and Storage	Transport, Storage And Delivery
72	439.0	NW	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
73	439.0	N	Arup	Nyquist House, Ellice Way, Wrexham Technology Park, Wrexham, LL13 7YT	Civil Engineers	Engineering Services
74	441.0	N	Works	-	Unspecified Works Or Factories	Industrial Features
75L	442.0	NE	Hi-Speed Tyres	Caxton Place, Wrexham, LL11 1PP	Vehicle Parts and Accessories	Motoring
76M	447.0	N	Kwik-Fit	Mold Road, Wrexham, LL11 2AD	Vehicle Parts and Accessories	Motoring
77M	449.0	N	Depot	-	Container and Storage	Transport, Storage And Delivery
78	454.0	N	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
79	459.0	N	Wrexham General Station	-	Railway Stations, Junctions and Halts	Transport Access Points
80	478.0	E	Motormania	16-17, King Street, Wrexham, LL11 1HF	Vehicle Parts and Accessories	Motoring
81	483.0	NW	Gas Governor Station	-	Gas Features	Infrastructure And Facilities
82	485.0	E	A A Marubbi	Parkside, Ruthin Road, Wrexham, LL13 7NU	Vehicle Repair and Servicing	Repair And Servicing
83	489.0	NE	C W F Country Wide	Station Approach, Wrexham, LL11 2AA	Agricultural Contractors	Hiring And Contract Services
84	492.0	E	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities

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
85N	139.0	SE	332729, 350007	Total	Wrexham Service Station, Ruthin Road, Ruthin Road, Victoria Road, Wrexham, Clwyd, LL13 7TT	Not Applicable	Closed

86	370.0	NE	332916, 350714	Obsolete	Regent Service Station, Regent Street, Regent Street, Wrexham, Clwyd, LL11 1PF	Not Applicable	Obsolete

3.3 Underground High Pressure Oil and Gas Pipelines

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

Database searched and no data found.

4. Geology

4.1 Artificial Ground and Made Ground

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

Distance (m)	Direction	LEX Code	Description	Rock Type
32.0	On Site	MGR-MGRD	Made Ground (undivided)	Artificial Deposit

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

4.2 Superficial Ground and Drift Geology

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

Distance (m)	Direction	Lex Code	Description	Rock Type
0.0	On Site	GFSDD-SAGR	Glaciofluvial Sheet Deposits, Devensian	Sand and Gravel
5.0	On Site	TILLD-DMTN	Till, Devensian	Diamicton
32.0	On Site	ALV-CSSG	Alluvium	Clay, Silt, 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.

Distance (m)	Direction	LEX Code	Description	Rock Type
0.0	On Site	ETM-MDST	Etruria Formation	Mudstone

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

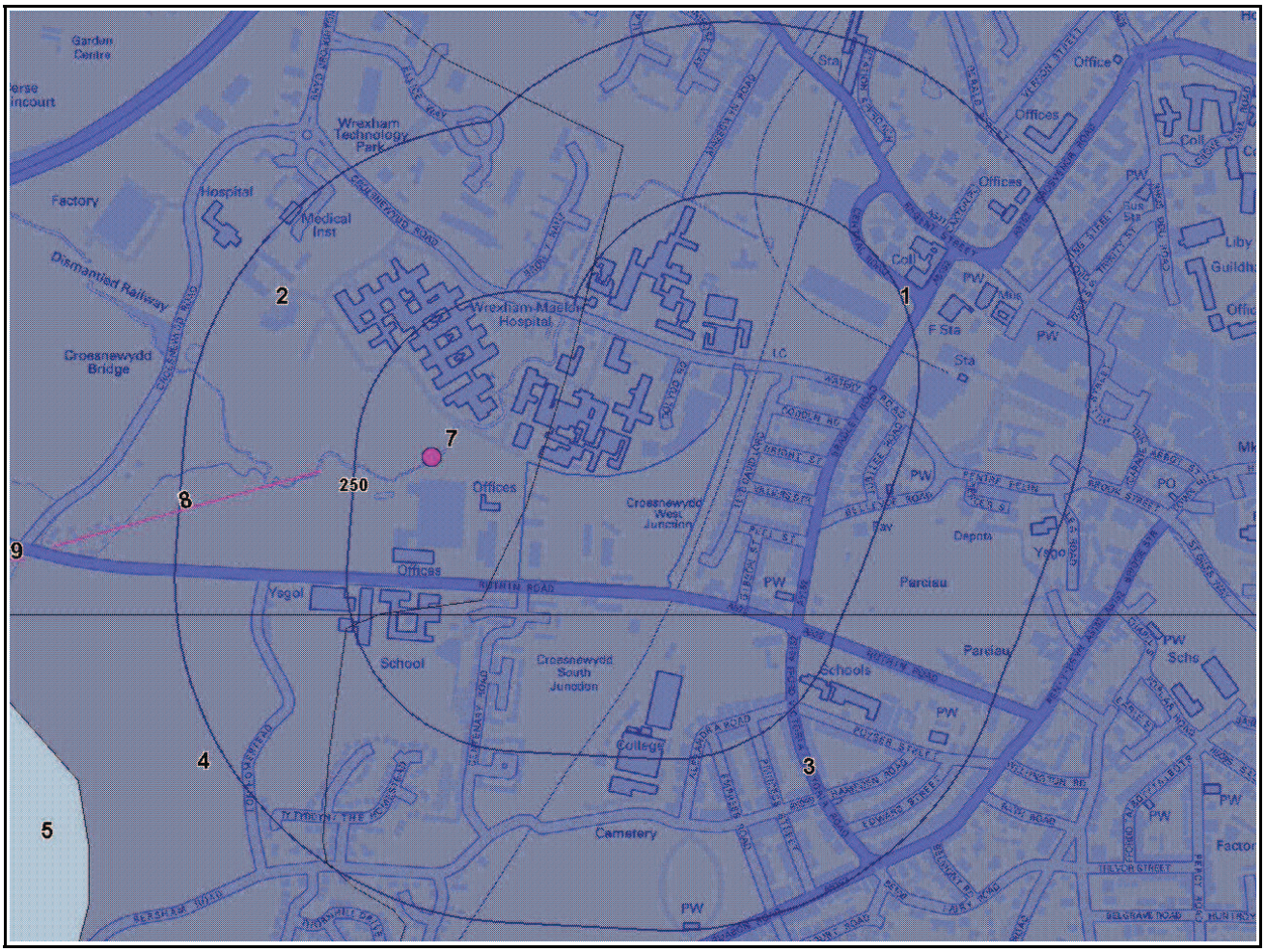
For more detailed geological and ground stability data please refer to the "GroundSure Geology and Ground Stability Report". Available from our website.

5. Hydrogeology and Hydrology: - Aquifer and Abstraction Licence Map

NW ▲ N NE

◄W E►

SW ▼ S SE



Hydrogeology and Hydrology Legend

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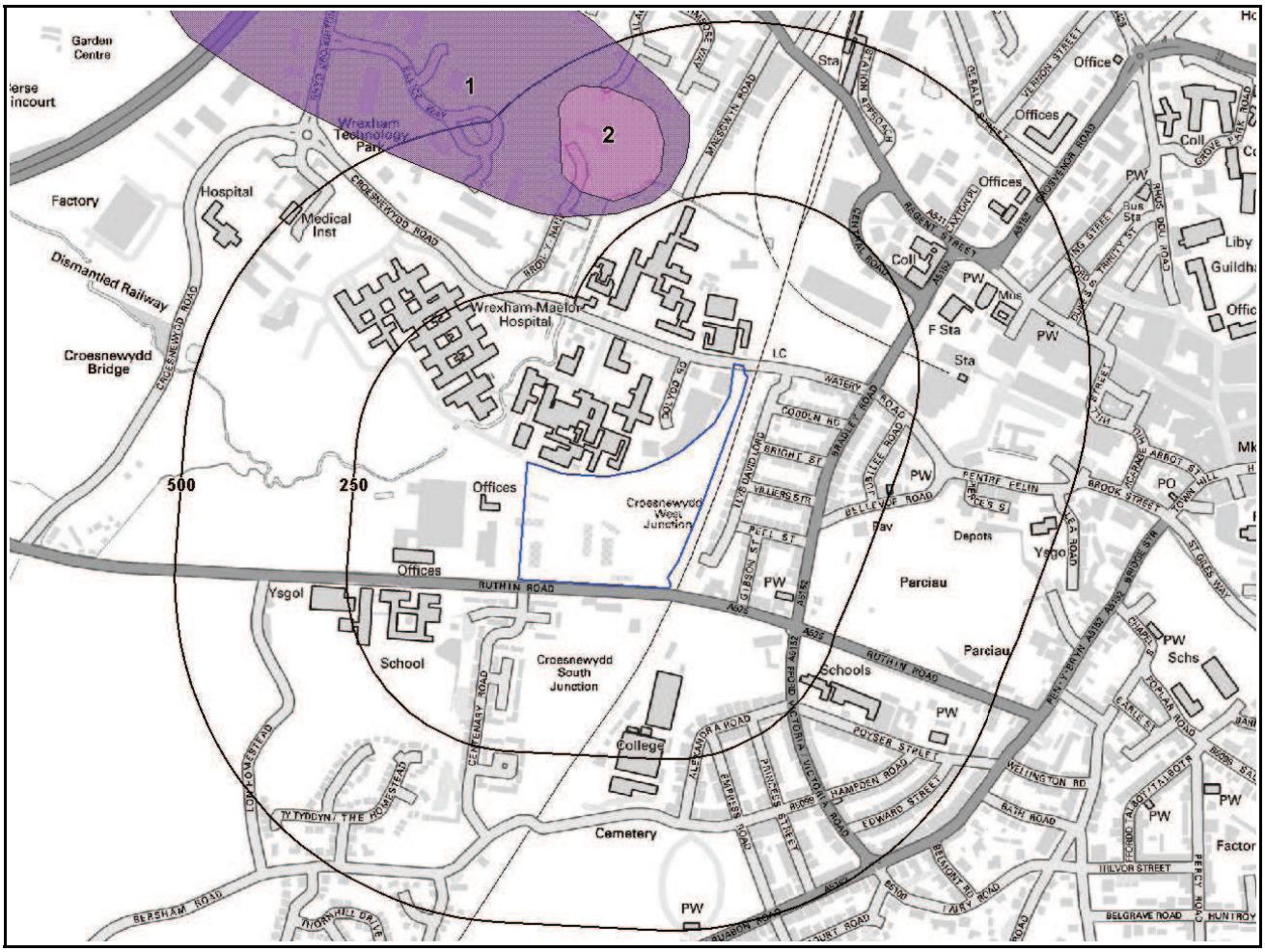
- Site Outline
- Search Buffers (m) 250 500
- Minor Aquifer - Low Leaching Potential
- Minor Aquifer - Intermediate Leaching Potential
- Minor Aquifer - High Leaching Potential
- Major Aquifer - Low Leaching Potential
- Major Aquifer - Intermediate Leaching Potential
- Major Aquifer - High Leaching Potential
- Main River
- Groundwater Abstraction Licence
- Surface Water Abstraction Licence

5b. Hydrogeology and Hydrology: - SPZ and Potable Water Abstraction Map

NW ▲ N NE

◄W E►

SW ▼ S SE



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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

5. Hydrogeology and Hydrology

5.1 Groundwater Vulnerability and Soil Classification

Records of aquifer and soil classification within 200m of the study site: **Yes**

The following groundwater information is represented as polygons on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	Classification
1	0.0	On Site	Minor Aquifer/High Leaching Potential
2	0.0	On Site	Minor Aquifer/High Leaching Potential
3	39.0	S	Minor Aquifer/High Leaching Potential

5.2 Groundwater Abstraction Licences

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

Database searched and no data found.

