PHASE 2
SWALLOW LANE
GOLCAR, HUDDERSFIELD

for

Jones Homes (Yorkshire) Limited

Report Number 3974

November 2019

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1 INTRODUCTION

1.1 At the request of Jones Homes (Yorkshire) Limited, a Phase I Geoenvironmental and Geotechnical Assessment (Desk Study) and a Phase II Intrusive Investigation have been carried out at land off Swallow Lane in Golcar. The site lies immediately to the West of a current Jones Homes development and is therefore referred to as Phase 2. It was proposed to redevelop the land with eighteen residential properties.

1.2 The purpose of the desk study was to review and assess published information on the site including geological, mining and hydrogeological data. It was also to review the past history of the site and its environmental setting.

1.3 The intrusive investigation comprised window sampling, rotary drilling and trial pitting, with associated in-situ and laboratory testing. Recommendations are made for the safe and economic development of the site.

1.4 The development site was previously partly investigated in 2014 by Michael D Joyce Associates LLP. The findings were presented in Report No. 3432, dated February 2014. This latest report comprises an up-date of that report and includes the latest Geo-Insight and Enviro-Insight information. This latest report also includes the results of rotary openhole drilling which was outstanding at the time of the original report. Where still relevant, the findings of the original investigation have been incorporated into this latest report.

1.5 The study has not included checks on services on or adjacent to the site, and no structural or asbestos surveys have been carried out.

2 THE SITE

2.1 The site covers an area of approximately 0.75 hectares. It is located to the South side of Swallow Lane in Golcar, approximately 5 km West of the centre of Huddersfield. The Ordnance Survey National Grid Reference is 409300, 416000. It lies at approximately 240 mAOD in the Northwest of the site, falling gently to around 225 mAOD in the Southeast corner. Figure 1 shows the general site location, whilst figure 2 shows the site in more detail.

2.2 The site was inspected on 31st October 2019. The site is bounded to the North by terraced housing on Swallow Lane, whilst to the West there is more recent housing. To the East is the current Jones Homes Phase 1 Development and to the South are fields.

2.3 The site comprised two discrete parcels of land situated behind the properties on Swallow Lane. The Eastern strip of land comprised an access track from Swallow Lane and a works unit with rough ground to the South and an area where rubbish and building materials have been burnt. Immediately West of the works unit the ground is boggy, which is assumed to be due to poor drainage of surface run-off from the works unit and from land to the West.

2.4 The Western parcel of land is occupied as a builder's yard and is accessed via a locked metal gate. It contains construction materials and plant along with several above ground diesel tanks, two of which appeared to be empty and simply kept at the site.

3 SITE HISTORY

3.1 The following archival Ordnance Survey maps have been examined to trace the past development of the site. These are reproduced in Appendix 7 with the current site boundary superimposed on them. The apparent displacement on the older maps is due to a change in Ordnance Survey co-ordinates.

Scale and Year of Publication			
6" to 1 mile	1854	1:2500	1893
	1892		1907
	1908		1919
	1930		1932
	1938		1961
	1948		1980
	1956		1982
	1969		
1:10,000	1978	1:1250	1993
	1993		1994
	2001		2003
	2010		
	2019		

3.2 The earliest map of 1854 shows the site as undeveloped agricultural land to the South side of Swallow Lane.

3.3 Some of the terraced housing along the Northern boundary is shown on the maps of 1893, which also shows the land to the East to be a cricket ground.

3.4 Over the subsequent years, further housing was built to the North, although the site itself, together with land to the East, South and West remained undeveloped.

3.5 By 1932 the housing mid-way along the Northern boundary had been built, and by 1963, sheds or stables dotted the site. Thereafter the site remained largely unchanged with the housing on Heathwood Drive being built by 1993.

3.6 Due to time and cost constraints, it has not been possible to consult with local history journals and newspapers. This can be carried out if requested at additional cost.

3.7 It is not believed that the study site is of archaeological interest, however, it would be prudent to make enquiries with West Yorkshire Archaeology Service.

4 GEOLOGY AND MINING

4.1 Geology

4.1.1 Maps of the British Geological Survey (BGS), in particular 1:10,560 sheet 246 SW and 1:50,000 sheet 77 show the site to be underlain by the Huddersfield White Rock, of the Carboniferous Millstone Grit Series.

4.1.2 The sandstone can be expected to have weathered to a gravelly sand or sandy gravel in the near surface. There are no Drift deposits shown on the geological maps, which also show the site to be free of faulting.

4.2 Mining

4.2.1 The geological maps show the conjectured position of the outcrop of the Upper Meltham Coal to lie just to the North side of Swallow Lane. The seam dips away from the site in a Northerly direction. However, as discussed later in this report, this seam has been encountered towards the middle of Phase 1 of the site, but was found to be unworked.

4.2.2 The geological memoir for Huddersfield published in 1930 states that "*in this district the Upper Meltham Coal becomes of some importance and has been worked in the past on Pole Moor, where however it was stated seldom to exceed 1ft (0.3m) in thickness".* Pole Moor is approximately 1½ km to the West.

4.2.3 An up to date report has been obtained from the Coal Authority, and is reproduced in full in Appendix 8. It states that there has been no recorded mining beneath the site.

4.2.4 The report makes no mention that shallow unrecorded workings might be present. The Coal Authority holds no record of any notice or subsidence claim having been made, and there are no opencasts recorded in the immediate vicinity.

4.2.5 No shaft or adits are reported on, or within 20m of the site boundary. Although old unrecorded mine entries might be present on the site, these are considered very unlikely. No past, present or future opencasts are reported within the vicinity of the site.

4.3 GroundSure Geo-Insight

4.3.1 A GroundSure Geo-Insight Report has been obtained for the site and is reproduced in Appendix 6. The report is based on the British Geological Survey (BGS) geological maps, GroundSure data and miscellaneous other geological sources.

4.3.2 None of the following are recorded beneath the site.

Feature
Records related to the permeability of superficial ground
Records of landslips
Artificial Ground / Made Ground beneath the site
Superficial Ground / Drift Geology beneath the site
Faults within 500m of the site
Historical Underground Working Features
Current Ground Workings
Historical Mining
Coal Mining
Shallow Mining within 150m
Non-Coal Mining Cavities
Natural Cavities
Brine Extraction
Gypsym Extraction
Tin Mining
Clay Mining

In respect of natural ground subsidence, the BGS reports the following risk ratings.

Hazard	Risk
Shrink-Swell Clay	Very Low
Landslide	Low
Ground Dissolution of Soluble Rocks	Negligible
Compressible Deposits	Negligible
Collapsible Deposits	Very Low
Running Sand	Negligible

5 HYDROGEOLOGY AND FLOODING

Hydrogeology

5.1 The Millstone Grit Series occurs throughout the industrialised areas of West and South Yorkshire. It comprises a thick sequence of faulted rocks characterised by the repeated sequence of predominantly sandstone, with mudstone, siltstone, seatearth and rare coals.

5.2 Since April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive.

5.3 The aquifer within the bedrock deposits is designated as Secondary A. This is described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

5.4 Details provided by the Environment Agency in the GroundSure Enviro-Insight report, indicate there to be no licensed surface water or groundwater abstraction points within at least 1km of the site.

Flooding

5.5 There are no open watercourses in the immediate vicinity of the site, and according to data supplied by the Environment Agency in the GroundSure Enviro-Insight report, the site is not at risk from flooding.

6 GROUNDSURE ENVIRO-INSIGHT REPORT

6.1 A GroundSure Enviro-Insight Report has also been commissioned for this site. None of the following features are recorded within 250m of the centre of the site. Full details are given in Appendix 6.

Authorisations, Incidents and Registers
IPC Authorisations IPPC Authorisations Water Industry Referrals (potentially harmful discharges to the public sewer) Red List Discharge Consents (potentially harmful discharge to controlled waters) List 1 Dangerous Substances Inventory sites List 2 Dangerous Substances Inventory sites Part A (2) and Part B Activities and Enforcements Category 3 or 4 Radioactive Substances Authorisations Licensed Discharge Consents Planning Hazardous Substance Consents and Enforcements COMAH and NIHHS sites (within 500m) Environment Agency Recorded Pollution Incidents Sites Determined as Contaminated Land under Part IIA EPA 1990

Landfill and Other Waste Sites
Environment Agency Registered landfill Sites Landfill Data – Operational Landfill Sites Environment Agency Historic Landfill Sites Landfill Data – Non-Operational Landfill Sites BGS/DoE Landfill Site Survey GroundSure Local Authority Landfill Sites Data Operational Waste Treatment, Transfer and Disposal Sites Non-Operational Waste Treatment, Transfer and Disposal Sites Environment Agency (REGIS) Waste Sites

Current Land Uses
Records of Petrol and Fuel Sites Underground High Pressure Oil and Gas Pipelines

Hydrogeology and Hydrology
Groundwater Abstraction Licences Surface Water Abstraction Licences Potable Water Abstraction Licences Source Protection Zones within 500m Environment Agency information on river quality Main Rivers Surface water features

Flooding
Environment Agency indicative Zone 2 floodplains within 250m Environment Agency indicative Zone 3 floodplains within 250m Flood Defences within 250m Areas benefiting from Flood Defences within 250m Areas used for Flood Storage within 250m

Designated Environmentally Sensitive Sites
Sites of Special Scientific Interest (SSSI) National Nature Reserves (NNR) Local Nature Reserves (LNR) Special Areas of Conservation (SAC) Special Protection Areas (SPA) Ramsar sites World Heritage Sites Environmentally Sensitive Areas Outstanding Natural Beauty (AONB) National Parks Nitrate Sensitive Areas Ancient Woodlands

6.2 The GroundSure Enviro-Insight Report is based upon known, published information and may not comprise a complete record of all features of relevance. An explanation of the datasets used is available on request.

6.3 It should be noted that due to time constraints the Local Authority has not been contacted, nor has the Petroleum Licensing Officer as former fuel tanks are not suspected.

7 CONTAMINATED LAND

7.1 There is no visibly contaminated material on the surface of the site, nor is there any distressed vegetation suggestive of significant or serious contamination.

8 RADON

8.1 According to the GroundSure Geo-Insight report the site lies in an area where between 1% and 3% of homes are above the action level recommended by the Health Protection Agency. However, radon protective measures are not necessary according to the BGS data provided in the GroundSure report and as described in Building Research Publication BR 211.

9 THE INVESTIGATION

9.1 The investigation was designed to provide preliminary information on ground and groundwater conditions on the site, together with identifying potential areas of contamination. The investigation was undertaken in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001 and under the full-time supervision of a Fellow of the Geological Society from Michael D Joyce Associates LLP.

9.2 The original ground investigation was carried out on 22nd and 23rd January 2014 and comprised trial pitting and window sampling. The latest investigation was carried out between 31st October 2019 and 22nd November 2019. The exploratory positions are shown on figures 2 and 3.

9.3 The trial pitting consisted of excavating a number of trial holes using a mechanical excavator. In-situ permeability tests were then carried out. On completion, the excavations were backfilled with the arisings.

9.4 The window sampling consisted of driving a series of 1m and 2m long tubes into the ground using a dropping weight. On completion of each run, the tube was withdrawn. The next tube was then inserted and the process repeated to provide a continuous profile of the ground. On each run the tube diameter was reduced in order to assist in its recovery.

9.5 It was also possible to carry out Standard Penetration Tests using the window sampling equipment, which has the same specification as a conventional cable percussive SPT. On completion the boreholes were backfilled with arisings.

9.6 The rotary drilling was carried out using a Beretta T25 rig and using a water flush technique. The openhole technique meant that logging was carried out by inspecting the arisings that were brought to the surface in the water flush. On completion the boreholes were backfilled with arisings and bentonite.

10 STRATA PROFILE

10.1 The full exploratory window sampling borehole records are presented in Appendix 1. The trial pit records are presented in Appendix 2 and the rotary borehole logs in Appendix 3. These give full strata descriptions based on visual identification and are in accordance with the requirements of BS EN ISO 14688-1:2002 "Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 1", BS EN ISO 14688-2:2004 "Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 2", and BS EN ISO 14689-1:2003 "Geotechnical Investigation and Testing - Identification and Classification of Rock - Part 1". The findings of the original investigation have also been included.

10.2 The boreholes and trial pits generally encountered a variable thickness of topsoil ranging from 200mm to 700mm, although generally around 200mm thick. In borehole WS10 the topsoil contained occasional brick fragments. Borehole WS11 encountered 200mm of rough concrete and tarmac overlying 300mm of gravelly clay with ash and clinker.

10.3 Borehole WS13 and WS14 encountered 400mm and 200mm of clay containing brick, concrete and sandstone.

10.4 The topsoil and Made Ground overlaid in places a firm becoming stiff brown and orange mottled slightly silty slightly gravelly clay. The gravel comprised pieces of mudstone, sandstone and a little coal. Within this clay SPT 'N' values ranged from N = 20 to N = >30, indicating a firm to stiff material, albeit with a high content of gravels. However, over much of the site the topsoil and Made Ground was underlain by an orange-grey and brown clayey sand with sandstone fragments.

10.5 The majority of the boreholes terminated on a hard stratum of sandstone between 0.6m and 2.0m depth.

10.6 All five trial pits also terminated in competent sandstone bedrock, comprising a very weak to weak, thinly laminated to thickly bedded, fine to medium grained sandstone.

10.7 All the exploratory window sampling boreholes and trial pits were dry on completion.

10.8 The rotary boreholes encountered a sequence of sandstone and mudstone to a maximum proven depth of 25m. A thin band of weathered 'dirty' coal was encountered in the near surface. This coal was intact and measured only 0.4m to 0.5m in thickness. It was also underlain by a 0.1m thick band of coal, which was also intact.

10.9 There was no evidence of voids or broken ground, and the flush return was good throughout the drilling.

10.10 Borehole R4 encountered possible Made Ground to 1.8m depth. However, due to the logging being based on small arisings, this depth should be treated with caution.