5.3 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 1000m of the study site? **Yes**

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	NGR	Details	
7	139.0	W	332350,350230	Licence No: 24/67/7/0135 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: River Gwenfro Data Type: Point	Application No: 328 Original Start Date: 24/2/1967 Expiry Date: - Issue No: 100 Version Start Date: 28/1/1983 Version End Date: -
8	297.0	W	331800,350100	Licence No: 24/67/7/0135 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: Tributary Of River Gwenfro Data Type: Line	Application No: - Original Start Date: 24/2/1967 Expiry Date: - Issue No: 101 Version Start Date: 13/6/2003 Version End Date: -
9	718.0	W	331100,350060	Licence No: 24/67/7/0135 Details: Spray Irrigation - Direct Direct Source: Eaw Surface Water Point: Tributary Of River Gwenfro Data Type: Line	Application No: - Original Start Date: 24/2/1967 Expiry Date: - Issue No: 101 Version Start Date: 13/6/2003 Version End Date: -

5.4 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? **Yes**

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map:

ID	Distance	Direction	Type	Description
1	265.0	NW	2.0	Outer Catchment
2	286.0	NW	1.0	Inner Catchment

5.5 Potable Water Abstraction Licences

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

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

ID	Distance	Direction	NGR	Details	
Not shown	1674.0	SE	333400,348520	Licence No: 24/67/7/0169 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Eaw Surface Water Point: Spring Data Type: Point	Original Application No: Original Start Date: 14/6/1968 Expiry Date: Issue No: 100 Version Start Date: Version End Date:
Not shown	1870.0	S	332440,348180	Licence No: 24/67/7/0169 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Eaw Surface Water Point: Spring Data Type: Point	Original Application No: Original Start Date: 14/6/1968 Expiry Date: Issue No: 100 Version Start Date: Version End Date:

5.6 River Quality

Is there any Environment Agency information on river quality within 500m of the study site? **Yes**

The following river quality records are not represented on mapping:

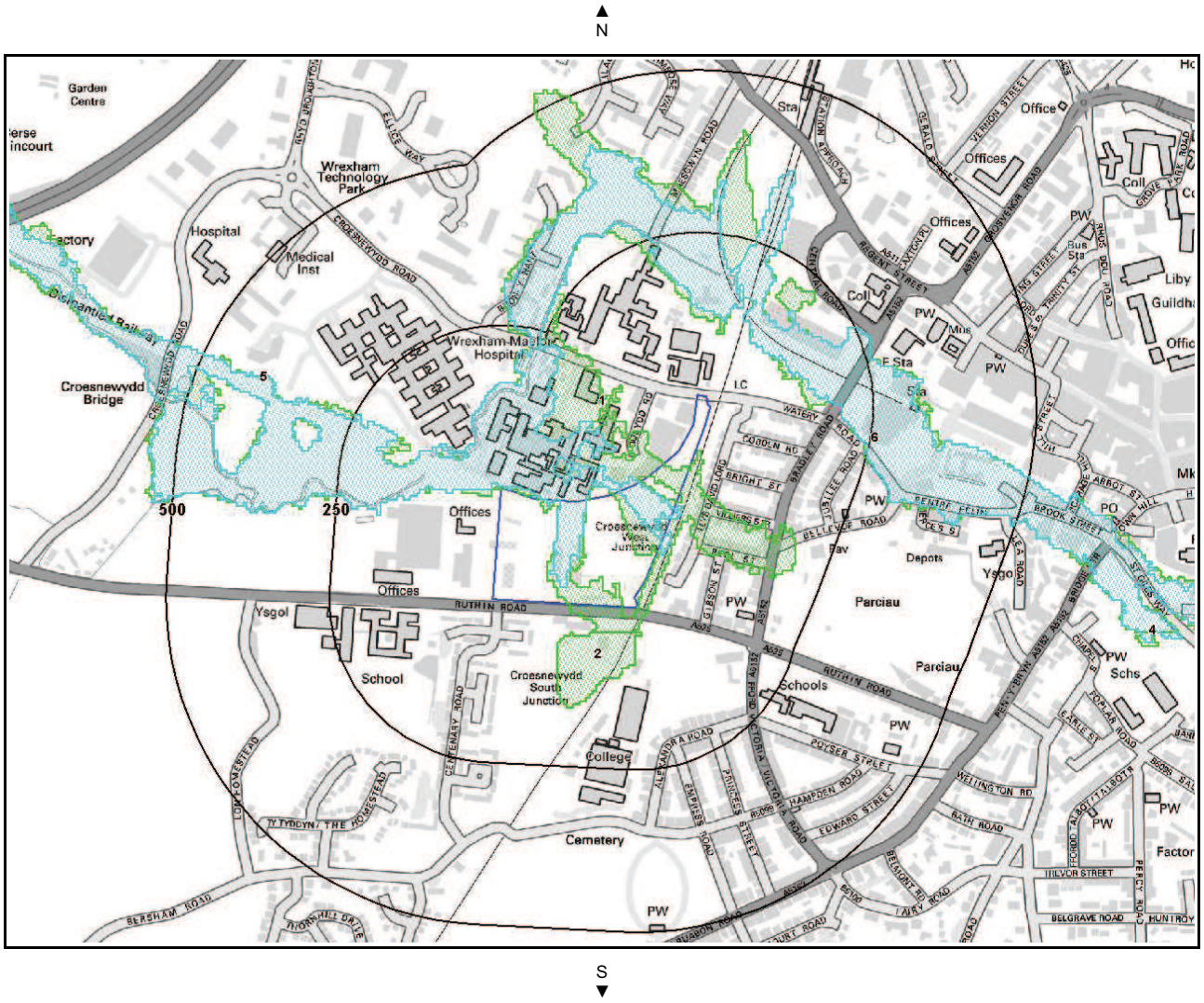
Distance	Direction	River	Reach	Chemical Grade	Biological Grade
20.0	NE	Gwenfro	Willow Rd.wrexham - Hospital	B	0

5.7 Main Rivers

Are there any Main Rivers within 500m of the study site? **No**

Database searched and no data found.

6. Surface Water Flood Map



Flood Legend

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- Site Outline
- Search Buffers (m): 250, 500
- 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**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

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

ID	Distance	Direction	Update
1	0.0	On Site	24-Apr-2008
2	39.0	S	24-Apr-2008

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**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

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

ID	Distance	Direction	Update
5	0.0	On Site	24-Apr-2008
6	104.0	NE	24-Apr-2008

6.3 Areas benefiting from Flood Defences

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

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.4 Areas used for Storage Areas

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

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.5. Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the centre of the study site?	**Yes**
What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?	**High**

6.6 Groundwater Flooding Confidence Areas

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

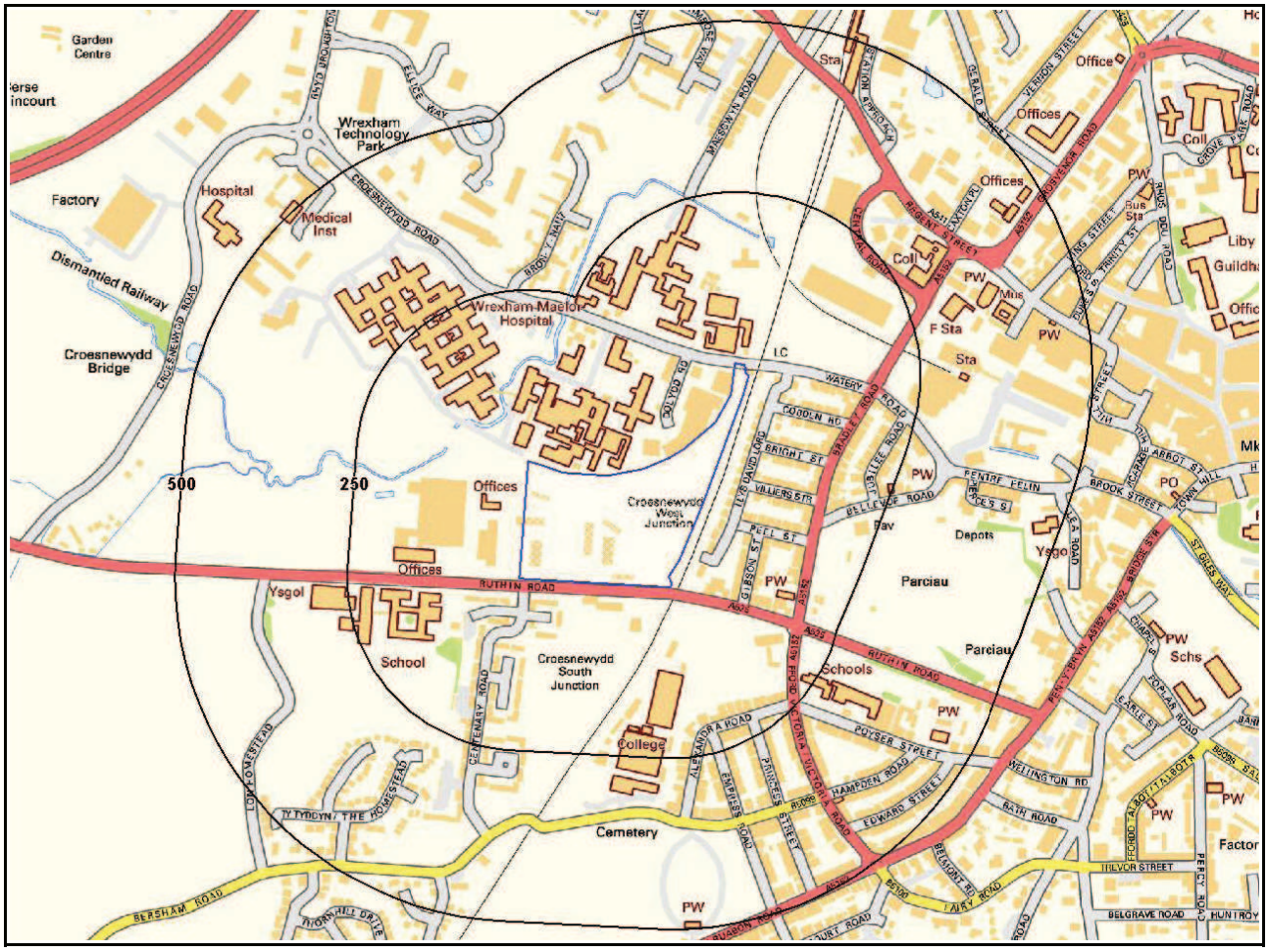
Notes:

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 fivefold scale - Low, Moderately Low, Moderate, Moderately High 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. Ecological Designated Sites Map

N



S

Ecological Designated Sites Legend

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Site Outline

SAC

SSSI

NNR

World Heritage Sites

250
500
Search Buffers (m)

SPA

Ramsar

LNR

7. Ecological Designated Sites

Presence of sites of ecological value within 1000m of the study site? **Yes**

Records of Sites of Special Scientific Interest (SSSI) within 1000m of the study site: **1**

The following Sites of Special Scientific Interest (SSSI) records provided by English Nature/Countryside Council for Wales are represented as polygons on the Ecological Designated Sites Map:

ID	Distance	Direction	SSSI Name	Data Source
Not shown	943.0	N	Gatewen Marsh	Countryside Council for Wales

Records of National Nature Reserves (NNR) within 1000m of the study site: **0**

Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 1000m of the study site: **0**

Database searched and no data found.