10.11 There was no unusual colouration or odours to any of the soils encountered during the investigation and no obvious visual evidence of contamination, such as asbestos, was found during the investigation.

10.12 It should be noted that lateral and vertical changes can occur between exploratory points and care is needed when extrapolation is used. This is particularly true of the Made Ground which, by its nature, can be very variable in its physical and chemical composition.

11 IN-SITU AND LABORATORY TESTING

11.1 In-Situ Gas Monitoring

11.1.1 Methane is the dominant constituent of landfill gas, and can form an explosive mixture in air at concentrations of between 5% and 15%. Thus 5% methane in air is known as the Lower Explosive Limit (LEL). Concentrations less than this do not normally ignite. Carbon dioxide can also be a potential problem, especially where it occurs in concentrations greater than 1.5%.

11.1.2 In-situ gas tests were carried out in the boreholes on completion. Testing was with a portable meter, which measures the methane content as its percentage volume in air. The corresponding oxygen and carbon dioxide concentrations are also measured.

11.1.3 No methane, carbon monoxide or hydrogen sulphide gases were detected in any of the boreholes. Carbon dioxide ranged from zero to 0.6% by volume.

11.1.4 In order to monitor over the longer term, gas monitoring standpipes were installed in windows sample boreholes WS9, WS11 and WS12. These comprise slotted uPVC pipework surrounded by single sized gravel to between 1.0m and 2.0m depth. The top 0.5m of pipework is not slotted and is surrounded by bentonite pellets to seal the boreholes. Valves were fitted and the installations protected by lockable stopcock covers fitted flush with the ground.

11.1.5 The risks associated with the gases have been considered in accordance with British Standard BS 8485:2015 “Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments”, CIRIA report C665, “Assessing Risks Posed by Hazardous Ground Gases to Buildings” and NHBC Report No. 4 “Guidance on

Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present". To date, two monitoring visits have been made. No methane, carbon monoxide or hydrogen sulphide gases have been detected. Carbon dioxide is low, ranging from 0.1% to 2.4%, with no flows recorded.

11.2 In-Situ Strength Testing

11.2.1 MEXE Cone Penetrometer tests were carried out in the trial pits in order to assess the strengths of the sub-soils, and California Bearing Ratio (CBR) as follows:

Material	**CBR (%)**	
	Range	**Typical**
Firm to stiff silty sandy gravelly CLAY.	1 - >5	1.5 – 2.0

11.3 Soakaway Testing

11.3.1 Permeability testing was carried out in trial pits in accordance with BRE Digest 365: Soakaway Design. This involved filling the trial pits with water and recording the fall in water level over a period of time.

11.3.2 Testing in trial pits TP1 and TP2 was carried out during the original investigation, with testing in trial pits TP3, TP4 and TP5 during this latest investigation.

11.3.3 Negligible falls in water level were recorded in trial pits TP1, TP2 and TP3 indicating very low permeabilities.

11.3.4 Trial pits TP4 and TP5 however, did perform satisfactorily, recording Soil Infiltration Rates of 1.3×10^{-5} m/s and 1.5×10^{-5} m/s respectively.

11.4 Geotechnical Laboratory Testing

The soil testing was carried out to BS1377:1990 Methods of Test for Soils for Civil Engineering Purposes. Testing was carried out by Envirolab of Cheshire to UKAS accredited procedures. The full results are presented in Appendix 4.

11.4.1 Plasticity Tests

Atterberg Limits Classification tests were attempted on samples of the silty sandy gravelly clay, but the high granular content prevented the determination of plasticity.

The clays are likely to be Glacial Till, which is known to exhibit low to moderate to high swelling and shrinkage properties and to be potentially frost susceptible. For design purposes, it is therefore recommended that a medium volume change potential is assumed.

11.4.2 Sulphate and Acidity Tests

Chemical tests were carried out on representative samples of the sub-soils in order to determine their water soluble content and acidity.

Contamination testing recorded negligible to low water soluble sulphate contents, ranging from <0.01 g/l to 0.24 g/l, and acidic to neutral pH values, with the exception of two alkaline results obtained from samples of Made Ground at boreholes WS6 and WS13.

11.4.3 Calorific Value

The coal encountered in the near surface was tested as part of the Phase 1 Investigation, and was found to have Calorific Values of 9.7 MJ/kg and 11.0 MJ/kg.

11.5 Contamination Testing

Rationale

11.5.1 The investigation and sampling was under the full time direction of a Fellow of the Geological Society. All the recovered soil samples were screened on site for any visual or olfactory evidence of contamination including the presence of VOCs. Samples were selected from the trial pits and window sample boreholes on the basis of those which were most likely to be contaminated and those which gave the most appropriate indication of the spread of any contaminants. The samples were stored in both glass and plastic containers and kept in cooled conditions. Testing was carried out by Envirolab of Cheshire to UKAS accredited procedures in accordance with MCERTS performance standards.

11.5.2 The aim of this was to make a preliminarily assessment of the level of any contamination on the site in order to determine if there was any significant risk associated with contaminants in respect of both human health and the environment, including controlled waters.

11.5.3 Standard Appendix B attached to this report discusses the methodology for the assessment of contamination and should be read in conjunction with the comments overleaf.

11.5.4 The Contaminated Land Report (CLR) series of documents have been produced by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency, to provide regulators with "relevant, appropriate, authoritative and scientifically based information and advice on the assessment of risk from contamination in soils".

11.5.5 The Environment Agency has issued a number of Soil Guideline Values (SGVs) which, whilst non-binding, may be used as guidance in the assessment of land and in setting remediation targets. They should only be applied to human health assessments.

11.5.6 The SGVs have been derived using the Contaminated Land Exposure Assessment Model (CLEA) and are based on assumptions relating to soil conditions, pollutant type and behaviour, land use patterns and the availability of receptors. SGVs are also subject to statistical assessment. The CLR documentation requires that the results of laboratory testing are subject to statistical analysis to remove uncertainty over a so-called 'averaging area'.

11.5.7 To date selective SGVs have been issued for the following land-uses as follows;

- Residential with and without plant uptake (SGVres)
- Allotments
- Commercial/Industrial (SGVcomm)

11.5.8 DEFRA previously issued “Outcome of the Way Forward Exercise on Soil Guideline Values”. This document was intended to provide guidance to determine if there is a

Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

11.5.9 In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

11.5.10 It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

11.5.11 In April 2012, Defra published new Statutory Guidance which forms a major part of their contaminated land regimes under Part 2A of the Environment Protection Act 1990. The regime provides a means of dealing with contaminated land which poses a significant risk to human health or the environment where there is no alternative solution. It also works alongside planning rules and building regulations to help ensure that affected land is made suitable for use when it is redeveloped.

11.5.12 Since the regime was first introduced in 2000 there has been considerable uncertainty over how to decide when land is, and is not, contaminated land on grounds of the

legal test of *significant possibility of significant harm to human health or the environment*.

11.5.13 To help address this, one of the main changes set out in the new Statutory Guidance, is the introduction of a new four category test to help decide when land is, and is not, contaminated land on grounds of *significant possibility of significant harm to human health*. Under the new four category test:

- Category 1 describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.

- Categories 2 and 3 cover less straightforward land where more detailed consideration is needed before the regulator can decide either: (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or (b) that such a case does not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.

- Category 4 describes land that is clearly not contaminated land, as discussed below.

11.5.14 One of the main purposes of including the Categories in the Statutory Guidance is to provide a legal framework against which new technical tools can be developed by the land contamination sector to describe the Categories in more detail with regard to specific substances and/or situations.

11.5.15 The new Category 4 test is particularly important in terms of reducing uncertainty over when land is definitely not caught by the regime.

11.5.16 The new Statutory Guidance makes clear what land should be placed into Category 4,

for example:

(a) Land where no relevant contaminant linkage has been established.

(b) Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise. In other words land with normal background concentrations in the soil.

(c) Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.

(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed to in the normal course of their lives).

11.5.17 The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

3.27 It is common practice in contaminated land risk assessment to use "generic assessment criteria" (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work may be warranted.

3.28 Local authorities may use GACs and other technical tools to inform certain decisions under the Part 2A regime, provided: (i) they understand how they were derived and how they can be used appropriately; (ii) they have been produced in an objective, scientifically robust and expert manner by reputable

organisations; and (iii) they are only used in a manner that is in accordance with Part 2A and this Guidance.

3.29 GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regard to such GACs:

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

11.5.18 The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

Results

11.5.19 The following range of results was obtained and the full results are presented in Appendix 5.

Soils

Analyte	Concentration Range (mg/kg)		SGV Concentration for Residential Use (mg/kg)
Arsenic	<1	56	37 (3)
Cadmium	<0.5	0.7	22 (3)
Chromium (vi)	<1	<1	21 (3)
Copper	9	105	2330 (1)
Mercury	<0.5	1.1	170 (2)
Nickel	6	20	130 (2)
Selenium	<1	2	350 (2)
Lead	10	531	200 (3)
Zinc	18	157	3750 (1)
Phenol	<0.2	1.1	420 (2)
Benzo(a)pyrene	0.11	49.9	5.0 (3)
Dibenzo(a,h)anthracene	<0.04	6.4	0.9 (1)
Naphthalene	<0.03	4.3	8.7 (1)
Fluorene	<0.01	11.9	780 (1)

(1) *Values derived by LQM/CIEH "Generic Assessment Criteria for Human Health Risk Assessment" 2009. For organics a SOM of 2.5% assumed.*

(2) *Latest SGV published in 2009.*
< indicates below the limit of detection.

(3) *C4SL published 2014.*

11.5.20 The vast majority of the results fell below their respective C4SLs and SGVs. Samples from boreholes WS6 and WS13 contained elevated levels of Polyaromatic Hydrocarbons and may be a localised fuel or oil spillage. In addition, the sample from borehole WS11 contained slightly elevated levels of arsenic and lead, recording 56 mg/kg and 531 mg/kg respectively. It is notable that all three samples were of an area of Made Ground located towards the Eastern boundary of the site. In addition, all the samples were screened for the presence of asbestos, but none were found.

12 GEOENVIRONMENTAL RISK ASSESSMENT

Conceptual Site Model

12.1 A quantitative health and environmental risk assessment has been carried out as part of this assessment. The process of risk assessment is set out in Part IIA of the Environment Protection Act 1990 and amended in part by The Water Act 2003. This defines contaminated land as *"any land which appears to the local authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that there is a significant possibility of significant harm being caused, or that significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused".*

12.2 The Act introduces the concept of a pollution linkage. This linkage consists of a pollution (contaminative) source or hazard and a receptor, together with an established pathway between the two. For land to be contaminated, a pollution linkage (hazard-pathway-receptor) must exist. This forms a so-called 'conceptual model' of the site.

12.3 Examples of pathways and effects from land contamination (after PPS 23) are given below, and these are illustrated on figure 5.

12.4 Human Health (Pathways 1-5, Receptors A – C)

Uptake of contaminants by food plants grown in contaminated soil - Uptake will depend on the concentration of a contaminant in soil, its chemical form, soil pH, plant species and prominence in diet.

Ingestion and inhalation - Substances may be ingested directly by young children playing on contaminated soil, or by eating plants which have absorbed metals or are contaminated with soil or dust. Ingestion may also occur via contaminated water supplies. Metals and some organic material substances may be inhaled from dusts and soils. Land gas, radon and volatile organic compounds can be inhaled directly.

Skin contact - Soil containing tars, oils and corrosive substances may cause irritation to the skin through direct contact. Some substances (e.g. phenols) may be absorbed into the body through the skin or through cuts and abrasions.

Irradiation - As well as being inhaled and absorbed through the skin, radioactive materials emitting gamma rays can cause a radiation response.

Fire and explosion - Materials such as coal, coke particles, oil, tar, pitch, rubber, plastic and domestic waste are all combustible. Both underground fires and biodegradation of organic materials may produce toxic or flammable gases. Methane and other gases may explode if allowed to accumulate in confined spaces.

12.5 Buildings (Pathways 7 and 8)

Fire and explosion - Underground fires may cause ground subsidence and cause structural damage. Accumulations of flammable gases in confined space leads to a risk of explosion. Underground fires may damage services.

Chemical attack on building materials and services - Sulphates may attack concrete structures. Acids, oils and tarry substances may accelerate corrosion of metals or attack plastics, rubber and other polymeric materials used in pipework and service conduits or as jointing seals and protective coatings to concrete and metals.

Physical - Blast-furnace and steel-making slag (and some natural materials) may expand. Degradation of fills may cause settlement and voids in buried tanks and drums may collapse as corrosion occurs or under loading.

12.6 Natural Environment (Pathway 6, Receptors D - E)

Phytotoxicity (prevention/inhibition of plant growth) - Some metals essential for plant growth at low levels are phytotoxic at higher concentrations. Methane and other gases may give rise to phytotoxic effects.

Contamination of water resources - Soil has a limited capacity to absorb, degrade or attenuate the effects of pollutants. When this is exceeded, polluting substances may enter into surface and groundwaters.

Ecotoxological effects - Contaminants in soil may affect microbial, animal and plant populations. Ecosystems or individual species on the site, in surface waters or areas affected by migration from the site may be affected.

12.7 For any contaminant source identified, judgement is used regarding the probability of a pollution linkage occurring and the potential consequences of that linkage. Based on the probability and likely consequences, the overall risk (significance) can be established. The definitions that have been used for this purpose are given in Standard Appendix B. The probability of a hazard, combined with its consequences, can be used to assess risk. This forms the so-called Conceptual Site Model.

Sources

12.8 The site has largely remained undeveloped with the exception of the small parcel of land which was occupied by a builder's yard which included construction materials and several above ground diesel tanks.

12.9 Reference has been made primarily to DEFRA publication CLR8 'Potential Contaminants for the Assessment of Land' and the relevant DOE Industry Profiles to identify the typical contaminants associated with the past industrial use.

Risk Assessment based on Conceptual Site Model

Summary of Hazards, Pathways and Receptors

Source	Potential Pollutant	Pathways	Receptor	Risk (1)
Potential contaminated Made Ground. **Possible past minor spillages and metals.**	Oils, fuels (diesel), grease, hydraulic fluid, metals, asbestos.	1 - 5	A. Present Occupants.	**Low Risk.**
			B. Groundworkers.	**Low Risk** involved with excavation work, providing personnel adopt suitable precautions, together with washing facilities.
			C. Future Occupants.	**Low Risk.**
		6	D. Controlled Waters.	**Low Risk.**
			E. Ecosystems.	**Low Risk.**
		7	F. Building Materials and Services.	**Low Risk.** Install pipes in clean bedding materials. Adequate precautions to be taken in respect of buried concrete.
Organic Material.	Landfill Gases, Radon, VOCs, SVOCs.	8	A - F	**Low Risk.** Low values of ground gases present during the investigation. Gas monitoring is on-going and will be reviewed on completion.
Waste materials.	Fly-tipping.			Any waste materials to be removed from site.

(1) See Standard Appendix B. *The risk ratings are based on the results of the investigation, assumes that the remedial measures proposed in section 13 are applied.*

Pathways and Receptors

12.10 The principal receptors are groundworkers, future residents and controlled waters (Receptors B, C and D). However based on the past history of the site and laboratory testing to date, the probability of contamination being present sufficient to affect the identified receptors is considered to be a low risk.

12.11 The overall risk is assessed to be low. At this stage it is not considered that there is likely to be any significant risk and further intrusive investigation in respect of contamination is not considered to be necessary.

12.12 With any site, the possibility of contaminants being present, sufficient to cause significant harm cannot be entirely precluded without extensive intrusive investigation, sampling and testing since it is not always possible to determine if contaminants have been tipped on the site, or have seeped into the ground, or have migrated below the ground onto the site from adjacent pieces of land. However, based on the investigation carried out to date, this is considered unlikely.

12.13 It is recommended that if during construction any suspicious or unusual odours, colours, liquids or soils are uncovered, these should be brought to the attention of Michael D Joyce Associates LLP and appropriate advice sought.

13 RECOMMENDATIONS

13.1 It is proposed to redevelop the site for residential purposes. At present there do not appear to be any major geotechnical constraints to developing this site. However, there are a number of aspects that need to be taken into consideration when assessing the feasibility and design of this scheme.

13.2 Foundation Criteria

Normal Strip Footings

13.2.1 Normal strip footings will be suitable for the new houses. They will have to be sited below any Made Ground and original topsoil still remaining after site clearance, and founded upon the underlying firm or firm to stiff clay. This clay can be expected to exhibit moderate swelling and shrinkage properties. In order to allow for seasonal variations in the moisture content of this clay, foundation levels should be at least 1.0m below groundlevel. At this depth, for foundations sited upon the firm clay, allowable bearing pressures of up to 100kN/m^2 can be adopted. It would also be prudent to lightly reinforce the footings.

13.2.2 All foundation excavations must be inspected to ensure that no footings are sited upon any weak Made Ground, softer clays or other such weak materials that would be incapable of safely sustaining the applied foundation loads. This will be particularly important wherever any appreciable amounts of Made Ground occur. As discussed previously, an area of deeper Made Ground may occur around borehole R4. Wherever any suspect ground is encountered at proposed foundation level, then that footing must be deepened until a satisfactory bearing medium is obtained. Should the coal seam be encountered in excavations for foundations or service trenches, it

should be blinded with lean mix concrete to prevent its spontaneous combustion. For the same reason, no footings should be founded directly on it. Instead the excavations should be deepened to below the base of the coal seam. These are subject to the recommendations made in Section 13.12.

13.3 Building Near Trees

13.3.1 Wherever any houses are located near existing or proposed new trees, their foundations must be sited below the root growth zone. Reference should therefore be made to the NHBC Standards Chapter 4.2 "Building Near Trees", which gives guidance on foundation criteria, depths and construction. All services will also have to be similarly protected.

13.4 Landfill and Radon Gas

13.4.1 The site is not in an area where radon protection measures are required for new properties, and no elevated levels of ground or landfill gases have been found on the site. Nevertheless, in view of the presence of the coal seam and in accordance with good practice, it would be prudent to incorporate basic gas protection measures in the new houses.

13.4.2 If suspended concrete beams and block ground floors are adopted for the houses, it is recommended that as with Phase 1, a layer of Visqueen 1200 gauge membrane or equivalent is laid over the concrete blocks and covered by a concrete screed.

13.4.3 Any void spaces beneath ground floors must be well ventilated both internally and externally with closely spaced air-bricks. Sleeper walls should either be of honeycomb structure or contain sufficient openings to ensure a through draught. Air-bricks must

be placed at the top of the void space and not allowed to become blocked by soil or vegetation. They should be lined or cased through cavity walls.

13.4.4 The Building Research Establishment Report BR414 "Protective Measures for Housing on Gas Contaminated Land", and British Standard BS8485: 2015 "Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings" both give construction advice for preventing gases entering buildings, the principles of which are incorporated in the above recommendations. Advice is also given in respect of sealing services where they pass through impermeable membranes.

13.5 Existing Drains and Services

13.5.1 Drains and possible buried service channels may possibly lie around parts of the site. It will be necessary therefore to ensure that any footings for the new buildings are not sited directly over any of them, as they could eventually collapse and cause loss of strength to the foundation stratum.

13.5.2 Wherever any redundant drains and other services channels are likely to underlie building foundations, they must be dug out and replaced by lean mix concrete, or compacted hardcore. Alternatively, long drainage runs can be grouted up, particularly where their alignments are uncertain but care is needed to ensure that no grout enters any live services. In the case of roads, they should be dug out and the areas infilled by properly compacted fill.

13.6 Road Construction

13.6.1 The new road should conform to the specifications of a Type A1 Road, up to 5.5m wide, in accordance with the former West Yorkshire County Council "Highways Design Guide", which continues to be implemented by the district council.

13.6.2 The subgrade will comprise firm to stiff clay. The MEXE Cone Penetrometer tests recorded typical in-situ CBRs of 1½% to in excess of 5% for these clays.

13.6.3 In some places Made Ground will underlie the new carriageway. This should be dug out to a depth of 0.75m and replaced by suitable, non-frost susceptible materials, laid in properly compacted layers to formation level.

13.6.4 It is recommended that a design CBR of 2% be adopted for this new road. This will allow for a reasonable construction thickness on top of the subgrade, as well as for any isolated weaker areas of the clays. A Type A1 Road for less than 50 properties will therefore require 350mm of sub-base.

13.6.5 Prior to the application of any sub-base, all subgrades must be checked by proof rolling to ensure that an adequate CBR exists. Where any loose granular or soft clayey areas remain, these must be either dug out and replaced by compacted material or an additional 150mm of sub-base added. This will be especially important wherever trench works for drains, sewers and other services have been carried out. Old foundations should be removed to a depth of 1m below subgrade level to prevent hardspots occurring. It will also be necessary to prevent the deterioration of the subgrade due to the effects of wet weather and the site traffic.

13.7 Sustainable Surface Water Drainage

13.7.1 As parts of this site are underlain by fractured sandstone bedrock, soakaways for carriageway and/or house roof surface water drainage should be feasible in places. Each soakaway will have to be sited in the clean, unweathered zone of the sandstone bedrock, which should be at a reasonable depth. If soakaways are proposed, it will be necessary to carry out further representative tests in order to establish the permeabilities of the sandstone bedrock, and depths of clean unweathered zones at the actual locations of the proposed soakaways. Soakaways should be designed in accordance with BRE Digest 365: *Soakaway Design* and sized so that they discharge the design storm within 24 hours.

13.7.2 No soakaways should be placed within 5m of building foundations, nor should they discharge into Made Ground.

13.8 Excavations and Groundwater

13.8.1 Soft ground plant should prove suitable for most of the excavations.

13.8.2 For all deep excavations in excess of 1.2m where vertical sides are necessary, trench supports should be provided as the soils will not be self-supporting for any appreciable length of time. It would also be prudent to monitor excavations for the presence of explosive or asphyxiating gases.

13.8.3 No groundwater seepages were noted in the near surface. However it should be remembered that trapped groundwater can be released from areas of Made Ground

when they are excavated. In this respect it is considered good practice for ground staff to be equipped with pumping apparatus as a precaution.

13.9 Contamination

13.9.1 Laboratory testing to date has recorded no significant contamination. However, an area of Made Ground was identified in boreholes WS6, WS11, WS13 and trial pit TP2. This Made Ground was found to contain some contamination.

13.9.2 Since the topsoil has been found to be uncontaminated, it is recommended that this be stripped and stockpiled for reuse. Following removal of the topsoil, areas of Made Ground should be removed down to natural ground and the excavated material removed from site, or used as infill inside foundation areas.

13.9.3 In view of the presence of above ground diesel tanks, it is recommended that once these have been removed and the surface stripped, an inspection is carried out in respect of any localised hydrocarbon spillages. If necessary, removal and validation testing may be required.

13.10 Cement and Buried Concrete

13.10.1 The Made Ground and natural soils have been found to contain low levels of soluble sulphates.

13.10.2 In accordance therefore with the Building Research Establishment Special Digest No. 1 "Concrete in Aggressive Ground", a cement in accordance with Group DS-1 Specification can be used for buried concrete, mortar, and pre-cast concrete pipes.

13.11 Sustainable Surface Water Drainage

13.11.1 At this stage the site must be considered unsuitable for soakaways. Three of the five soakaway tests were carried out which were unsuccessful, essentially because fissures were not encountered in the sandstone bedrock. Should such fissures be encountered, soakaways may be suitable, but it will be necessary to be selective as to where soakaways are placed. Where present, fissured sandstone could have a good permeability. It will therefore be necessary to check each proposed soakaway location to assure that an adequate rate of dissipation is achievable.

13.12 Further Investigation and Monitoring

13.12.1 Should any geotechnical or geoenvironmental problems arise on site or if ground conditions are different from those that we predicted, they should be referred back to Michael D Joyce Associates LLP.

A D Joyce

BSc MSc ARSM CEng CGeol CEnv MICE FGS SiLC

November 2019

Procedure Notes

The desk study and/or ground investigation have been carried out using reasonable skill and care in accordance with the principles of Ground Investigation and Testing", BS5930: 2013 and BS10175:2011+A1:2013, and the terms of the client's brief. The report has been prepared for the specific purposes notified at the time of the initial enquiry.

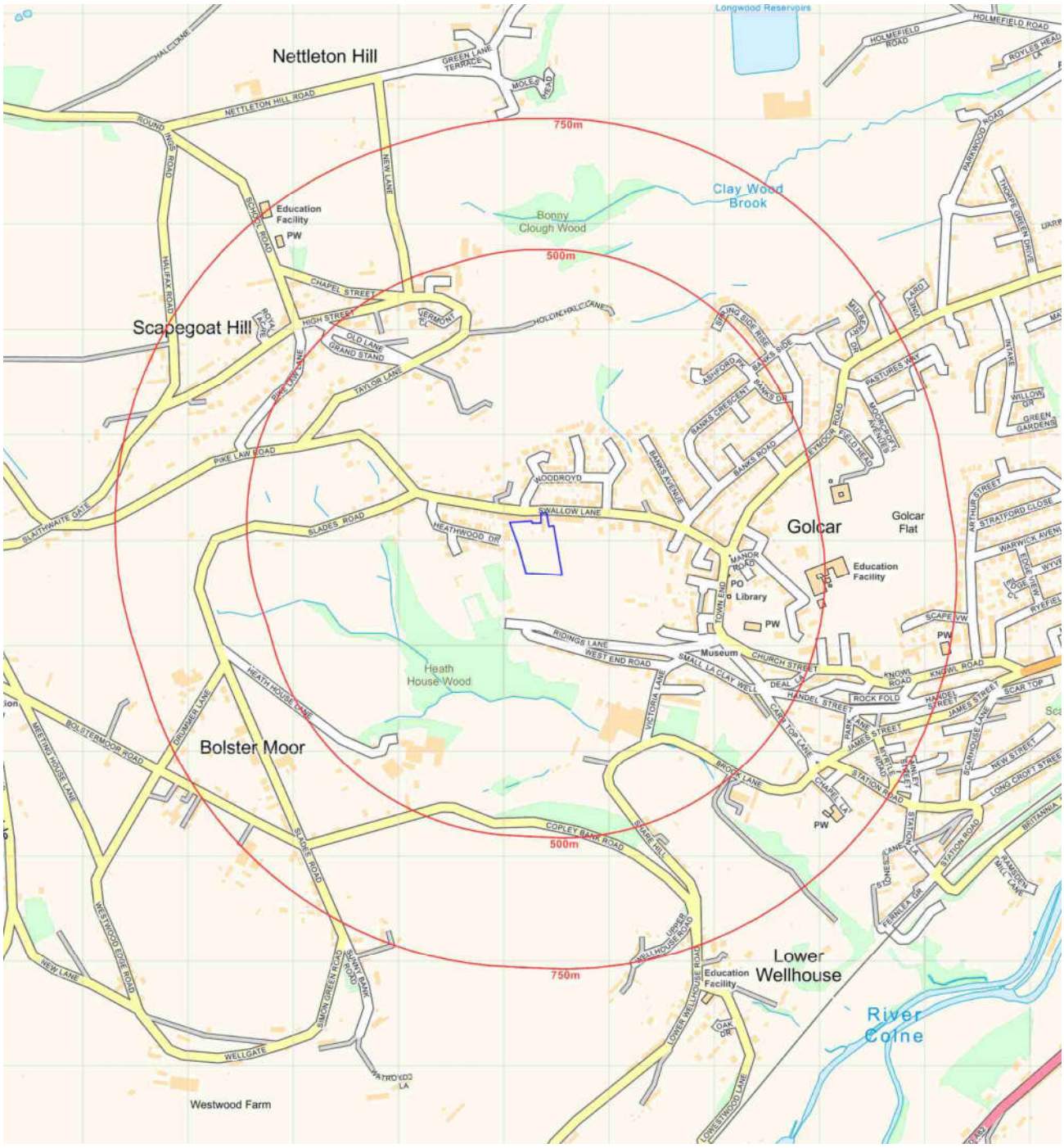
By its very nature any ground investigation only encounters and samples a small percentage of the ground. Consequently changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimize such risks. Conclusions and recommendations are based on the information presented in this report, but unforeseen features may exist. No liability can be accepted for conditions not revealed by the exploratory holes. Therefore, actual ground conditions should be noted during construction and further advice sought if they differ from those predicted. Michael D. Joyce LLP reserves the right to amend the conclusions and recommendations in the light of further information. Actual methods of construction or alternative designs should be notified to Michael D. Joyce Associates LLP, such that the recommendations made can be reconsidered in the light of any changes.