Records of Special Protection Areas (SPA) within 1000m of the study site: **0**

Database searched and no data found.

Records of Ramsar sites within 1000m of the study site: **0**

Database searched and no data found.

Records of Local Nature Reserves (LNR) within 1000m of the study site: **0**

Database searched and no data found.

Records of World Heritage Sites within1000m of the study site: **0**

Database searched and no data found.

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, please obtain a GroundSure Geology and Ground Stability Report. 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**

8.1.2 Landslides

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

8.1.3 Soluble Rocks

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

8.1.4 Compressible Ground

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

8.1.5 Collapsible Rocks

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

8.1.6 Running Sand

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

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 (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.

9.2 Shallow Mining

What is the hazard of subsidence relating to shallow mining onsite? (this includes a 150m buffer) **Negligible**

10.Contacts

GroundSure Helpline
Telephone: 01273 819700
info @ groundsure.com

British Geological Survey (England & Wales)
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3136. www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

Environment Agency
Northern
Ffordd Penlan - Parc Meni, Bangor, Gwynedd, LL57 4DE Tel: (01248) 670770
EA Wales Tel: (02920) 770088

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848. DX 716176 Mansfield 5
www.coal-authority.co.uk
Coal mining reports and related enquiries

Ordnance Survey
Romsey Road
Southampton SO16 4GU
Tel: 08456 050505

Local Authority
Wrexham County Borough Council Tel: 01978 292000

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

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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.

GroundSure Limited – Standard Terms and Conditions

1 Definitions

In these conditions unless the context otherwise requires:

"Beneficiary" means the Customer or the client of the Customer for whom the Customer has procured the Services.

"Consultancy Services" mean consultancy services provided by GroundSure including, without limitation, carrying out interpretation of third party and in-house environmental data, provision of environmental consultancy advice, undertaking environmental audits and assessments, site investigation, site monitoring and related items.

"Content" means any data, database or other information contained in a Report or Mapping which is provided to GroundSure by a Data Provider.

"Contract" means the contract between GroundSure and the Customer for the performance of the Services which shall incorporate these conditions, the relevant GroundSure user guide, proposal by GroundSure and the content of any subsequent report, and any agreed amendments in accordance with condition 12.

"Customer" means the party that submits an Order or commissions GroundSure further to a written proposal for environmental consultancy services.

"Data Provider" means any third party providing Content to GroundSure.

"Data Report" means reports comprising factual data with no professional interpretation in respect of the level of likely risk and/or liability available from GroundSure.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028 and whose registered office is at Greater London House, Hampstead Road, London NW1 7EJ.

"Intellectual Property" means any patent, copyright, registered design rights, service marks, moral rights, data protection rights, know-how, trade mark or other intellectual property rights.

"Mapping" an historical map or a combination of historical maps of various ages, time periods and scales available from GroundSure;

"Order" means an order form submitted by or for the Beneficiary requiring Services from GroundSure in respect of a specified site.

"Report" means a Risk Screening or Data Report for commercial or residential property available from GroundSure relating to a site identified in the Order prepared in accordance with the specifications set out in the relevant user guide.

"Risk Screening" means one of GroundSure's risk screening reports such as GroundSure Homebuyers; GroundSure Home Environmental GroundSure SiteGuard, GroundSure Screening, GroundSure Review, GroundSure Developer Review, or any other risk screening report available from GroundSure.

"Services" means the provision of any Report, Mapping and Consultancy Services which GroundSure has agreed to carry out for the Customer/Beneficiary on these terms and conditions in respect of a site detailed in the Order.

2Scope of Services

2.1GroundSure agrees to carry out the Services in accordance with the Contract and to the extent set out therein.

2.2GroundSure shall exercise all reasonable skill, care and diligence in the performance of the Services.

2.3The Customer 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 the Contract.

2.4Terms and conditions appearing on a Customer's order form, printed stationery or other communication, including invoices, to GroundSure, its employees, servants, agents or other representatives shall be of no effect and these terms and conditions shall prevail over all others.

2.5In the event that a Customer/Beneficiary opts to take out insurance in conjunction with or as a result of the Services, such insurance shall be subject solely to the terms of any policy issued to it in that respect and GroundSure will have no liability therefore.

3The Customer's obligations

3.1The Customer shall be solely responsible for ensuring that the Report/Mapping ordered is appropriate and suitable for the Beneficiary's needs.

3.2The Customer shall (or shall procure that the Beneficiary shall) supply to GroundSure as soon as practicable and without charge all information necessary and accurate relevant data including any specific and/or unusual environmental information relating to the site known to the Customer/Beneficiary which may pertain to the Services and shall give such assistance as GroundSure shall reasonably require in the performance of the Services (including, without limitation, access to a site, facilities and equipment as agreed in the Contract).

3.3Where Customer/Beneficiary approval or decision is required, such approval or decision shall be given or procured in reasonable time as not to delay or disrupt the performance of any other part of the Services.

3.4The Customer shall not and shall procure that the Beneficiary shall not, save as expressly permitted by these terms and conditions, re-sell, alter, add to, amend or use out of context the content of any Report, Mapping,or in respect of any service or information given by GroundSure. For the avoidance of doubt, the Customer and Beneficiary may make the Report, Mapping or GroundSure's findings available to a third party, but such third party cannot rely on the same unless expressly permitted under condition 4.

3.5The Customer is responsible for maintaining the confidentiality of its user name and password if using GroundSure's internet ordering service and accepts responsibility for all activity that occurs under such account and password.
4Reliance
4.1Upon full payment of all relevant fees and subject to the provisions of these terms and conditions, the Customer and Beneficiary are granted an irrevocable royalty-free licence to use the information contained in the Report, Mapping or in a report prepared by GroundSure in respect of or arising out of the Consultancy Services. The Services may only be used for the benefit of the Customer and those persons listed in conditions 4.2 and 4.3.
4.2 In relation to Data Reports, Mapping and Risk Screening, reliance shall be limited to the Customer, Beneficiary and subsequent first purchaser or first tenant of the site including the professional advisers and lenders of each. For the avoidance of doubt, such persons shall include any entity necessary under the Housing Act 2004 or as legally required because of the Home Information Pack.
4.3 In relation to Consultancy Services, reliance shall be limited to the Customer, Beneficiary and named parties on the GroundSure proposal and subsequent report.
4.4 No party referred to in conditions 4.2 and 4.3 shall assign any rights or obligations under these terms and conditions without the prior written consent of GroundSure. GroundSure reserves the right to charge an assignment fee which will be no higher than 15% of the original fee or £250 whichever is the highest. GroundSure may assign its rights and obligations under these terms.
4.5Save as set out in conditions 4.2 and 4.3, unless otherwise agreed in writing with GroundSure, any other party considering the information within a Report, Mapping or proposal and subsequent report in respect of Consultancy Services, including insurance underwriters, does so at their own risk and GroundSure has no legal obligations to such party unless otherwise agreed in writing.
4.6The Customer shall not and shall procure that any person (including the Beneficiary) who is provided with a copy of any Report shall not: (a) remove, suppress or modify any trade mark, copyright or other proprietary marking from the Report or Mapping; (b) create any product which is derived directly or indirectly from the data contained in the Report or Mapping; (c) combine the Report or Mapping with, or incorporate the Report or Mapping into any other information data or service; or (d) re-format or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping save to the extent that the Customer is adding its assessment to the Report or Mapping solely for the purposes of providing its services to the Beneficiary.
4.7Without prejudice to any other right or remedy available to GroundSure including without limitation any claim for infringement of copyright, breach of confidence or contract or otherwise howsoever arising if the Customer or a person to whom a Report or Mapping is provided, breaches any of the provisions of this condition 4, the Customer shall fully and effectually indemnify GroundSure and hold it harmless against any claim by any third party who may claim to have sustained injury loss or damage by reason of their reliance upon any report or document which GroundSure may have prepared for the Customer or upon the contents thereof.
5Fees and Disbursements
5.1GroundSure shall charge the Customer fees at the rate and frequency specified in the Contract together with all proper disbursements made in performing the Services. The Customer shall in addition pay all value added tax or other tax payable on such fees and disbursements in the country concerned in relation to the provision of the Services.
5.2Unless GroundSure requires prepayment, the Customer shall promptly pay all fees disbursements and other monies due to GroundSure in full without deduction, counterclaim or set off together with such Value Added Tax or equivalent local tax as may be required within 30 days from the date of GroundSure's invoice. GroundSure reserves the right to charge interest which shall accrue on a daily basis from the date of invoice until the date of payment (whether before or after judgment) at the rate of two per cent per month.
5.3In the event that the Customer disputes the amount payable in respect of GroundSure's invoice it shall notify GroundSure no later than 28 days after the date thereof that it is in dispute. In default of such notification the Customer shall be deemed to have agreed the amount thereof which shall thereupon be due and payable. As soon as reasonably practicable following receipt of any disputed invoice, a member of the management team at GroundSure shall contact the Customer and the parties shall use all reasonable endeavours to resolve the dispute.
6 Intellectual Property
6.1Unless expressly agreed in writing to the contrary GroundSure and its Data Providers (where relevant) retain all Intellectual Property rights and proprietary rights in all information, Content and data reproduced in a Report or as part of the Consultancy Services.
6.2Data Providers may enforce any breach of condition 6.1 against the Customer or Beneficiary.
7 Liability
7.1GroundSure shall not be liable to pay compensation to the Customer or any person to whom the Customer provides a copy of the Report, Mapping or results of the Consultancy Services in any circumstances whatsoever unless arising out of a breach on its part of the obligations set out in the Contract.
7.2GroundSure shall not be liable if the Services are used otherwise than as provided or referred to in these conditions
7.3Where any person is engaged whether by the Customer or by GroundSure on the Customer or Beneficiary's behalf in the performance of the Services or any part thereof GroundSure shall not be liable for acts of negligence, default or omission by such person.