Further investigation can be carried out to further reduce uncertainty and risk but ultimately these risks cannot be eliminated. Similarly a desk study normally only considers readily available information and further information could be held by other sources. In commissioning further research or investigation the cost/benefit of doing so must be considered.

It is assumed that groundlevels will not change significantly from those at present. The groundwater conditions are based on observations made at the time of the investigation, unless stated otherwise. It should be noted that the observations are subject to the method of the boring or excavation and that groundwater levels will vary due to seasonal or other effects.

Where buildings are present on a site, structural and asbestos surveys have not been carried out, unless specifically stated. An Unexploded Ordnance Survey has not been carried out unless specifically stated. In relevant situations it would be prudent to commission such surveys.

Where information has been obtained from Third Parties, no liability can be accepted for the accuracy or completeness of this information. Where anecdotal evidence or speculations are presented, they must be treated as such and cannot be relied upon.



Swallow Lane, Golcar – Phase 2

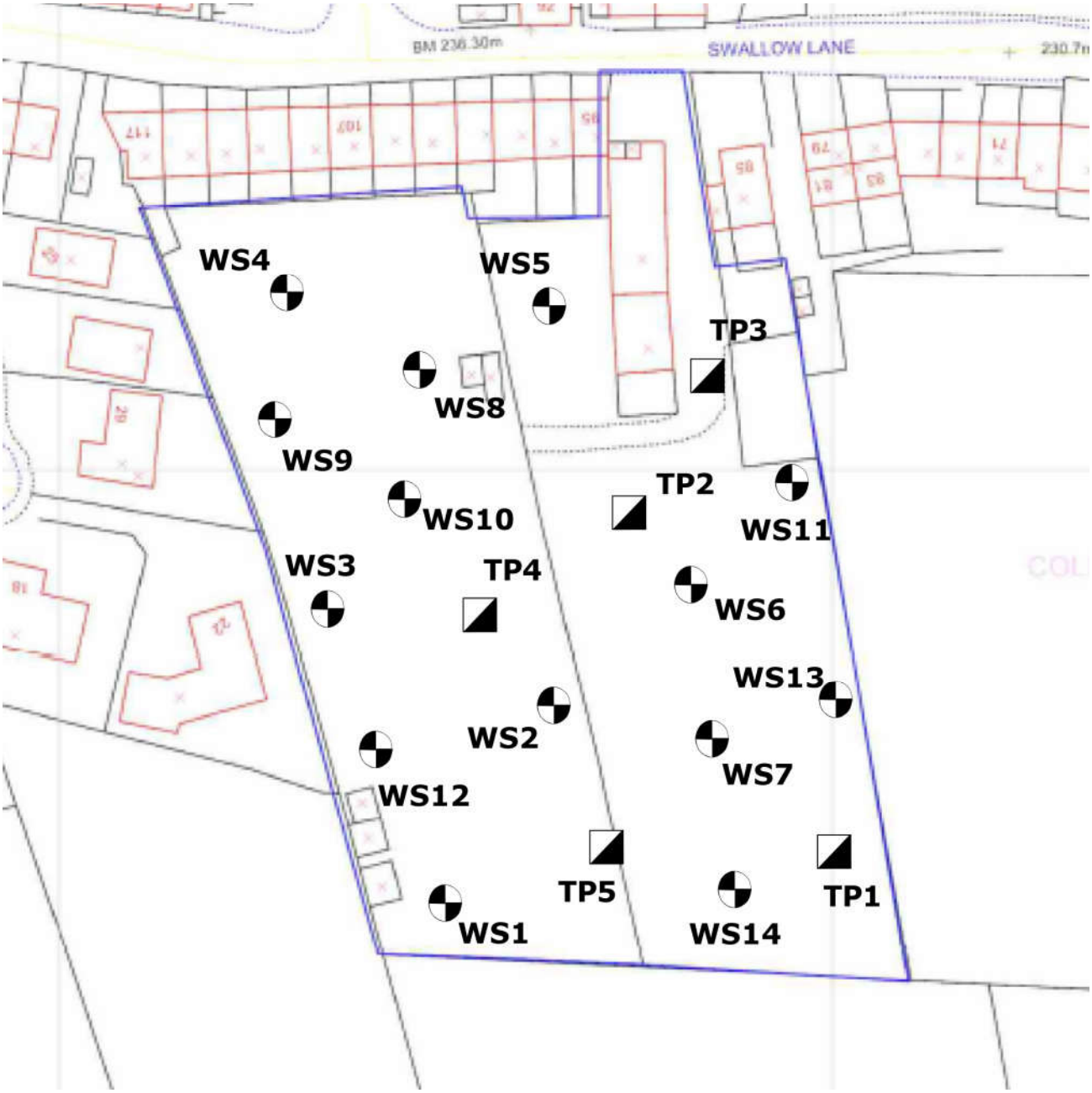
Site Location

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Scale: NTS

Figure: 1



Swallow Lane, Golcar – Phase 2

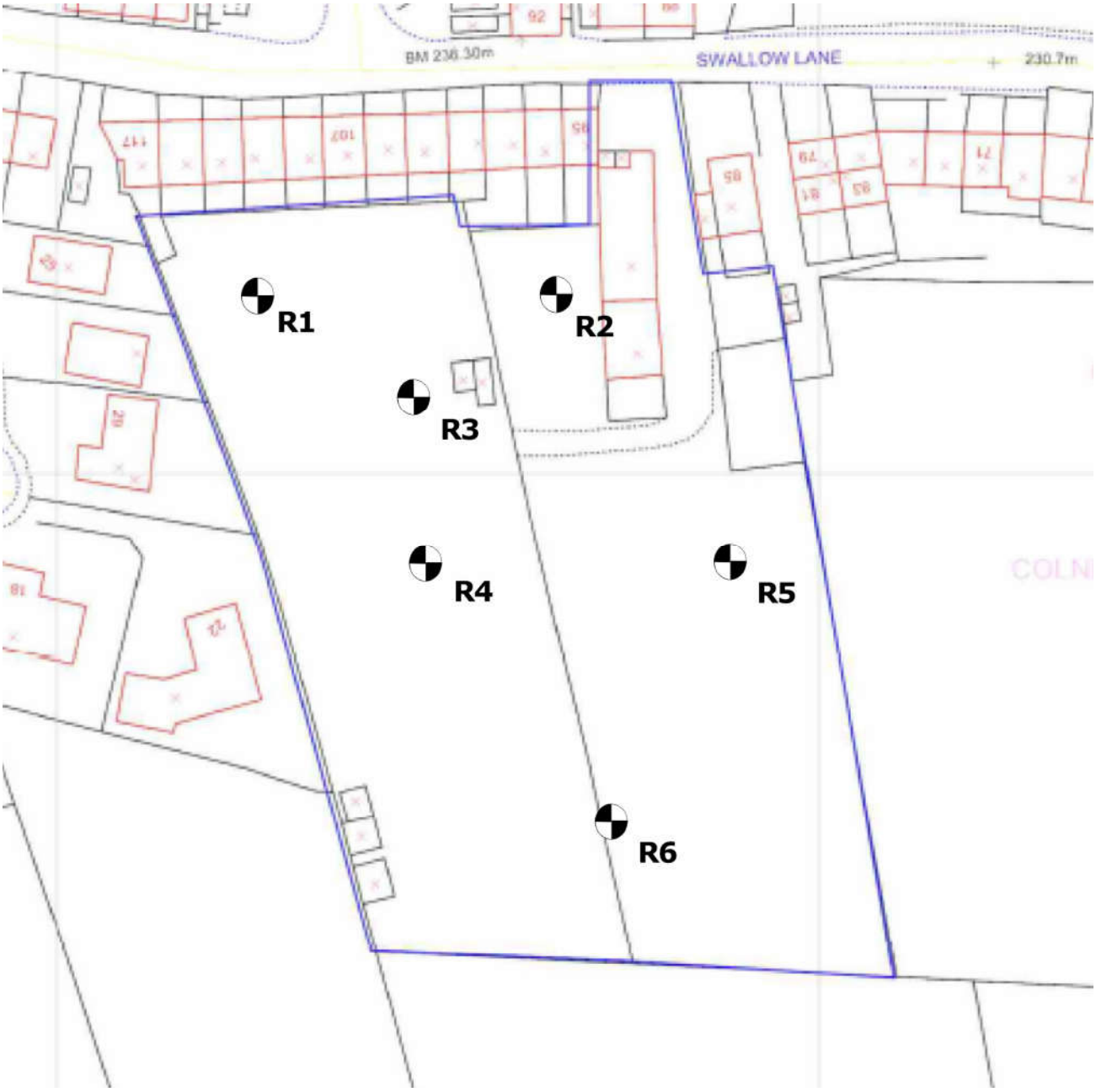
Site Plan with Exploratory Window Sampling Boreholes and Trial Pits

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Scale: NTS

Figure: 2



Swallow Lane, Golcar – Phase 2

Site Plan with Exploratory Rotary Borehole Positions

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Scale: NTS

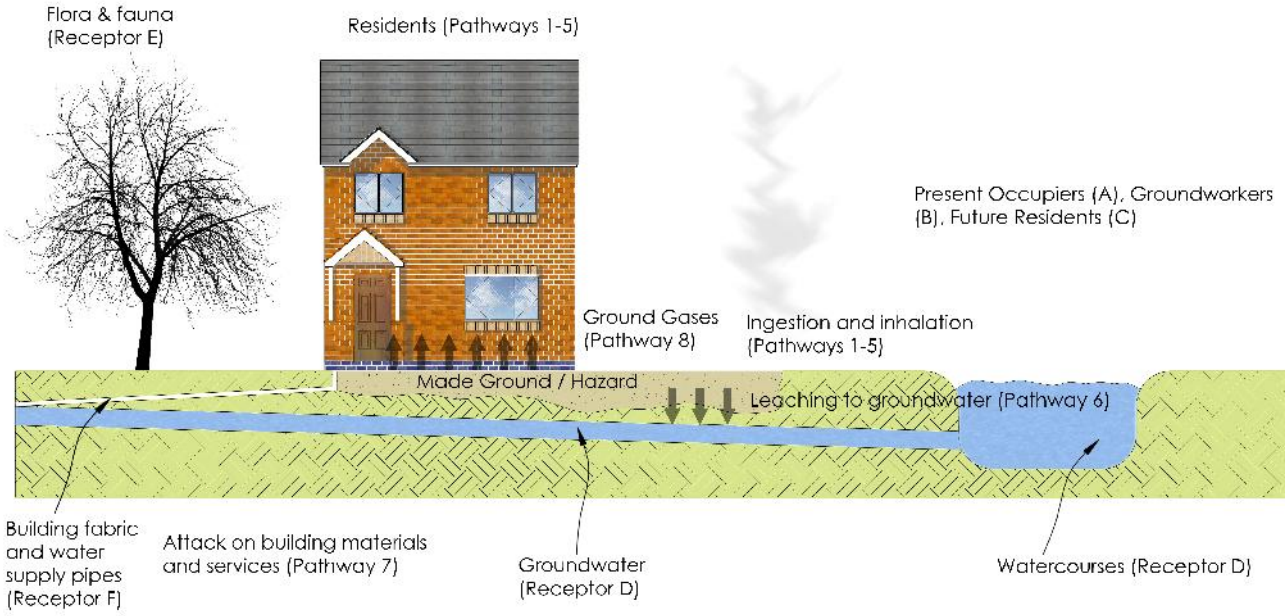
Figure: 3

Swallow Lane, Golcar – Phase 2
Development Proposals

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

Scale: NTS

Figure: 4



Pathways

1. Ingestion of contaminated soil/dust
2. Ingestion of contaminated food
3. Ingestion of contaminated water
4. Inhalation of contaminated vapours
5. Dermal contact with contaminated soil/dust or water
6. Pollution of controlled water and off site migration
7. Attack on building materials and services
8. Migration of landfill gases and radon

Receptors

A. Present site occupiers
B. Site development personnel
C. Future residents
D. Controlled waters
E. Flora and fauna
F. Building and services

Schematic Representation of Conceptual Site Model

Schematic Representation of Conceptual Site Model

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Figure: 5

APPENDIX 1

Window Sampling Records

Site: Swallow Lane [3432]
Location: Golcar, Huddersfield
Method: Dart Rig
Date: 22nd January 2014
Client: Southdale Limited

Window Sampling No: 1

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	Jar			-0.2		Turf over TOPSOIL - Brown slightly organic very slightly sandy clay.	
0.60	Jar			-0.7		Firm dark brown mottled orange and brown slightly sandy, slightly silty gravelly CLAY. Gravel was sub-angular to sub-rounded, fine to medium of sandstone and a little coal. Common rootlets.	
1.00 - 1.45	CPT		N = 21		1	Stiff grey, brown and orange slightly sandy, slightly silty gravelly CLAY. Gravel was sub-angular to sub-rounded, fine to medium gravel of weathered mudstone, sandstone and a little coal.	
1.50 - 1.75	CPT		N = 39	-1.5		End of Borehole	
					2		
					3		
					4		