7.4GroundSure makes no representation, warranties, express or implied, as to the accuracy, reliability, completeness, validity or fitness for purpose of the Content shall not be liable for any omission, error or inaccuracy in relation thereto.
7.5GroundSure shall not be liable for any inaccurate statement or risk rating in a Report which resulted from a reasonable interpretation of the Content.
7.6GroundSure shall not be liable for any indirect losses, loss of profit nor consequential loss caused by the suspension or reduction of activity on the site.
7.7 Notwithstanding anything to the contrary contained elsewhere in the Contract, and irrespective of whether multiple parties make use of the same Services, the total liability of GroundSure under or in connection with the Contract, whether in contract in tort for breach of statutory duty or otherwise shall not exceed the amount of GroundSure's insurance as provided for below.
7.8GroundSure shall maintain professional indemnity insurance in respect of its liabilities in respect of the Services (provided it is available at reasonable commercial rates) giving cover of not less than £5 million in the aggregate which amount shall first include the whole of any sum payable for death or personal injury. GroundSure shall produce evidence of such insurance if requested by the Customer. A greater level of cover may be available upon request and agreement with the Customer.
7.9The Customer shall be liable to indemnify GroundSure where any loss arises as a result of any breach on the part of the Customer of its obligations under these terms and conditions.
7.10GroundSure's liability under the Contract shall cease upon the expiry of six years from the date when the Customer/Beneficiary became aware that it may have a claim against GroundSure in respect of the Services provided always that there shall be no liability at the expiration of twelve years from the completion of the Contract.
7.11Whilst GroundSure will use all reasonable endeavours to maintain operability of its internet ordering service it will not be liable for any loss or damages caused by a delay or loss of use of such service. The Customer shall use GroundSure's internet ordering service at its own risk. GroundSure shall not be responsible for any damage to a Customer or permitted assignee's computer, software, modem, telephone or other property resulting from the use of GroundSure's internet ordering service.
7.12The Customer accepts, and shall procure that anyone who is provided with a copy of the Report accepts, that it has no claim or recourse to any Data Provider or to GroundSure in respect of the acts or omissions of such Data Providers including Content supplied by them.
7.13Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or wilful default.
7.14GroundSure accepts no liability for use of any residential Reports or any data or information contained therein for development or other commercial property purposes in respect of which a commercial Report should have been obtained.
8 Remediation
8.1 For the purpose of this condition 8, 'Claimant' shall mean one of: (a) the Beneficiary, (b) the purchaser of the site from the Beneficiary or (c) the funder of (a) or (b) as applicable.
8.2 This condition 8 shall apply solely to GroundSure Homebuyers and GroundSure Home Environmental with passed rather than failed status.
8.3 GroundSure may, at its sole discretion without any admission of liability, make a contribution to the Claimant towards the costs of any clean up works required to be carried out under a notice served on a Claimant in respect of a site under Part II (A) Environmental protection Act 1990 ("Remediation Notice") on the terms of this condition 8 ("Clean up Award").
8.4 The Clean up Award:

(a) is only available once in respect of a site and to one Claimant only;(b) shall only apply where the site is a single residential dwelling house or a single residential flat within a block of flats. For the avoidance of doubt, a Clean up Award will not be considered in respect of commercial property or to any site being developed or redeveloped whether for residential purposes or otherwise; and (c) shall only apply to contamination or a pollution occurring as at or prior to the date of GroundSure Homebuyers.

8.5 The Clean up Award will not be paid in respect of any of the following, including without limitation:

(a) asbestos; (b) radioactive contamination arising directly or indirectly from or in connection with ionising radiations or contamination by radioactivity from any nuclear waste or fuel; from the combustion of nuclear fuel or the radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof; (c) naturally occurring materials or their removal except where such materials are present in excess of their natural concentration; (d) any condition caused by acts of war or an act of terrorism;(e) any condition which is known or ought reasonably to have been known to the Claimant prior to the purchase of GroundSure Homebuyers; (f) non-compliance by the Claimant or any other person with respect to the site with any statute, regulation, byelaws complaint, or notice from any regulatory authority; (g) any property belonging to or in the custody or control of the Claimant which does not form a fixed part of the site or the structure; (h)any losses incurred following a material change in use of, alteration or development of the site; or (i) financial loss in respect of loss of rental, profit, revenue, savings, business or any consequential, indirect or economic loss, damages or expenses, including the cost of temporary accommodation or business interruption.

8.6 In the event the Claimant wishes to apply for a Clean up Award, it shall notify GroundSure in writing within 3 months of the date of the Remediation Notice. The Claimant shall comply with all reasonable requirements of GroundSure with regard to the commission and conduct of the clean up works to be carried out under the Remediation Notice. In the event that the Claimant breaches this provision including, without limitation, failing to obtain GroundSure's prior written consent in respect of estimates for such works GroundSure shall not be required to pay a Clean up Award.
8.7 GroundSure shall only pay a Clean up Award where a Remediation Notice is served within 36 months of the date of GroundSure Homebuyers.
8.8 The maximum sum of any Clean up Award shall be £60,000 and shall be paid subject to the Claimant having paid to GroundSure an excess in respect of its claim of £5,000.
8.9 GroundSure reserves the right at any time to withdraw the offer of payment of a Clean up Award.
8.10 The Claimant shall take all reasonable steps to appeal such Remediation Notice and mitigate any costs incurred in connection with the remediation works required under the terms of any Remediation Notice. GroundSure reserves the right to withhold or reduce the amount of its Clean up Award in the event of a breach of this condition or an appeal is still active.
9 GroundSure right to suspend or terminate
9.1In the event that GroundSure reasonably believes that the Customer or Beneficiary as applicable has not provided the information or assistance required to enable the proper performance of the Services, GroundSure shall be entitled on fourteen days written notice to suspend all further performance of the Services until such time as any such deficiency has been made good.
9.2 GroundSure may additionally terminate the Contract immediately on written notice in the event that:

(i)the Customer shall fail to pay any sum due to GroundSure within 28 days of the due date for payment; or (ii) the Customer (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 Customer is struck off the Register of Companies or dissolved; or(iii) the Customer 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 Customer shall enter into a composition or arrangement with the Customer's creditors or shall suffer distress or execution to be levied on his goods; or (iv) the Customer breaches any material term of the Contract (including, but not limited to, the obligations in condition 4) incapable of remedy then and in any such case GroundSure shall be entitled to a fair and reasonable amount on account of the fees due commensurate with the services performed to the date of such termination and any outstanding expenses or other disbursements that it may have incurred in respect of the Contract including without limitation equipment hire costs for the remainder of any lease, storage costs, transportation costs, labour costs or sub-contractor fees.

10 Customer's Right to Terminate and Suspend
10.1Subject to condition 11.2, the Customer may at any time after commencement of the Services by notice in writing to GroundSure require GroundSure to terminate or suspend immediately performance of all or any of the Services.
10.2 The Customer waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a Report/Mapping.
11 Consequences of Withdrawal, Termination or Suspension
11.1 Upon termination or any suspension of the Services, 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 Customer/Beneficiary any property of the Customer/Beneficiary in GroundSure's possession or control.
11.2 The Customer shall pay to GroundSure all and any fees as are due in respect of the Services performed up to or in respect of such termination or suspension.
12General
12.1GroundSure and the Customer agree not to rescind or vary these terms and conditions to Ordnance Survey's or its successor's detriment without obtaining Ordnance Survey's or its successor's prior written consent.
12.2Subject to condition 12.1, GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by GroundSure or made in accordance with condition 12.1.
12.3No failure on the part of GroundSure to exercise and no delay in exercising, any right, power or provision under these terms and conditions shall operate as a waiver thereof.
12.4 Save as expressly provided in conditions 6.2 and 12.5, no person other than the Customer, Beneficiary and GroundSure shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of these terms and conditions.
12.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey, may enforce breach of conditions 6.1 or 12.1 of these terms and conditions against the Customer in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
12.6 GroundSure shall not be liable to the Customer if the provision of the Services is delayed or prevented by any circumstance which is beyond GroundSure's reasonable control including without limitation one or more of the following circumstances:

(i) the Customer or Beneficiary's failure to provide facilities, access or information; (ii)fire, storm, flood, tempest or epidemic; (iii)process shutdown; (iv) Acts of God or the public enemy; (v)riot, civil commotion or war; (vi)strikes, labour disputes or industrial action; (vii) acts or regulations of any governmental or other agency; (viii)suspension or delay of services at public registries by Data Providers; or (ix) changes in law.

12.7Any notice provided for 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.

12.8Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email and on the second working day after the day of posting if sent by first class post.

12.9The Contract constitutes the entire contract between the parties and shall supersede all previous arrangements between the parties.

12.10Each 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.

12.11 These terms and conditions shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with these terms and conditions shall be subject to the exclusive jurisdiction of the English courts.

12.12These terms and conditions were produced on 28 May 2008.

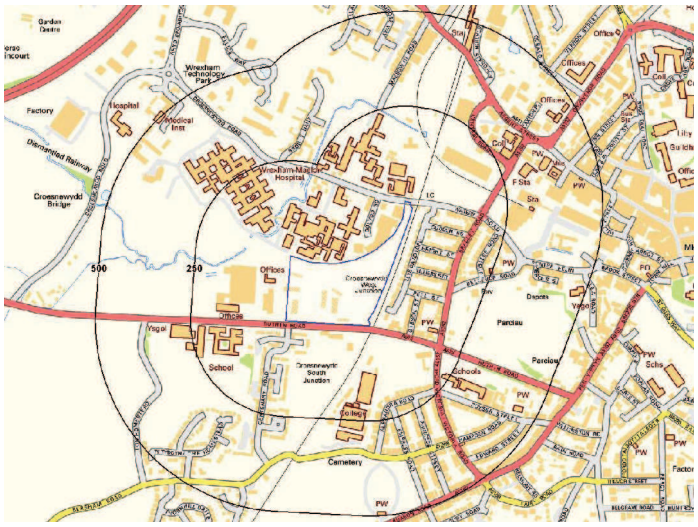
GroundSure Geology & Ground Stability Report

Address: Ruthin Road, Wrexham, LL13 7TU

Date: Jul 16, 2008

GroundSure Reference: HMD-231-167034

Your Reference: C3051/GC



Brought to you by GroundSure

If you would like any further assistance regarding this report then please contact
GroundSure on (T) 01273 819700, [F] 01273 377902, email: info@groundsure.com

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: Ruthin Road, Wrexham, LL13 7TU
Grid Reference: 332689,350106

Overview of Findings

The GroundSure Geology and Ground Stability Report 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 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? *	Yes
1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	Yes
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 10 and 30% 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 Resea rch Establishment?	Full 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	0	8	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	0	0	0

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

*This includes an automatically generated 150m 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	Negligible	-	-	-	-
4.4 Compressible Deposits	Very Low	-	-	-	-
4.5 Collapsible Deposits	Negligible	-	-	-	-
4.6 Running Sand	Very Low	-	-	-	-

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

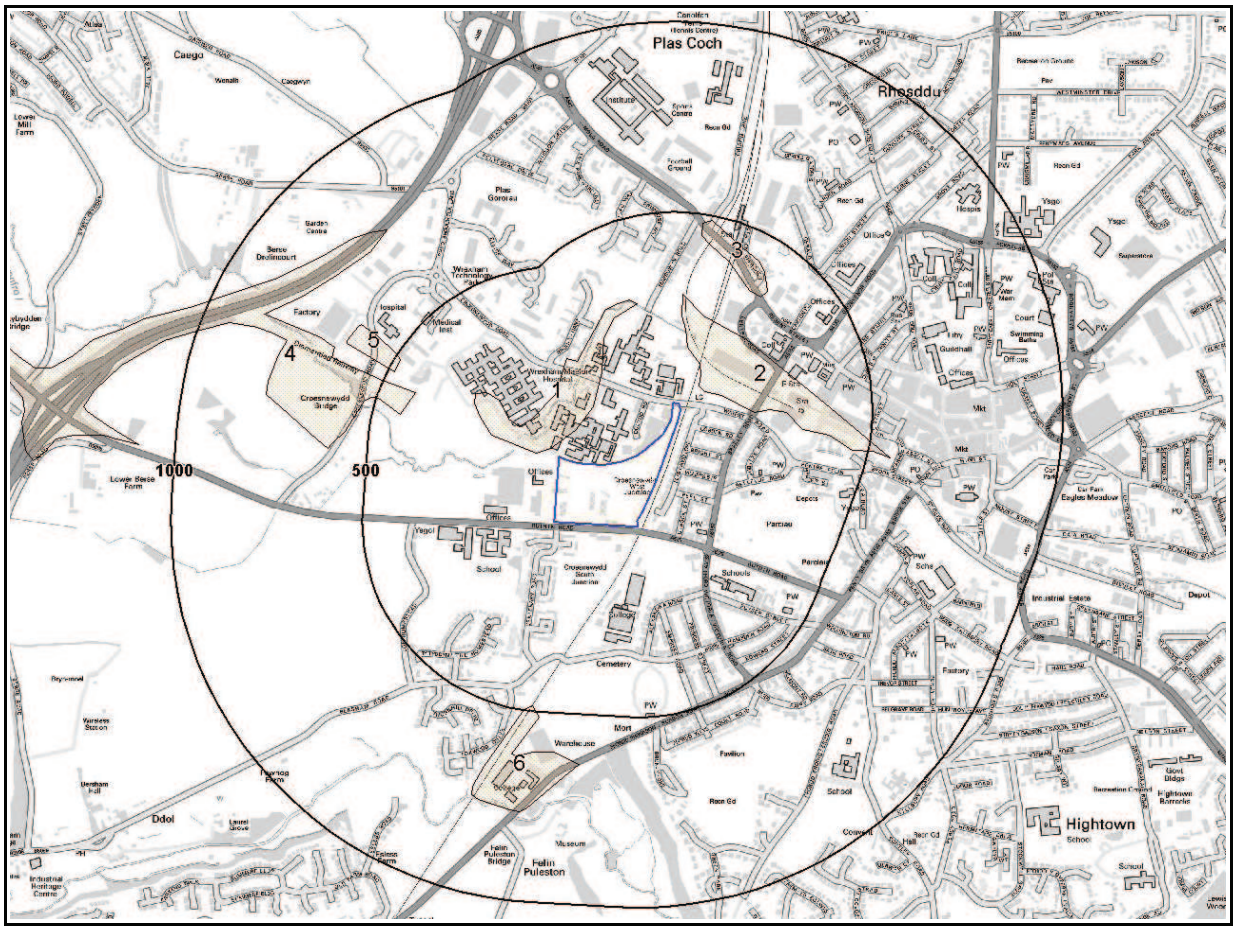
5. Borehole Records	on-site	0-50	51-250	251-500	501-1000
5.1 BGS Recorded Boreholes	6	4	20	-	-