General: WS1 terminated on hard stratum at 1.50m
Groundwater: Dry on completion
Remarks: Backfilled with arisings on completion

Site: Swallow Lane [3432]
Location: Golcar, Huddersfield
Method: Dart Rig
Date: 22nd January 2014
Client: Southdale Limited

Window Sampling No: 2

Michael D Joyce Associates LLP

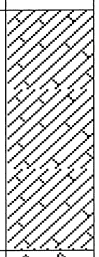
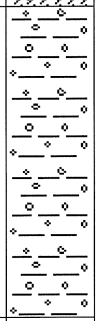
Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						Turf over TOPSOIL - Brown slightly organic very slightly sandy clay. Common rootlets.	
0.20	Jar			-0.2		Firm to stiff pale brown slightly sandy, slightly silty gravelly CLAY. Gravel was sub-angular to sub-rounded, fine to medium gravel of mudstone and a little coal.	
0.80	Jar						
1.00 - 1.45	CPT		N = 20		1		
1.80 - 2.05	CPT		N = >18	-1.8		End of Borehole	
					2		
					3		
					4		

General: WS2 terminated on hard stratum at 1.80m
Groundwater: Dry on completion
Remarks: Backfilled with arisings on completion

Site: Swallow Lane [3432]
Location: Golcar, Huddersfield
Method: Dart Rig
Date: 22nd January 2014
Client: Southdale Limited

Window Sampling No: 3

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	Jar					Turf over TOPSOIL - Brown slightly organic very slightly sandy clay. Common rootlets. NOTE: (Soft ground at surface)	
0.60	Jar			-0.7			
						Medium dense pale yellowish-pale brown mottled orange slightly silty gravelly clayey SAND. Gravel was sub-angular to sub-rounded, fine to medium gravel of sandstone and a little coal.	
1.00 - 1.45	CPT		N = 23		1		
1.60 - 1.90	CPT		N = >35	-1.6			
						End of Borehole	
					2		
					3		
					4		

General: WS3 terminated on hard stratum at 1.80m
Groundwater: Dry on completion
Remarks: Backfilled with arisings on completion

Site: Swallow Lane [3432]
Location: Golcar, Huddersfield
Method: Dart Rig
Date: 22nd January 2014
Client: Southdale Limited

Window Sampling No: 4

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	Jar			-0.2		Turf over TOPSOIL - Brown slightly organic very slightly sandy clay. Common Rootlets.	
0.60	Jar					Medium dense pale yellowish-pale brown mottled orange slightly silty sandy gravelly clayey SAND. Gravel was sub-angular to sub-rounded, fine to medium gravel of sandstone and a little coal.	
1.00 - 1.45	CPT		N = >50	-1	1	End of Borehole	
					2		
					3		
					4		

General: WS4 terminated on hard stratum at 1.0m
Groundwater: Dry on completion
Remarks: Backfilled with arisings on completion

Site: Swallow Lane [3432]
Location: Golcar, Huddersfield
Method: Dart Rig
Date: 22nd January 2014
Client: Southdale Limited

Window Sampling No: 5

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.20	Jar			-0.3		Turf over TOPSOIL - Brown slightly organic very slightly sandy clay. Common rootlets.	
0.90 - 1.15	CPT		N = >21	-0.9		Medium dense pale yellowish-pale brown mottled orange slightly silty sandy gravelly clayey SAND. Gravel was sub-angular to sub-rounded, fine to medium gravel of sandstone and a little coal. NOTE: (Area boggy, recovered soils wet - assumed from surface run-off)	
					1	End of Borehole	
					2		
					3		
					4		

General: WS5 terminated on hard stratum at 0.90m
Groundwater: Area boggy, recovered soils wet.
Remarks: Backfilled with arisings on completion

Site: Swallow Lane [3432]
Location: Golcar, Huddersfield
Method: Dart Rig
Date: 22nd January 2014
Client: Southdale Limited

Window Sampling No: 6

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	Jar			-0.2		Turf over MADE GROUND - Grey-brown slightly organic very slightly sandy, slightly gravelly clay. Gravel was sub-angular to sub-rounded, fine to medium gravel of brick and concrete. Common rootlets.	
0.50	Jar			-0.6		Firm brown very slightly organic, slightly fine sandy CLAY.	
1.00 - 1.45	CPT		N = 37	-1	1	Medium dense brown mottled orange slightly silty sandy gravelly clayey SAND. Gravel was sub-angular to sub-rounded, fine to medium gravel of sandstone and a little coal.	
						End of Borehole	
					2		
					3		
					4		

General: WS6 terminated on hard stratum at 1.0m
Groundwater: Dry on completion
Remarks: Backfilled with arisings on completion

Site: Swallow Lane [3432]
Location: Golcar, Huddersfield
Method: Dart Rig
Date: 22nd January 2014
Client: Southdale Limited

Window Sampling No: 7

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						Turf over TOPSOIL - Brown slightly organic very slightly sandy clay. Common rootlets.	
0.20	Jar			-0.2		Stiff grey, yellow and brown sandy slightly silty gravelly CLAY. Gravel was sub-angular to sub-rounded, fine to medium gravel of sandstone and a little coal.	
0.80 - 082	CPT		N = >50 (Bouncing)	-0.8	1	End of Borehole	
					2		
					3		
					4		

General: WS7 terminated on hard stratum at 0.8m
Groundwater: Dry on completion
Remarks: Backfilled with arisings on completion

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Terrier Rig

Date: 31st October 2019

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 8

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	D			-0.3		TOPSOIL.	
0.90	D					Firm becoming stiff grey and orange sandy CLAY with sandstone fragments.	
1.00 - 1.45	SPT		3,4,6,6,6,9 N=27		1		
				-1.8			
				-2		Brown and orange moderately weathered fine and medium grained SANDSTONE.	
2.00 - 2.25	SPT		N>50		2	End of Borehole	
					3		
					4		
					5		

General:

Groundwater: Dry on completion.

Remarks:

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Terrier Rig

Date: 31st October 2019

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 9

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	D			-0.15		TOPSOIL.	
0.50	D			-0.7		Orange highly weathered SANDSTONE.	
1.00 - 1.10	SPT		N>50	-1	1	Brown and orange moderately weathered fine and medium grained SANDSTONE.	
						End of Borehole	
					2		
					3		
					4		
					5		

General:

Groundwater: Dry on completion.

Remarks: Standpipe installed to 1.0m.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Terrier Rig

Date: 31st October 2019

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 10

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	D			-0.3		MADE GROUND: Firm brown and grey silty clay topsoil with occasional brick fragments.	
1.00	D					Orange slightly clayey highly becoming moderately weathered SANDSTONE.	
1.00 - 1.45	SPT		4,5,6,6,6,7 N=25		1		
				-1.7			
2.00 - 2.40	SPT		N>50	-2		Brown and orange moderately weathered fine and medium grained SANDSTONE.	
					2	End of Borehole	
					3		
					4		
					5		

General:

Groundwater: Dry on completion.

Remarks:

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Terrier Rig

Date: 31st October 2019

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 11

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
				-0.2		MADE GROUND: Rough concrete/Tarmac.	
0.30	D			-0.5		MADE GROUND: Brown silty sandy gravelly clay with ash and clinker.	
0.90	D					Firm becoming firm to stiff grey and orange sandy CLAY with sandstone fragments.	
1.00 - 1.45	SPT		1,1,1,1,2,4 N=8		1		
				-1.9			
2.00 - 2.45	SPT		N>50	-2	2	Brown and orange moderately weathered fine and medium grained SANDSTONE.	
						End of Borehole	
					3		
					4		
					5		

General:

Groundwater: Dry on completion.

Remarks: Standpipe installed to 2.0m.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Terrier Rig

Date: 31st October 2019

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 12

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
				-0.1		TOPSOIL.	
				-0.6		Orange slightly clayey highly weathered SANDSTONE.	
				-1		Brown and orange moderately weathered fine and medium grained SANDSTONE.	
1.00 - 1.10	SPT		N>50		1	End of Borehole	
					2		
					3		
					4		
					5		

General:

Groundwater: Dry on completion.

Remarks: Standpipe installed to 1.0m.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Terrier Rig

Date: 31st October 2019

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 13

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.20	D			-0.4		MADE GROUND: Brown and grey clay with brick, concrete and sandstone.	
1.00 - 1.45	SPT		2,3,3,4,5,5, N=17		1	Firm becoming firm to stiff grey and orange sandy CLAY with sandstone fragments.	
1.10	D			-1.5			
1.60 - 1.70	SPT		N>50	-1.6		Brown and orange moderately weathered fine and medium grained SANDSTONE.	
						End of Borehole	
					2		
					3		
					4		
					5		

General:

Groundwater: Dry on completion.

Remarks:

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Terrier Rig

Date: 31st October 2019

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 14

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	D			-0.2		MADE GROUND: Brown and grey gravelly clay with brick and ash.	
						Orange slightly clayey highly weathered SANDSTONE.	
0.80	D			-0.9			
1.00 - 1.40	SPT		N>50	-1	1	Brown and orange moderately weathered fine and medium grained SANDSTONE.	
						End of Borehole	
					2		
					3		
					4		
					5		

General:

Groundwater: Dry on completion.

Remarks:

APPENDIX 2

Trial Pit Records

Site: Swallow Lane [3432]

Location: Golcar, Huddersfield

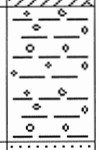
Excavated by: JCB 3CX

Date: 23rd January 2014

Client: Southdale Limited

Trial Pit No: 1

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
				-0.2		Turf over TOPSOIL - Brown slightly organic very slightly sandy clay. Common rootlets.	
				-0.6		Stiff grey, brown and orange slightly sandy, slightly gravelly CLAY. Gravel was sub-angular to sub-rounded, fine to medium gravel of weathered mudstone, sandstone and a little coal.	
				-0.7		Weak becoming strong pale grey, locally ironstained, fine SANDSTONE/SILTSTONE, recovered as large tabular cobbles.	
						End of Trial Pit	
					1		
					2		
					3		
					4		

Stability: TP1 terminated on hard stratum at 0.7m

General: Backfilled with arisings on completion

Groundwater: Dry on completion

Site: Swallow Lane [3432]

Location: Golcar, Huddersfield

Excavated by: JCB 3CX

Date: 23rd January 2014

Client: Southdale Limited

Trial Pit No: 2

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
				-0.2		Turf over MADE GROUND - Grey-brown slightly organic very slightly sandy, slightly gravelly clay. Gravel was sub-angular to sub-rounded, fine to medium of brick, ash and concrete. Common rootlets.	
						Medium dense brown mottled orange slightly sandy gravelly clayey SAND. Gravel was sub-angular to sub-rounded, fine to medium gravel of sandstone and a little coal.	
				-1	1	Very weak to weak thinly laminated to thinly bedded light brown, fine and medium grained micaceous SANDSTONE.	
				-1.8		End of Trial Pit	
					2		
					3		
					4		

Stability: TP2 terminated at 1.8m

General: Backfilled with arisings on completion

Groundwater: Dry on completion

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Excavated by: JCB 3CX

Date: 1st November 2019

Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: 3

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						TOPSOIL.	
				-0.3			
						Firm grey and orange sandy CLAY with sandstone fragments.	
				-1	1		
						Orange slightly clayey weathered SANDSTONE.	
				-1.5			
				-1.6		Brown and orange moderately weathered fine and medium grained SANDSTONE.	
						End of Trial Pit	
					2		
					3		
					4		

Stability: Sides stable.

General: L=2.00m, W=0.60m, D=1.60m

Groundwater: No groundwater encountered.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

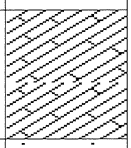
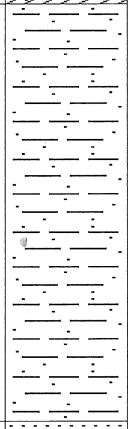
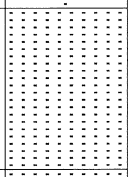
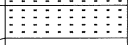
Excavated by: JCB 3CX

Date: 1st November 2019

Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: 4

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						TOPSOIL.	
				-0.4			
						Loose to medium dense orange and brown clayey SAND.	
				-1.7	1		
						Orange slightly clayey weathered SANDSTONE.	
				-2.2	2		
				-2.3		Brown and orange moderately weathered fine and medium grained SANDSTONE.	
						End of Trial Pit	
					3		
					4		

Stability: Sides stable.

General: L=2.00m, W=0.60m, D=2.30m

Groundwater: No groundwater encountered.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Excavated by: JCB 3CX

Date: 1st November 2019

Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: 5

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						TOPSOIL.	
				-0.4			
						Loose to medium dense orange and brown very clayey SAND.	
					1		
					2		
				-2.1			
						Orange slightly clayey weathered SANDSTONE.	
				-2.4			
				-2.5		Brown and orange moderately weathered fine and medium grained SANDSTONE.	
						End of Trial Pit	
					3		
					4		

Stability: Sides stable.

General: L=2.00m, W=0.60m, D=2.50m

Groundwater: No groundwater encountered.