1.1 Artificial Ground Map

NW ▲ N NE

◄W E►

SW ▼ S SE



Artificial Ground Legend

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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

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: **Yes**

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	32.0	NW	MGR-MGRD	Made Ground (undivided)	Artificial Deposit
2	69.0	NE	MGR-MGRD	Made Ground (undivided)	Artificial Deposit
3	350.0	NE	MGR-MGRD	Made Ground (undivided)	Artificial Deposit
4	411.0	NW	MGR-MGRD	Made Ground (undivided)	Artificial Deposit
5	483.0	NW	MGR-MGRD	Made Ground (undivided)	Artificial Deposit
6	485.0	S	MGR-MGRD	Made Ground (undivided)	Artificial Deposit

1.1.2 Permeability of Artificial Ground

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

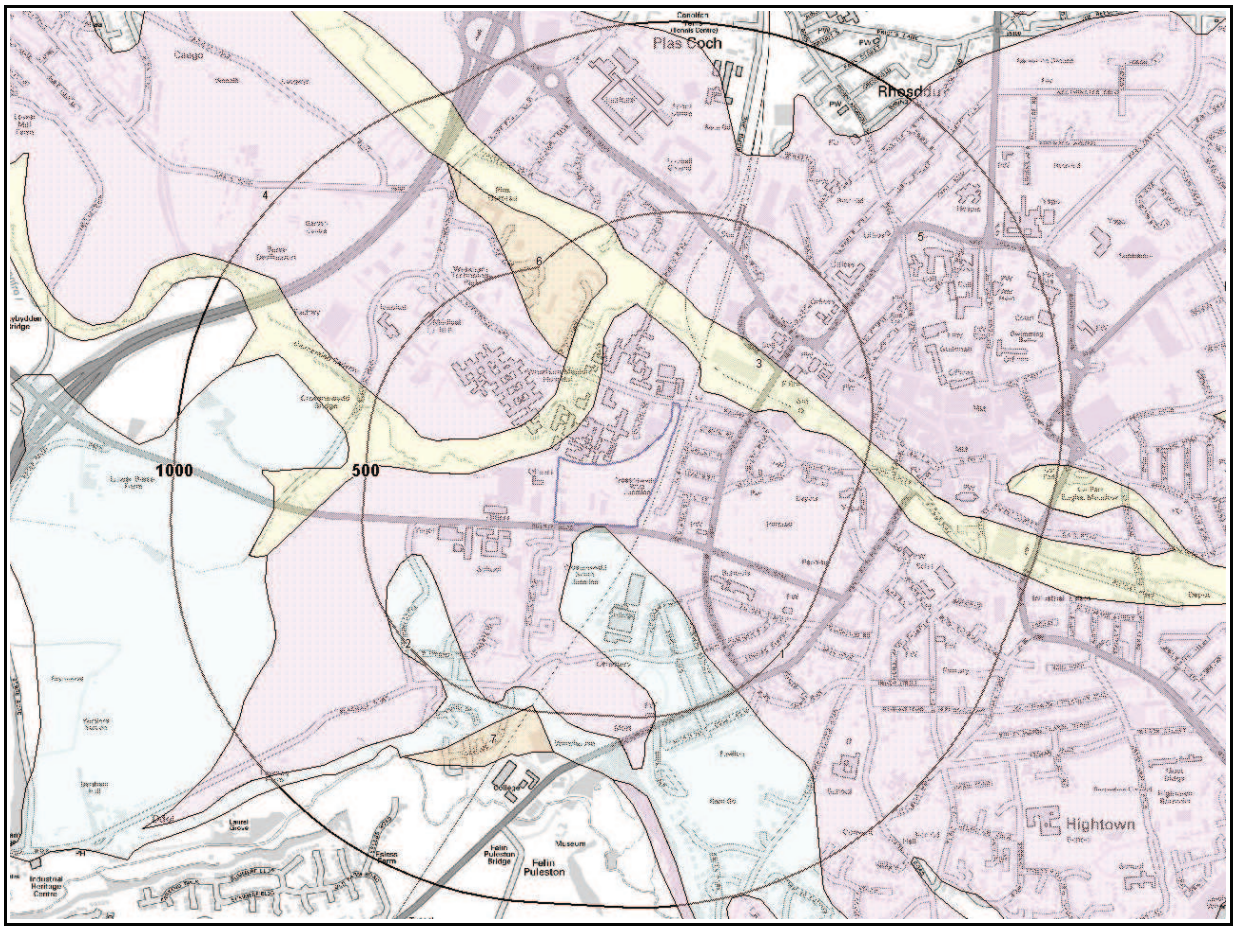
Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
32.0	NW	Intergranular	Very High	Very Low

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

If you would like any further assistance regarding this report then please contact GroundSure on (T) 01273 819700, [F] 01273 377902, email: info@groundsure.com

1.2 Superficial Deposits and Landslips Map

NW ▲ N NE



◄W E►

SW S ▼ SE

Superficial and Landslips Legend

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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	GFSDD-SAGR	Glaciofluvial Sheet Deposits, Devensian	Sand and Gravel
2	5.0	S	TILLD-DMTN	Till, Devensian	Diamicton
3	32.0	NW	ALV-CSSG	Alluvium	Clay, Silt, Sand and Gravel
4	124.0	NW	GFSDD-SAGR	Glaciofluvial Sheet Deposits, Devensian	Sand and Gravel
5	231.0	NE	GFSDD-SAGR	Glaciofluvial Sheet Deposits, Devensian	Sand and Gravel
6	259.0	N	RTDU-SAGR	River Terrace Deposits (undifferentiated)	Sand and Gravel
7	485.0	S	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
5.0	S	Mixed	High	Low
32.0	NW	Intergranular	High	Very Low
39.0	S	Intergranular	Very High	High
42.0	S	Mixed	High	Low
48.0	S	Intergranular	Very High	High

1.2.3 Landslip

Database searched and no data found.

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

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 discreet 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

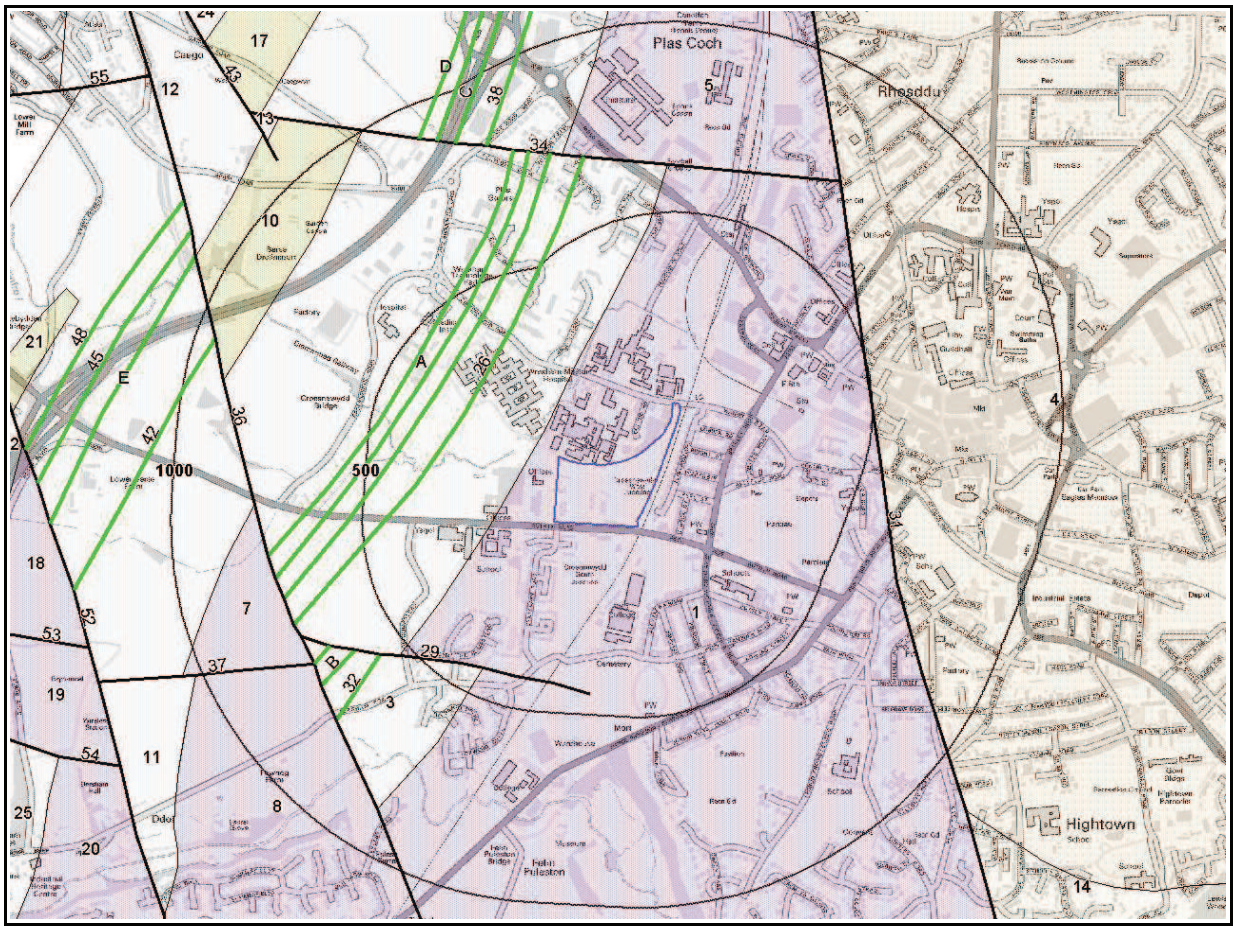
Are there any records relating to permeability of landslips within the study site* boundary: No