APPENDIX 3

Rotary Borehole Records

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R1

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
						0	0	Ground level.	
						-0.5		Turf over silty clay TOPSOIL.	
								Brown and grey SANDSTONE.	
						-4.8			
							5	Dark grey silty MUDSTONE.	
						-6.7			
						-7.1	7	Intact 'dirty' weathered COAL.	
								Grey SANDSTONE.	
						-8.3	8		
								Intact COAL.	
								Grey and brown SANDSTONE.	
							9		
							10		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R1

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							11	Grey and brown SANDSTONE.	
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R1

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							21		
							22		
							23		
							24		
						-25	25	End of Borehole	
							26		
							27		
							28		
							29		
							30		
							31		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R2

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
						0	0	Ground level.	
								MADE GROUND: Grey and brown silty clay.	
						-0.9	1	Brown weathered SANDSTONE.	
							2		
						-2.7	3	Brown and grey SANDSTONE.	
						-4	4	Dark grey silty MUDSTONE.	
						-5.7	5		
						-6.1	6	Intact 'dirty' weathered COAL.	
								Grey SANDSTONE.	
						-7.3	7	Intact COAL.	
								Grey and brown SANDSTONE.	
							8		
							9		
							10		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R2

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							11	Grey and brown SANDSTONE.	
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R2

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							21		
							22		
							23		
							24		
						-25	25	End of Borehole	
							26		
							27		
							28		
							29		
							30		
							31		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R3

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
						0	0	Ground level.	
						-0.5		Turf over silty clay TOPSOIL.	
						-1	1	Brown sandy CLAY.	
						-4.5		Brown and grey SANDSTONE.	
						-6.4	5	Dark grey silty MUDSTONE.	
						-6.8	6	Intact 'dirty' weathered COAL.	
						-8.1	7	Grey SANDSTONE.	
							8	Intact COAL.	
								Grey and brown SANDSTONE.	
							9		
							10		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R3

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							11	Grey and brown SANDSTONE.	
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R3

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							21		
							22		
							23		
							24		
						-25	25	End of Borehole	
							26		
							27		
							28		
							29		
							30		
							31		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R4

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
						0	0	Ground level.	
						-0.6		Turf over silty clay TOPSOIL.	
						-1.8	1	MADE GROUND: Crushed concrete fill.	
						-3	2	Brown SANDSTONE.	
						-4.5	3	Brown and grey SANDSTONE.	
						-6	4	Dark grey silty MUDSTONE.	
						-6.4	5	Intact 'dirty' weathered COAL.	
						-7.6	6	Grey SANDSTONE.	
							7	Intact COAL.	
							8	Grey SANDSTONE.	
						-10.2	9		
							10	Grey and brown MUDSTONE.	

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R4

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							11	Grey and brown MUDSTONE.	
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R4

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							21		
							22		
							23		
							24		
						-25	25	End of Borehole	
							26		
							27		
							28		
							29		
							30		
							31		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R5

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
						0	0	Ground level.	
								MADE GROUND: Grey and brown gravel.	
						-0.8	1	Brown silty CLAY.	
						-1.6			
						-2.1	2	Intact COAL.	
								Brown and grey intact SANDSTONE.	
						-3	3	Dark grey silty MUDSTONE.	
						-4.5	4		
								Grey and brown SANDSTONE.	
							5		
							6		
							7		
							8		
							9		
							10		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R5

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							11	Grey and brown SANDSTONE.	
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R5

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							21		
							22		
							23		
							24		
						-25	25	End of Borehole	
							26		
							27		
							28		
							29		
							30		
							31		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R6

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
						0	0	Ground level.	
						-0.5		Turf over silty clay TOPSOIL.	
						-1.2	1	Brown sandy CLAY.	
						-3.2	2	Brown weathered SANDSTONE.	
						-4.4	3	Brown and grey SANDSTONE.	
						-6.2	4	Dark grey silty MUDSTONE.	
						-6.6	5	Intact 'dirty' weathered COAL.	
						-8	6	Grey SANDSTONE.	
							7	Intact COAL.	
							8	Grey and brown SANDSTONE.	
							9		
							10		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R6

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							11	Grey and brown SANDSTONE.	
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

Site: PHASE 2 SWALLOW LANE

Location: GOLCAR (3974)

Method: Rotary openhole

Date: 21st November 2019

Client: Jones Homes (Yorkshire) Limited

Borehole No: R6

Michael D Joyce Associates LLP

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI (%)	Field Records	Reduced Level (mAOD)	Depth (m)	Description	Legend
							21		
							22		
							23		
							24		
						-25	25	End of Borehole	
							26		
							27		
							28		
							29		
							30		
							31		

Equipment: Beretta T25 rig.

Flush: No significant loss of flush.

Groundwater:

Returns: Good.

Remarks: No evidence of mine workings/mine gas.

APPENDIX 4

Geotechnical Laboratory Test Results

(Samples unsuitable for testing)

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/05156
Issue Number: 1 **Date:** 07 July, 2018

Client:
Michael D Joyce Associates LLP
Charnock Court
6 South Parade
Wakefield
WF1 1LR

Project Manager: Mr Anthony Joyce
Project Name: Swallow Lane, Golcar
Project Ref: N/A
Order No: N/A
Date Samples Received: 28/06/18
Date Instructions Received: 29/06/18
Date Analysis Completed: 05/07/18

Prepared by:

Holly Neary-King
Sales Executive

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 18/05156

Client Project Name: Swallow Lane, Golcar

Client Project Ref: N/A

Lab Sample ID	18/05156/1	18/05156/2							Units	Method ref
Client Sample No										
Client Sample ID	WST3	WST4								
Depth to Top	0.90	1.20								
Depth To Bottom	1.50	1.85								
Date Sampled										
Sample Type	Soil	Soil								
Sample Matrix Code										
Calorific Value$_A$	9.7	11.0							MJ/kg	Subcon Chemtest

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

APPENDIX 5

Contamination Laboratory Test Results

2531

ANALYTICAL TEST REPORT

Contract no: 82191

Contract name: Swallow Lane, Golcar

Client reference: -

Clients name: Michael D Joyce Associates

Clients address: Charnock Court
6 South Parade
Wakefield
WF1 1LR

Samples received: 01 November 2019

Analysis started: 04 November 2019

Analysis completed: 11 November 2019

Report issued: 11 November 2019

Notes:
Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key:
U UKAS accredited test
M MCERTS & UKAS accredited test
$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

Dave Bowerbank
Customer Support Hero

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
82191-1	WS8	0.10	Sandy Clay with Gravel	-	-	16.8
82191-2	WS9	0.10	Sandy Clay with Gravel	-	-	25.9
82191-3	WS10	0.10	Sandy Clay with Gravel	-	-	25.8
82191-4	WS11	0.30	Sandy Clay with Gravel	-	-	31.3
82191-5	WS13	0.20	Clayey Sand with Gravel	-	-	10.8

Chemtech Environmental Limited

SOILS

Lab number			82191-1	82191-2	82191-3	82191-4	82191-5
Sample id			WS8	WS9	WS10	WS11	WS13
Depth (m)			0.10	0.10	0.10	0.30	0.20
Date sampled			31/10/2019	31/10/2019	31/10/2019	31/10/2019	31/10/2019
Test	**Method**	**Units**					
Arsenic (total)	CE127 M	mg/kg As	3.6	14	23	56	6.9
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	0.3	0.4	0.3	0.3
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1
Copper (total)	CE127 M	mg/kg Cu	8.8	38	64	92	105
Lead (total)	CE127 M	mg/kg Pb	18	138	216	531	38
Mercury (total)	CE127 M	mg/kg Hg	<0.5	1.1	<0.5	0.6	<0.5
Nickel (total)	CE127 M	mg/kg Ni	6.0	11	18	18	20
Selenium (total)	CE127 M	mg/kg Se	0.7	1.2	1.7	1.5	1.2
Zinc (total)	CE127 M	mg/kg Zn	25	112	141	157	69
pH	CE004 M	units	6.7	6.2	6.1	9.0	10.6
Sulphate (2:1 water soluble)	CE061 M	mg/l SO_4	21	14	15	145	247
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	<1	<1
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	1.1	<0.5	<0.5
PAH							
Naphthalene	CE087 M	mg/kg	<0.02	0.02	<0.02	<0.02	1.19
Acenaphthylene	CE087 M	mg/kg	<0.02	0.09	<0.02	<0.02	<0.02
Acenaphthene	CE087 M	mg/kg	<0.02	0.05	<0.02	0.07	5.43
Fluorene	CE087 U	mg/kg	<0.02	0.08	<0.02	0.05	4.42
Phenanthrene	CE087 M	mg/kg	<0.02	0.97	0.21	0.73	28.32
Anthracene	CE087 U	mg/kg	<0.02	0.42	0.05	0.17	11.11
Fluoranthene	CE087 M	mg/kg	0.02	2.01	0.51	1.29	55.69
Pyrene	CE087 M	mg/kg	0.02	1.82	0.47	1.20	47.88
Benzo(a)anthracene	CE087 U	mg/kg	0.03	0.93	0.29	0.62	20.06
Chrysene	CE087 M	mg/kg	<0.03	1.21	0.35	0.74	19.30
Benzo(b)fluoranthene	CE087 M	mg/kg	<0.02	1.10	0.38	0.70	21.60
Benzo(k)fluoranthene	CE087 M	mg/kg	<0.03	0.42	0.14	0.31	9.75
Benzo(a)pyrene	CE087 U	mg/kg	<0.02	1.00	0.27	0.54	18.90
Indeno(123cd)pyrene	CE087 M	mg/kg	<0.02	0.67	0.24	0.47	11.90
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	0.09	0.04	0.08	2.48
Benzo(ghi)perylene	CE087 M	mg/kg	<0.02	0.53	0.21	0.39	10.18
PAH (total of USEPA 16)	CE087	mg/kg	<0.34	11.4	3.14	7.34	268
Subcontracted analysis							
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	M	10	mg/l SO_4
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
82191-1	WS8	0.10	N	
82191-2	WS9	0.10	N	
82191-3	WS10	0.10	N	
82191-4	WS11	0.30	N	
82191-5	WS13	0.20	N	

APPENDIX 6

GroundSure Enviro-Insight and Geo-Insight Reports

Michael D Joyce Associates LLP

6, South Parade,
Wakefield, WF1 1LR

Groundsure Reference:	HMD-354-6394124
Your Reference:	Swallow_Lane_-_Golcar_-_Phase_2
Report Date	11 Oct 2019
Report Delivery Method:	Email - pdf

Enviro Insight

Address: 409327, 415985,

Dear Sir/ Madam,

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

If you need any further assistance, please do not hesitate to contact our helpline on (0)1924 360458 quoting the above report reference number.

Yours faithfully,

Michael D Joyce Associates LLP

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:	**409327, 415985,**
Date:	**11 Oct 2019**
Reference:	**HMD-354-6394124**
Client:	**Michael D Joyce Associates LLP**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	26-Mar-2012
Grid Reference:	409261,415987
Site Size:	0.7439ha

Report Reference: HMD-354-6394124
Client Reference: Swallow_Lane_-_Golcar_-_Phase_2

Contents Page

Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	10	56
1.2 Additional Information – Historical Tank Database	0	0	6	17
1.3 Additional Information – Historical Energy Features Database	0	1	0	15
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	0	0	2	40

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	2
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	0	5
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	1	1	2
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	1	3

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	1	5	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	None identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	None identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	None identified
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	18
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	24
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	8
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	1	0	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	Yes
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	0	10	40	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Enviroment Agency Zone 2 floodplains within 250m of the study site	None identified
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low
7.4 Flood Defences within 250m of the study site	None identified
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified
7.6 Areas used for Flood Storage within 250m of the study site	None identified
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Potential at Surface
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	Low

Section 8: Designated Environmentally Sensitive Sites

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

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	1	0	0	0	2	2

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence	Very Low
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Very Low
9.1.2 Maximum Landslides hazard rating identified on the study site	Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Negligible
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Negligible
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Very Low
9.1.6 Maximum Running Sand hazard rating identified on the study site	Negligible
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The site is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	None identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	Identified
10.3 Brine affected areas within 75m of the study site	None identified

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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

8. Designated Environmentally Sensitive Sites

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

9. Natural Hazards

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

10. Mining

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

11. Contacts

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

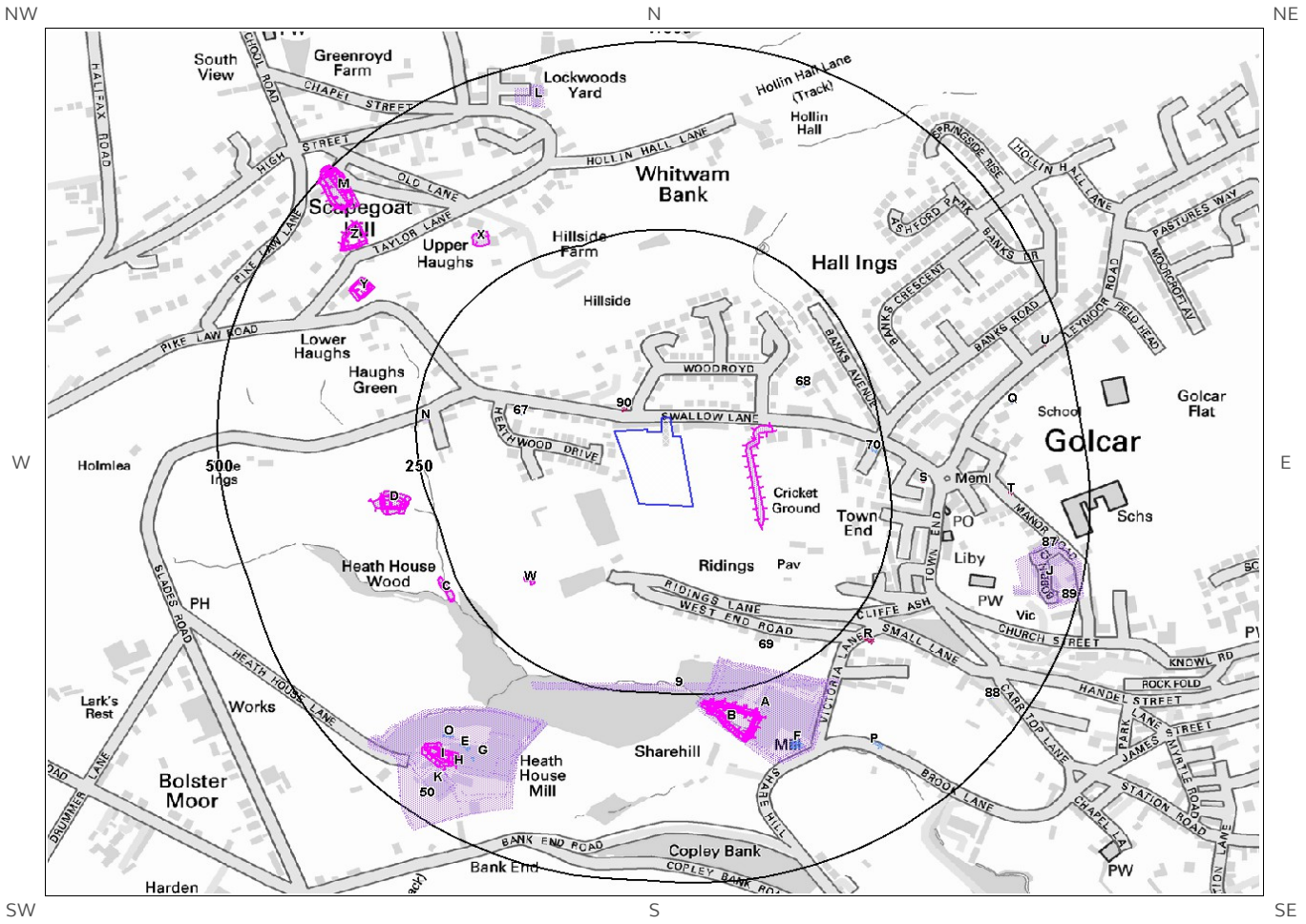
Note: Maps

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

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

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

1. Historical Land Use



Historical 1:10,000 and 1:10,560 scale mapping

Site Outline

Industrial Land Use

Potentially Infilled Land

250
500
Search Buffers (m)

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Historical military sites

Tanks

Garages

1. Historical Industrial Sites

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

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

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 66

ID	Distance [m]	Direction	Use	Date
1V	78	E	Unspecified Ground Workings	1905
2W	165	SW	Unspecified Ground Workings	1905
3A	203	S	Unspecified Mills	1938
4A	206	S	Unspecified Mills	1890
5A	208	S	Unspecified Mills	1948
6A	208	S	Unspecified Mills	1905
7A	208	S	Unspecified Mill	1993
8A	208	S	Unspecified Mills	1951
9	235	S	Rifle Range	1890
10N	235	W	Unspecified Tank	1905
11A	251	S	Unspecified Mill	1978
12A	251	S	Unspecified Mill	1967
13B	258	S	Mill Pond	1905
14B	260	S	Mill Pond	1938
15B	261	S	Mill Pond	1951
16C	263	SW	Unspecified Ground Workings	1905
17C	263	SW	Unspecified Ground Workings	1948
18B	268	S	Mill Pond	1948
19D	272	W	Unspecified Pit	1993
20D	272	W	Unspecified Pit	1967
21D	272	W	Unspecified Pit	1978
22D	276	W	Unspecified Pit	1951
23D	279	W	Unspecified Pit	1938
24D	279	W	Unspecified Pit	1938
25A	280	S	Chimney	1967
26D	281	W	Unspecified Pit	1948
27D	285	W	Unspecified Pit	1890
28A	286	S	Chimney	1978
29X	295	NW	Unspecified Heap	1905
30E	312	SW	Unspecified Mill	1938
31H	313	S	Unspecified Mill	1951
32E	317	SW	Unspecified Mill	1905

33E	317	SW	Unspecified Mill	1948
34E	318	SW	Unspecified Mill	1890
35F	331	SE	Unspecified Tank	1938
36F	336	SE	Unspecified Tank	1951
37F	337	S	Unspecified Tank	1948
38F	337	S	Unspecified Tank	1905
39G	346	SW	Unspecified Mill	1993
40G	346	SW	Unspecified Mill	1978
41G	346	SW	Unspecified Mill	1967
42H	404	SW	Mill Pond	1938
43I	407	SW	Mill Pond	1951
44I	411	SW	Mill Pond	1948
45J	412	E	Unspecified Mill	1967
46J	412	E	Unspecified Mill	1993
47J	412	E	Unspecified Mill	1978
48K	429	SW	Unspecified Mill	1993
49K	429	SW	Unspecified Mill	1978
50	429	SW	Unspecified Mill	1967
51J	431	E	Unspecified Mill	1948
52J	431	E	Unspecified Mill	1905
53J	432	E	Unspecified Mill	1890
54L	439	N	Unspecified Yard	1993
55L	439	N	Unspecified Yard	1978
56M	439	NW	Unspecified Ground Workings	1978
57J	440	E	Unspecified Mill	1951
58L	441	N	Unspecified Yard	1967
59M	447	NW	Unspecified Pit	1951
60M	449	NW	Unspecified Pit	1948
61M	449	NW	Unspecified Pit	1905
62J	450	E	Unspecified Mill	1938
63M	450	NW	Unspecified Pit	1938
64M	450	NW	Unspecified Pit	1938
65M	450	NW	Unspecified Pit	1890
66M	462	NW	Unspecified Ground Workings	1967

1.2 Additional Information – Historical Tank Database

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

Records of historical tanks within 500m of the search boundary: 23

ID	Distance (m)	Direction	Use	Date
67	117	W	Unspecified Tank	1893
68	168	NE	Unspecified Tank	1980
69	207	SE	Unspecified Tank	1919
70	232	E	Unspecified Tank	1919
71N	235	W	Unspecified Tank	1907
72N	237	W	Unspecified Tank	1893
73F	334	S	Unspecified Tank	1932
74F	334	S	Unspecified Tank	1919
75F	339	S	Unspecified Tank	1893
76F	341	SE	Unspecified Tank	1907
77O	383	SW	Unspecified Tank	1932
78P	384	SE	Tanks	1893
79O	386	SW	Unspecified Tank	1919
80G	388	SW	Unspecified Tank	1907
81P	392	SE	Tanks	1893
82G	397	SW	Unspecified Tank	1907
83Q	419	E	Unspecified Tank	1981
84Q	419	E	Unspecified Tank	1990
85Q	419	E	Unspecified Tank	1993
86Q	419	E	Unspecified Tank	1978
87	449	E	Tanks	1993
88	450	SE	Unspecified Tank	1893
89	487	E	Unspecified Tank	1893

1.3 Additional Information – Historical Energy Features Database

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

Records of historical energy features within 500m of the search boundary: 16

ID	Distance (m)	Direction	Use	Date
90	25	N	Electricity Substation	1980
91R	273	SE	Electricity Substation	1993
92R	275	SE	Electricity Substation	1982
93R	275	SE	Electricity Substation	1990
94S	290	E	Electricity Substation	1993
95S	290	E	Electricity Substation	1982
96S	290	E	Electricity Substation	1990
97T	397	E	Electricity Substation	1993

98T	398	E	Electricity Substation	1982
99T	398	E	Electricity Substation	1990
100U	474	E	Electricity Substation	1981
101U	474	E	Electricity Substation	1990
102U	474	E	Electricity Substation	1994
103U	474	E	Electricity Substation	1993
104U	474	E	Electricity Substation	1980
105U	477	E	Electricity Substation	1978

1.4 Additional Information – Historical Petrol and Fuel Site Database

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

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

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

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 0

Database searched and no data found.

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

1.7 Potentially Infilled Land

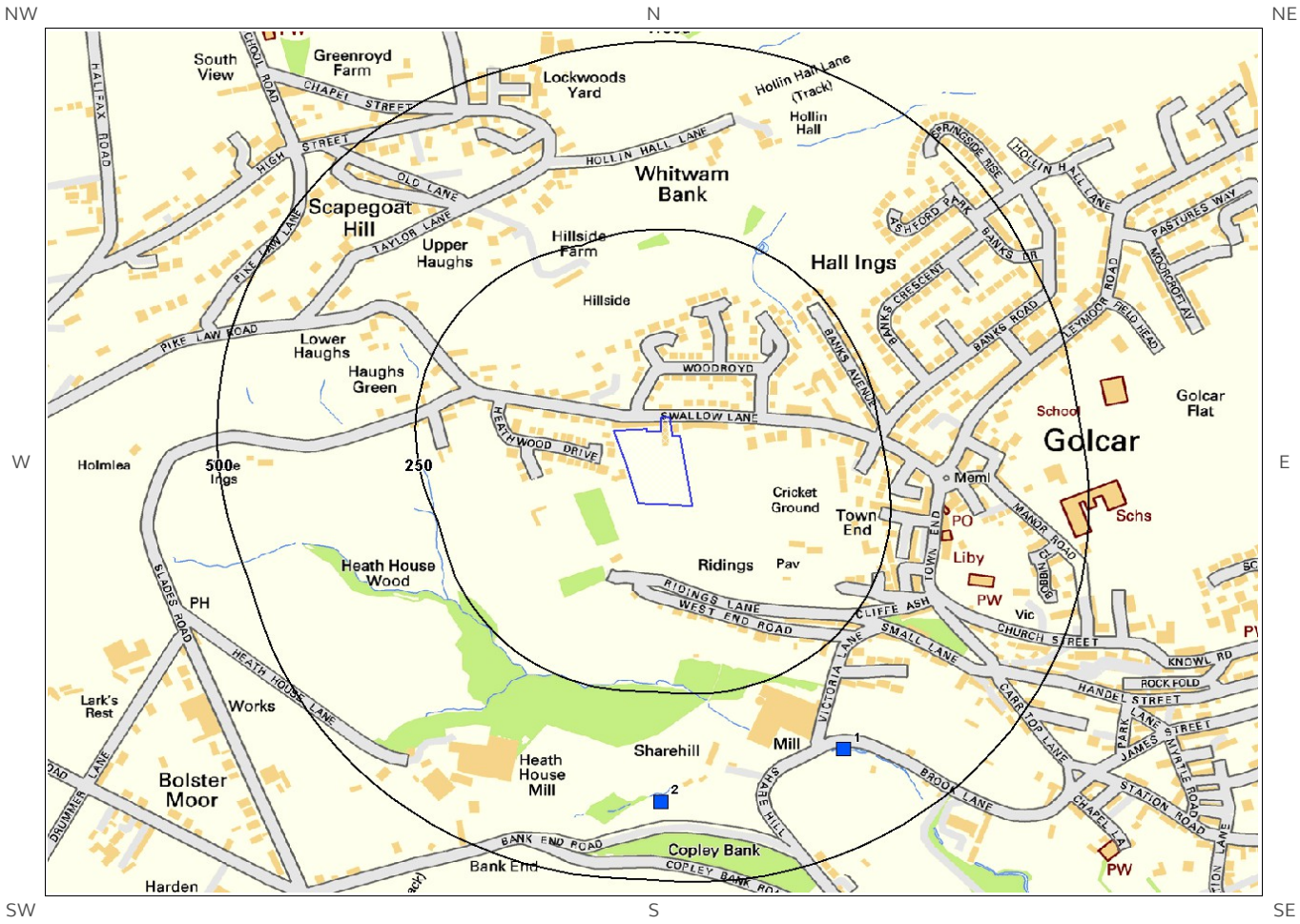
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 42

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

ID	Distance(m)	Direction	Use	Date
106V	78	E	Unspecified Ground Workings	1905
107W	165	SW	Unspecified Ground Workings	1905
108B	258	S	Pond	1890
109B	258	S	Mill Pond	1905
110B	260	S	Mill Pond	1938
111B	261	S	Mill Pond	1951
112B	261	S	Pond	1967
113C	263	SW	Unspecified Ground Workings	1948
114C	263	SW	Unspecified Ground Workings	1905
115B	267	S	Pond	1978
116B	268	S	Mill Pond	1948
117D	272	W	Unspecified Pit	1967
118D	272	W	Unspecified Pit	1978
119D	272	W	Unspecified Pit	1993
120D	276	W	Unspecified Pit	1951
121D	279	W	Unspecified Pit	1938
122D	279	W	Unspecified Pit	1938
123D	281	W	Unspecified Pit	1948
124D	285	W	Unspecified Pit	1890
125X	295	NW	Unspecified Heap	1905
126Y	357	NW	Reservoir	1951
127Y	360	NW	Reservoir	1948
128Y	360	NW	Reservoir	1905
129Y	361	NW	Reservoir	1938
130Z	401	NW	Reservoir	1951
131H	402	SW	Pond	1978
132H	402	SW	Pond	1993
133Z	403	NW	Reservoir	1948
134Z	403	NW	Reservoir	1905
135Z	403	NW	Reservoir	1938
136H	404	SW	Mill Pond	1938
137H	407	SW	Mill Pond	1951
138I	411	SW	Mill Pond	1948
139I	411	SW	Pond	1905
140M	439	NW	Unspecified Ground Workings	1978
141M	447	NW	Unspecified Pit	1951
142M	449	NW	Unspecified Pit	1905
143M	449	NW	Unspecified Pit	1948
144M	450	NW	Unspecified Pit	1938
145M	450	NW	Unspecified Pit	1938
146M	450	NW	Unspecified Pit	1890

147M	462	NW	Unspecified Ground Workings	1967

2. Environmental Permits, Incidents and Registers Map



- 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
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

2

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

ID	Distance (m)	Direction	NGR	Details	
1	375	SE	409500 415610	Address: BROOK LANE CSO, BROOK LANE, GOLCAR, NR HUDDERSFIELD, WEST YORKSHIRE Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: WRA7462 Permit Version: 1	Receiving Water: UNNAMED TRIB OF RIVER COLNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/10/1998 Effective Date: 26-Oct-1998 Revocation Date:
2	395	S	409270 415540	Address: COPLEY BANK CSO, COPLEY BANK, GOLCAR, NR HUDDERSFIELD, WEST YORKSHIRE Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: WRA7461 Permit Version: 1	Receiving Water: UNNAMED TRIB OF RIVER COLNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/10/1998 Effective Date: 26-Oct-1998 Revocation Date:

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

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.