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

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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
2A	67.0	NW	PLMC-MDSS	Pennine Lower Coal Measures Formation and Pennine Middle Coal Measures Formation (undifferentiated) - Mudstone, Siltston	Bolsovian (westphalian C) / Langsettian (westphalian A)
3	424.0	SW	PLMC-MDSS	Pennine Lower Coal Measures Formation and Pennine Middle Coal Measures Formation (undifferentiated) - Mudstone, Siltston	Bolsovian (westphalian C) / Langsettian (westphalian A)
4	494.0	E	SAL-MDSC	Salop Formation - Mudstone, Sandstone and Conglomerate	Early Permian / Westphalian D

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
39.0	S	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
26	270.0	NW	Rock	Coal seam, inferred
27A	359.0	NW	Rock	Coal seam, inferred
28A	408.0	NW	Rock	Coal seam, inferred
29	416.0	S	Fault	Normal fault, inferred
30A	449.0	NW	Rock	Coal seam, inferred
31	494.0	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 discreet 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

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

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 10 and 30% of properties are above the Action Level

1.3.5 Radon Protection

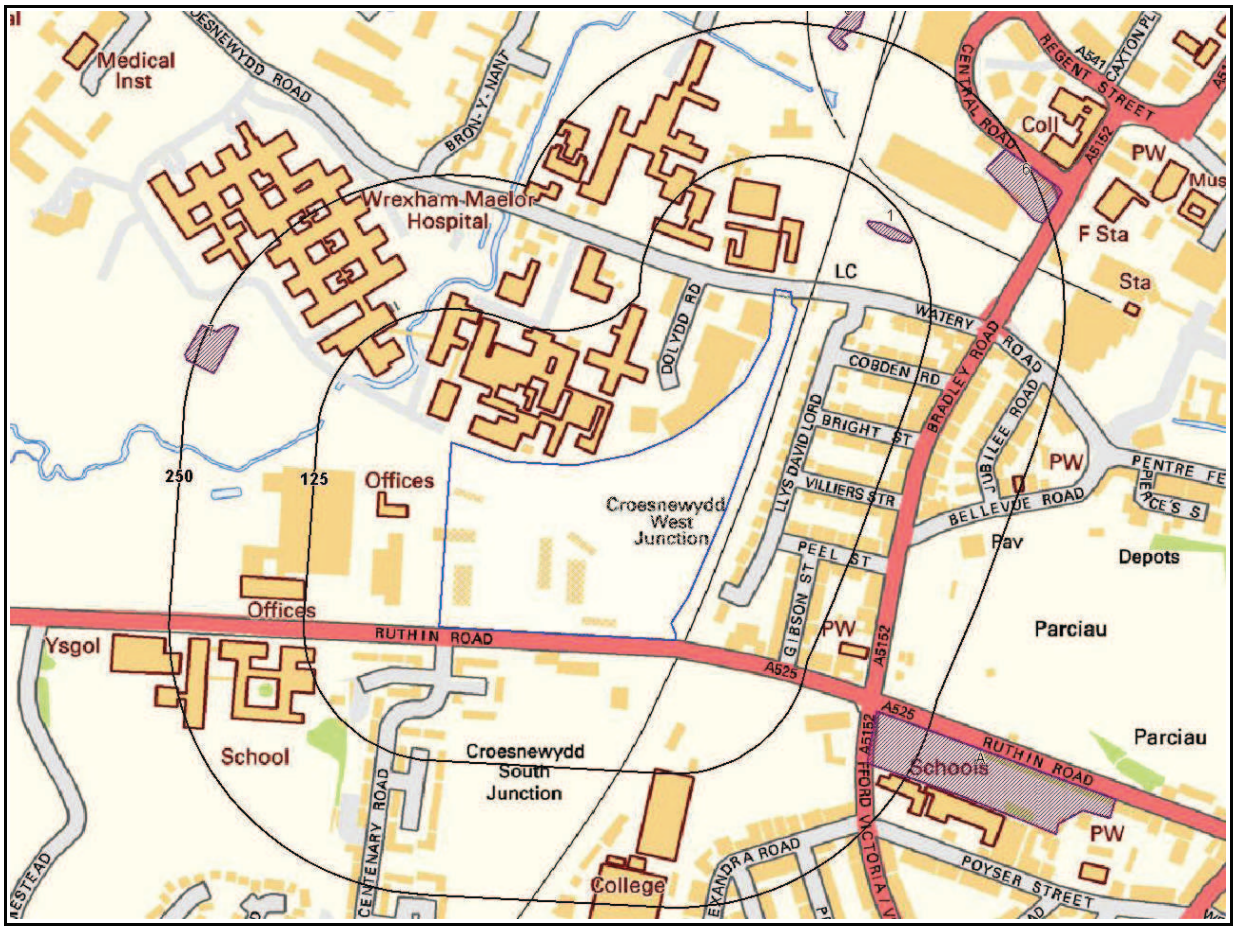
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?

Full radon protective measures are necessary

If you would like any further assistance regarding this report then please contact
GroundSure on (T) 01273 819700, [F] 01273 377902, email: info@groundsure.com

2. Ground Workings Map

NW N NE



◄W E►

SW S SE

Ground Workings Legend

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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 the 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	95.0	NE	332896,350419	Pond	1898
2A	199.0	E	332990,349915	Disused Cemetery	1938
3A	199.0	E	332990,349915	Disused Cemetery	1937
4A	199.0	E	332990,349915	Disused Cemetery	1898
5A	199.0	E	332990,349915	Cemetery	1872
6	214.0	NE	333021,350462	Unspecified Pit	1964
7	225.0	NW	332266,350310	Cuttings	1872
8	231.0	N	332861,350660	Unspecified Ground Workings	1898

2.2 Historical Underground Workings Features derived from the 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? **No**

Database searched and no data found.

2.3 Current Ground Workings

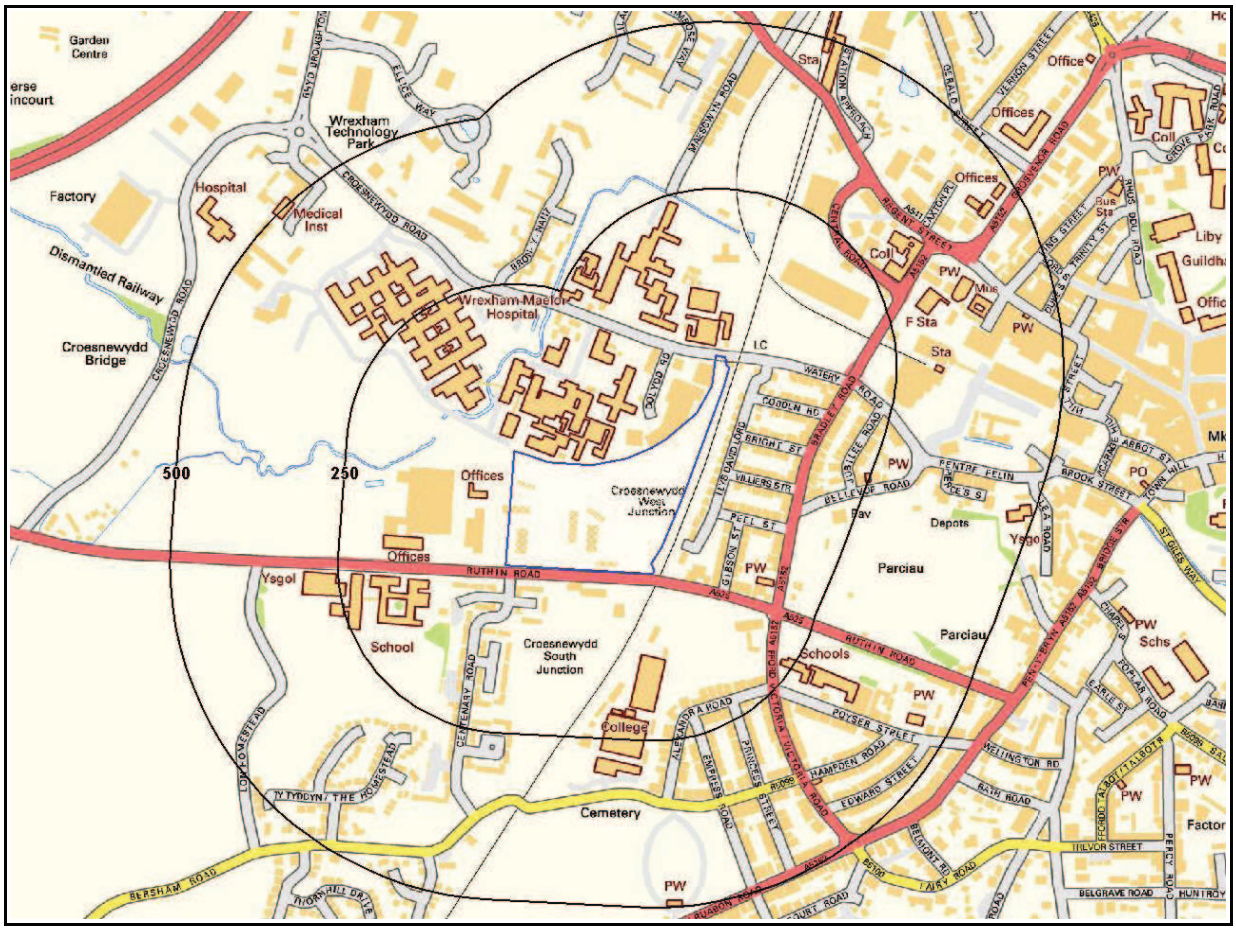
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? **No**

Database searched and no data found.

3. Mining, Extraction & Natural Cavities Map

NW ▲ N NE



W ◄ ► E

SW ▼ S SE

Mining, Extraction & Natural Cavities Legend

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Site Outline

250
500
Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities

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? **No**

Database searched and no data found.

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 Shallow Mining

This dataset refers to the (largely very old) extraction of mineral deposits by means of near surface underground workings.

What is the maximum hazard rating of subsidence relating to shallow mining within the study site* boundary? **Negligible**

*This includes an automatically generated 150m buffer zone around the study site boundary

The following Shallow Mining information provided by the British Geological Survey is not represented on Mapping:

Distance (m)	Direction	Hazard Rating	Details
0.0	On Site	Negligible	Where negligible potential is indicated, this means that the rocks underlying the area are not likely to have been mined at shallow depth. However, you should still find out whether or not a Coal Authority mining search is required in the area, for example, to check for deeper mining.

3.4 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.

3.5 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.

3.6 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.

3.7 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.

3.8 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records.

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

Database searched and no data found.

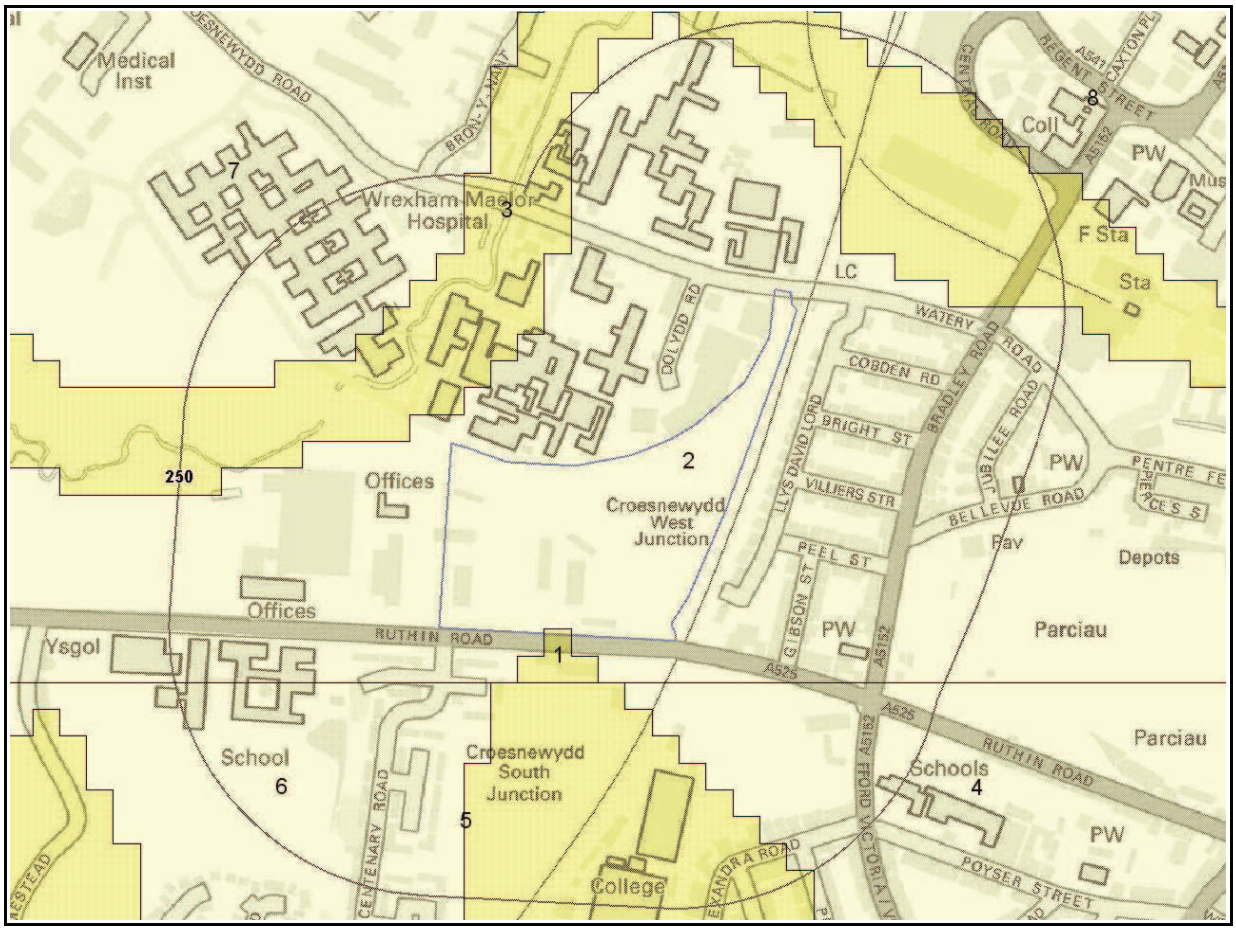
3.9 Clay Mining

This dataset provides information on Kalin 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



Shrink-Swell Clay Legend

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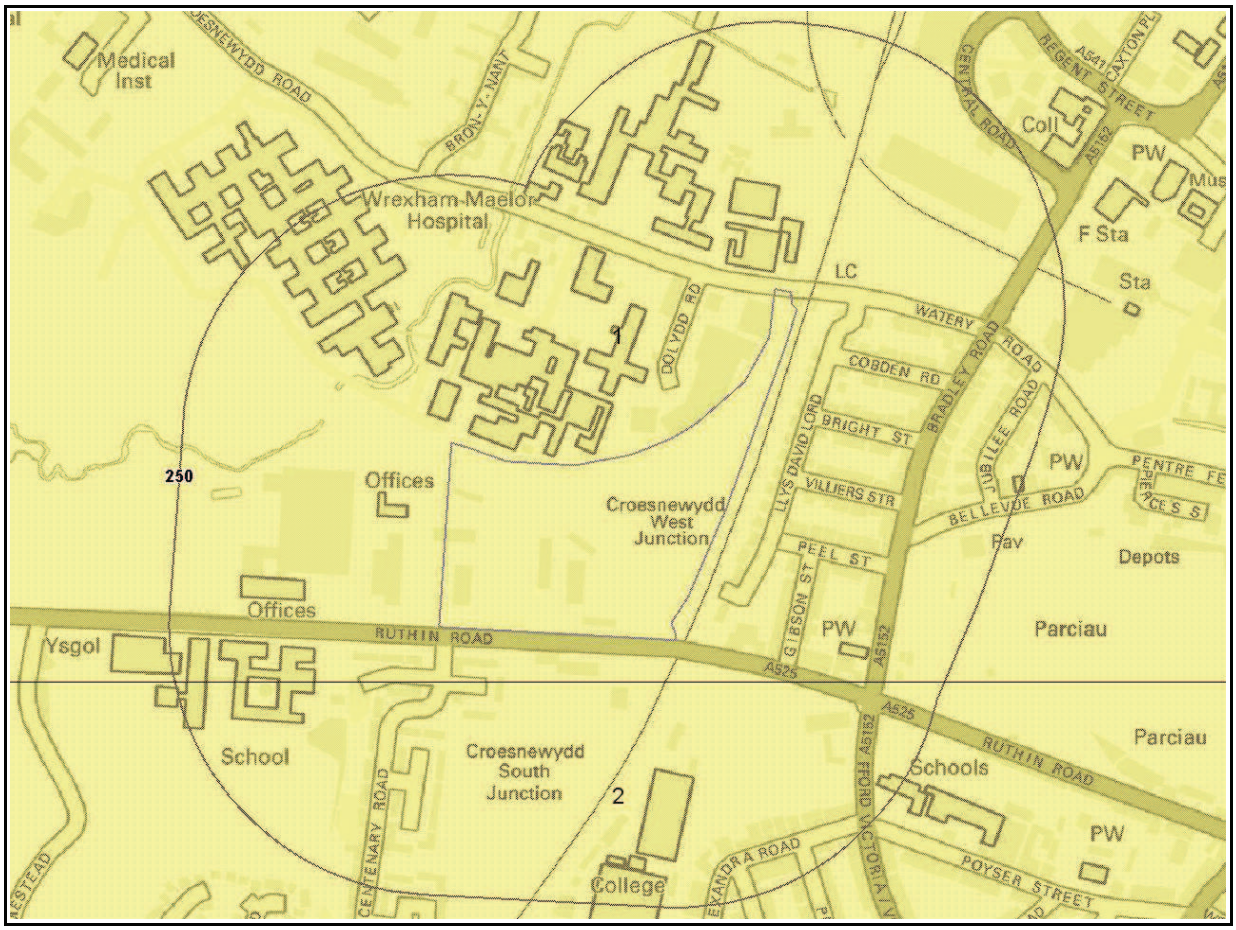
Site Outline

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

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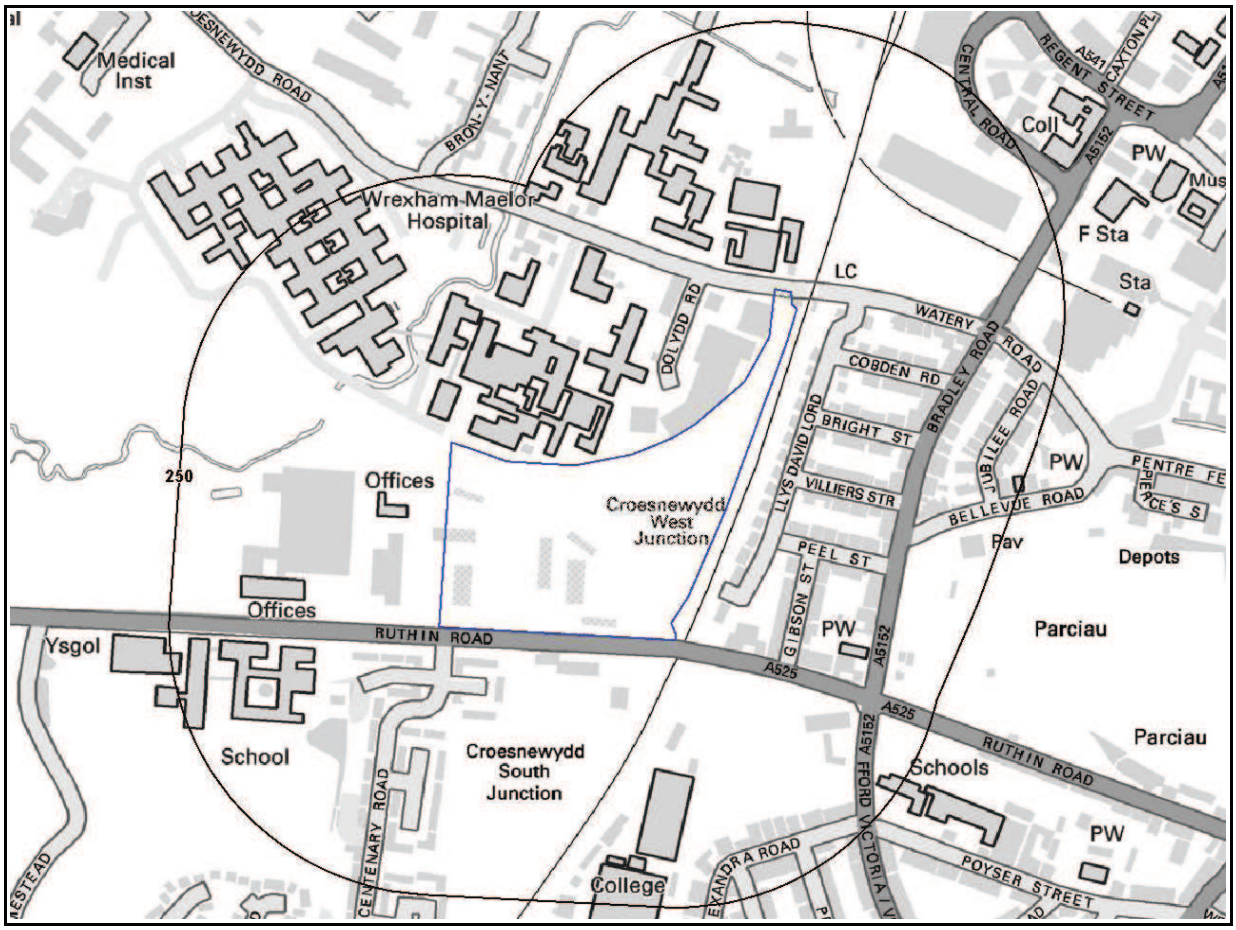
Site Outline

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

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Site Outline

125 250 Search Buffers (m)

No Data / Null

Negligible

Very Low

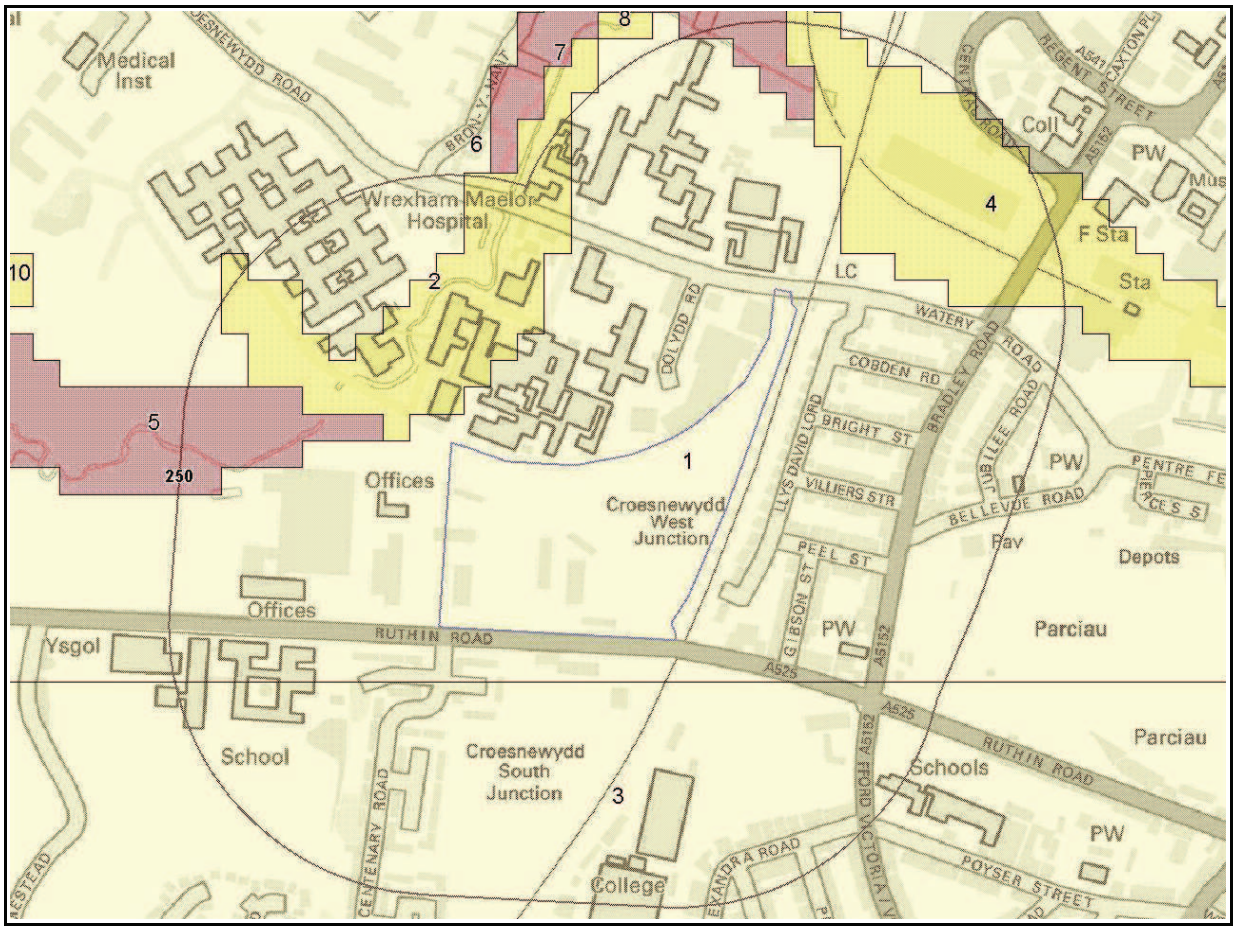
Low

Moderate

High

4.4 Compressible Deposits Map

NW N NE



W E

SW S SE

Compressible Deposits Legend

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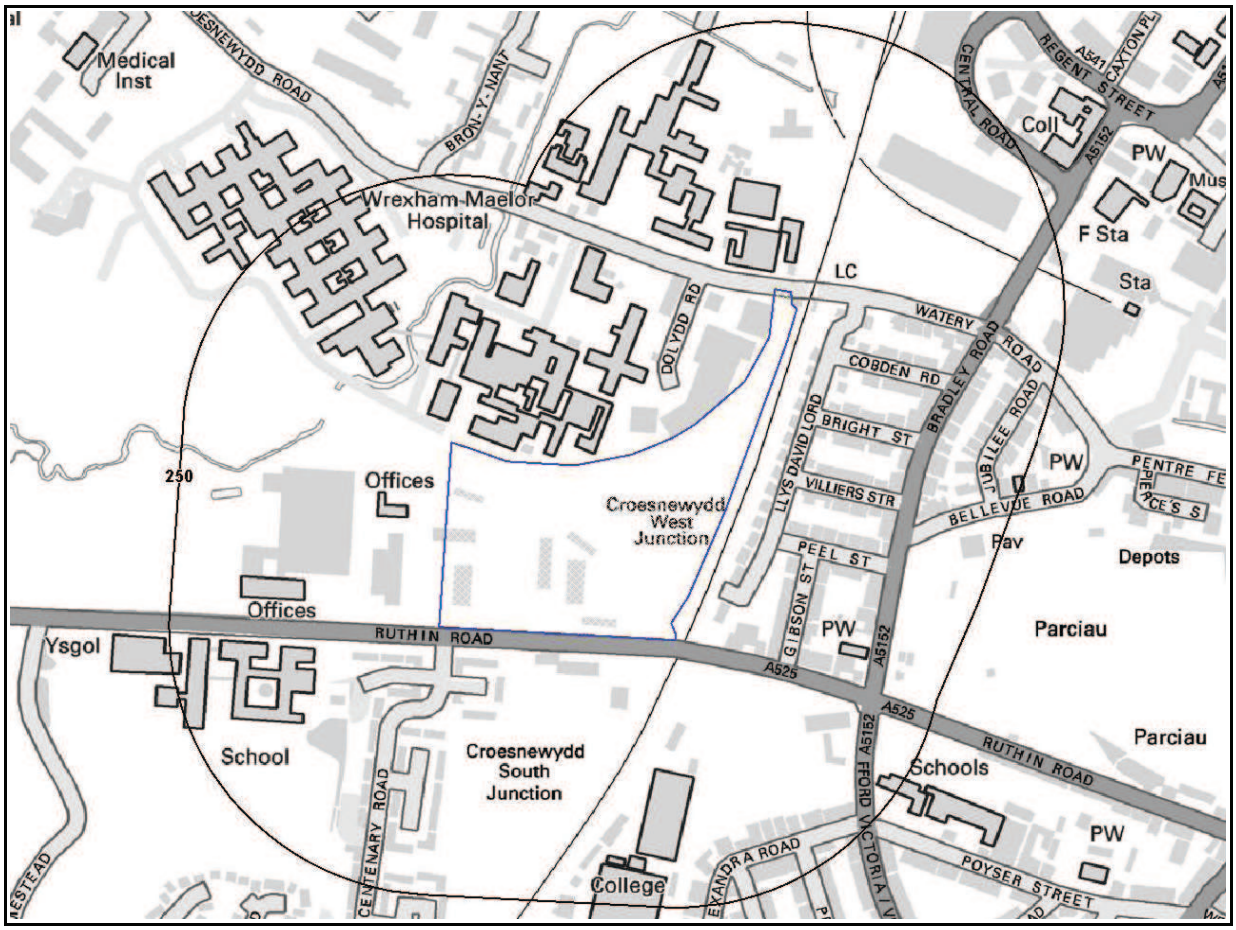
Site Outline

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

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Site Outline

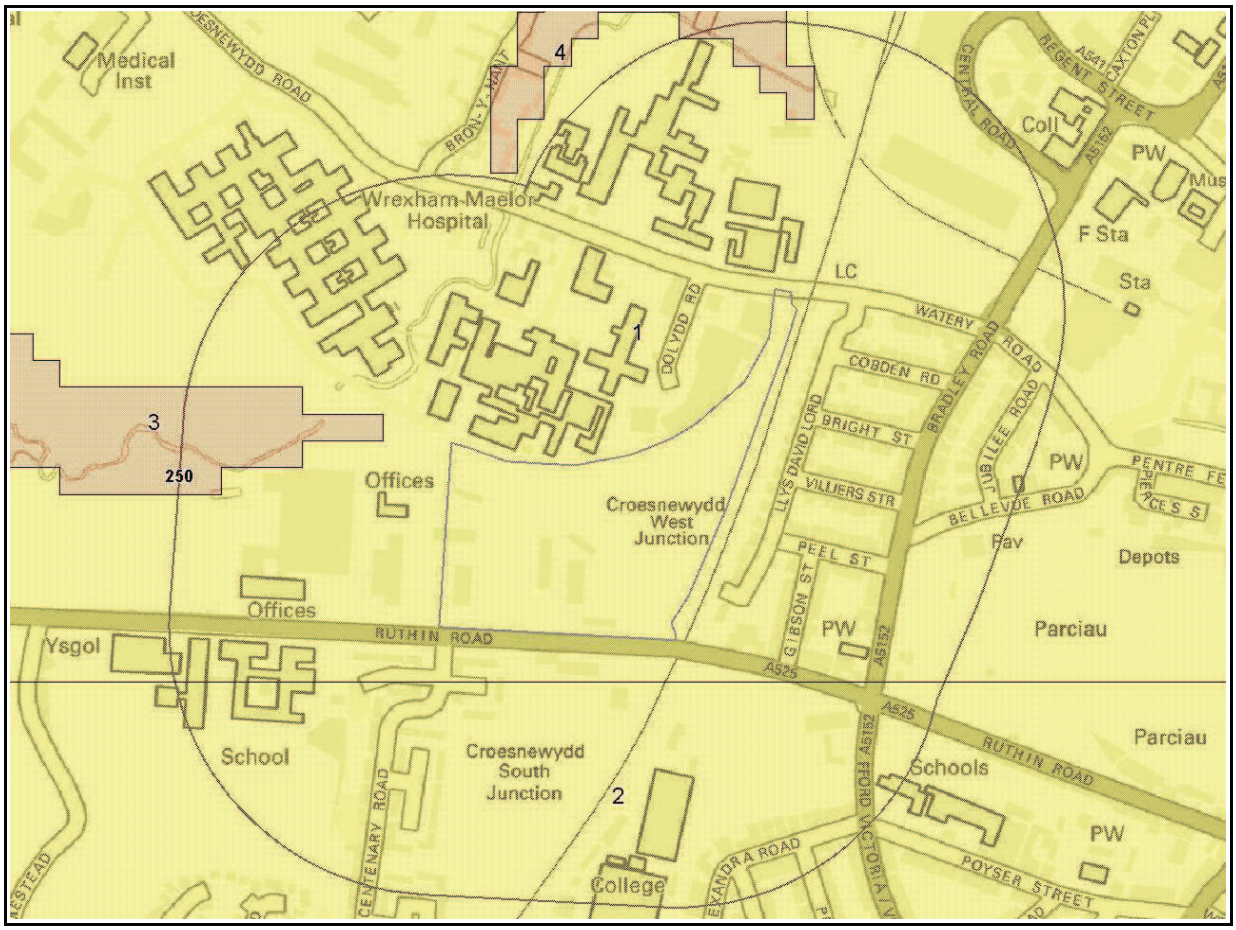
Search Buffers (m) 125 250

No Data / Null

Significant

4.6 Running Sand Map

NW N NE



W E

SW S SE

Running Sand Legend

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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**

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

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	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.
2	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.
3	27.0	N	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	39.0	S	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.
5	41.0	S	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.
6	48.0	S	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.

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.
2	39.0	S	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	On site	Null-Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

4.4 Compressible Deposits

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.
2	27.0	N	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
3	39.0	S	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:

Distance (m)*	Direction	Hazard Rating	Details
0	On site	Null-Negligible	No Indicators for collapsible deposits identified. No Special actions required to avoid problems due to collapsible deposit.

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.
2	39.0	S	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.