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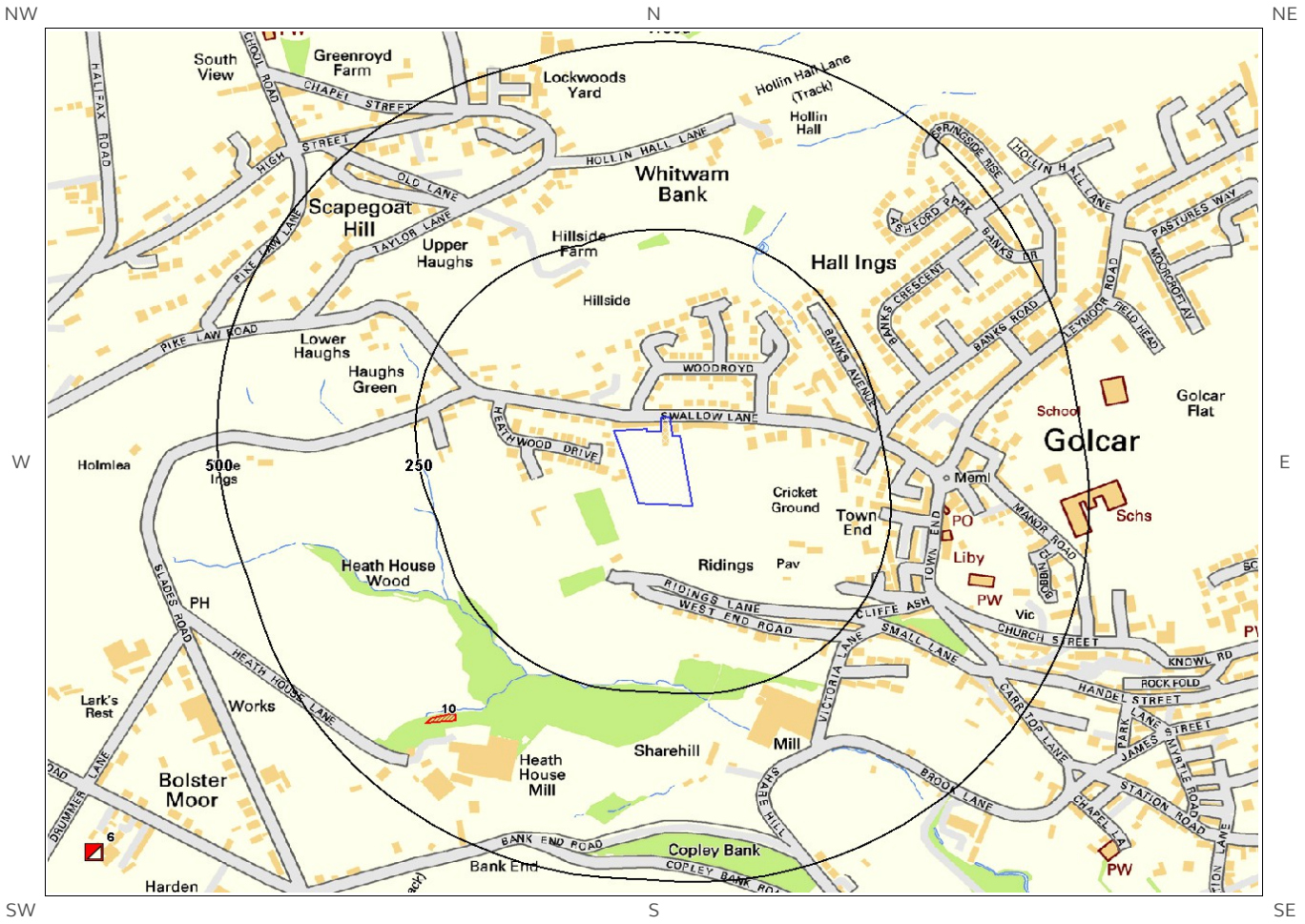
3. Landfill and Other Waste Sites Map



Site Outline

250 / 500 Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

5

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1015	NE		Site Address: Land at Leymoor Dyeworks, Parkwood Road, Leymoor, Huddersfield Waste Licence: Yes Site Reference: 4700/0122 Waste Type: Inert, Industrial, Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 27-Sep-1979 Licence Surrendered: 25-Apr-1994 Licence Holder Address: Parkwood Mills, Longwood, Huddersfield Operator: - Licence Holder: The Parkwood Mills Company Limited First Recorded: 01-Jan-1970 Last Recorded: 31-Dec-1992
Not shown	1179	S		Site Address: Dunnock Quarry, Spout Field, off Radcliffe Road, Golcar, Near Huddersfield Waste Licence: Yes Site Reference: 4700/0077 Waste Type: Inert, Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 22-Jul-1977 Licence Surrendered: 26-Apr-1994 Licence Holder Address: 36 Upper Wateroid, Bolster, Golcar, Huddersfield Operator: - Licence Holder: Mr M E Peate First Recorded: 01-Jan-1926 Last Recorded: -
Not shown	1410	NE		Site Address: Dam site off Grove Street, Longwood, Huddersfield Waste Licence: Yes Site Reference: 4700/0422 Waste Type: Inert, Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 17-Apr-1984 Licence Surrendered: 30-Apr-1994 Licence Holder Address: Grove Street, Longwood, Huddersfield Operator: - Licence Holder: Scholes Windows Limited First Recorded: 31-Dec-1984 Last Recorded: 31-Mar-1986
Not shown	1417	W		Site Address: Rockingstone Quarry, Wholestone Moor, Golcar, Huddersfield Waste Licence: Yes Site Reference: 48, NE4654 Waste Type: Inert Environmental Permitting Regulations	Licence Issue: 03-Aug-1977 Licence Surrendered: 13-Oct-2000 Licence Holder Address: Crossland Hill, Huddersfield, West Yorkshire Operator: - Licence Holder: Johnsons Wellfield

ID	Distance (m)	Direction	NGR	Details	
				(Waste) Reference: YQ1/L/JOH001	Quarries Limited First Recorded: 31-Dec-1900 Last Recorded: -
Not shown	1463	SE		Site Address: The Folly, Cowersley Lane, Linthwaite, Huddersfield Waste Licence: Yes Site Reference: 4700/0205, 723 Waste Type: Inert, Commercial, Household, Liquid sludge Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 07-Jun-1979 Licence Surrendered: 05-Mar-1993 Licence Holder Address: 184a Cowlersley Lane, Huddersfield Operator: Eric Wimpenny and Son Limited Licence Holder: Eric Wimpenny and Son Limited First Recorded: - Last Recorded: -

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

0

Database searched and no data found.

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

4

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

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
10	362	SW	408992 415651	Refuse Tip	1961 mapping	Polygon
Not shown	976	NE	409934 416793	Refuse Tip	1961 mapping	Polygon
Not shown	1012	W	408256 415668	Refuse Tip	1961 mapping	Polygon
Not shown	1018	NE	409986 416810	Refuse Tip	1961 mapping	Polygon

3.2 Other Waste Sites

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

0

Database searched and no data found.

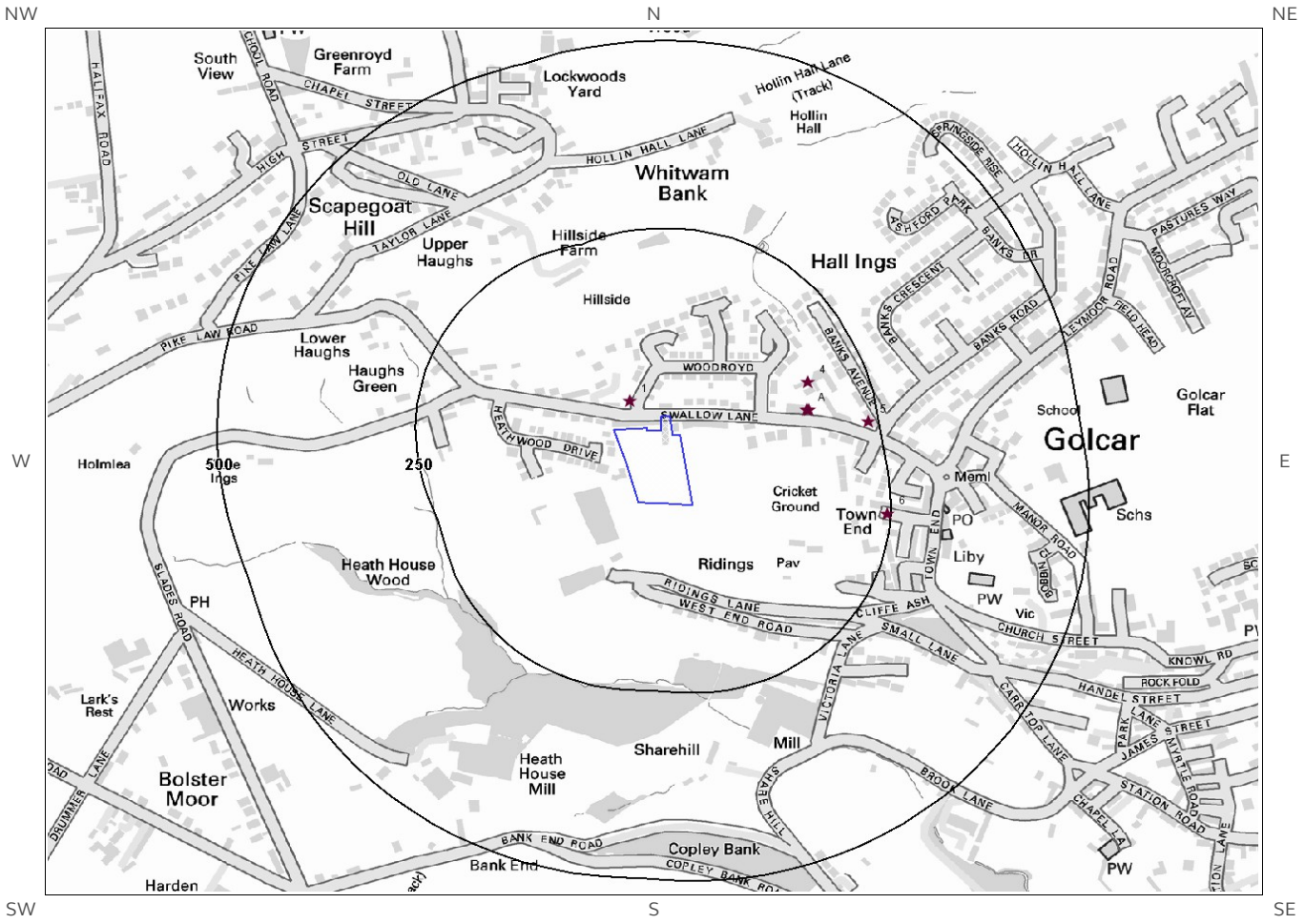
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

4

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

ID	Distance (m)	Direction	NGR	Details	
6	829	SW	408555 415473	Site Address: 33, Bolster Moor Road, Bolster Moor, Huddersfield, West Yorkshire, HD7 4JU Type: Incinerator Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HEA008 EPR reference: EA/EPR/SP3396ZL/A001 Operator: Mr Christopher Haigh / Mrs Jeanette Alison Haigh Waste Management licence No: 65536 Annual Tonnage: 438.0	Issue Date: 28/08/2007 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Heaven Scent Correspondence Address: -
Not shown	1450	S	409622 414518	Site Address: Unit 1, Bargate Yard, Bargate, Huddersfield, West Yorkshire, HD7 5QW Type: Vehicle Depollution Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ANI001 EPR reference: EA/EPR/EB3405TA/A001 Operator: Nasaar Anik Waste Management licence No: 403498 Annual Tonnage: 5000.0	Issue Date: 22/12/2016 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Bargate Motors Spares Ltd Correspondence Address: -
Not shown	1452	S	409643 414520	Site Address: Bargate Motor Spares, Manchester Road, Linthwaite, Huddersfield, West Yorkshire, HD7 5QW Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 000132 EPR reference: EA/EPR/HP3192ZM/A001 Operator: Crowther Robert Waste Management licence No: 65348 Annual Tonnage: 2500.0	Issue Date: 10/02/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Revoked Site Name: Bargate Motor Spares Correspondence Address: -
Not shown	1463	S	409600 414500	Site Address: Bargate Motor Spares, Bargate, Huddersfield, West Yorkshire, HD7 5QW Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BAR003 EPR reference: EA/EPR/GP3595ZW/S002 Operator: Bargate Motor Spares Waste Management licence No: 61010 Annual Tonnage: 336.0	Issue Date: 25/02/1992 Effective Date: - Modified: - Surrendered Date: Jan 8 2001 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Bargate Motor Spares Correspondence Address: -

4. Current Land Use Map



Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 6

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	38	N	Electricity Sub Station	409230 416073	West Yorkshire, HD7	Electrical Features	Infrastructure and Facilities
2A	163	E	Sovereign Press Print & Design	409453 416061	Charcoal Yard, 60b Swallow Lane, Golcar, Huddersfield, West Yorkshire, HD7 4NB	Published Goods	Industrial Products
3A	166	E	Golcar Brewery	409456 416061	Charcoal Delivery Yard, Swallow Lane, Golcar, Huddersfield, West Yorkshire, HD7 4LU	Alcoholic Drinks	Foodstuffs
4	176	NE	Tank	409455 416098	West Yorkshire, HD7	Tanks (Generic)	Industrial Features
5	237	E	Abbey Packaging	409531 416045	3, Banks Avenue, Golcar, Huddersfield, West Yorkshire, HD7 4LZ	Packaging	Industrial Products
6	245	E	Works	409555 415923	West Yorkshire, HD7	Unspecified Works Or Factories	Industrial Features

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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

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

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

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

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

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

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

5.2 Superficial Ground and Drift Geology

Database searched and no data found.

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

5.3 Bedrock and Solid Geology

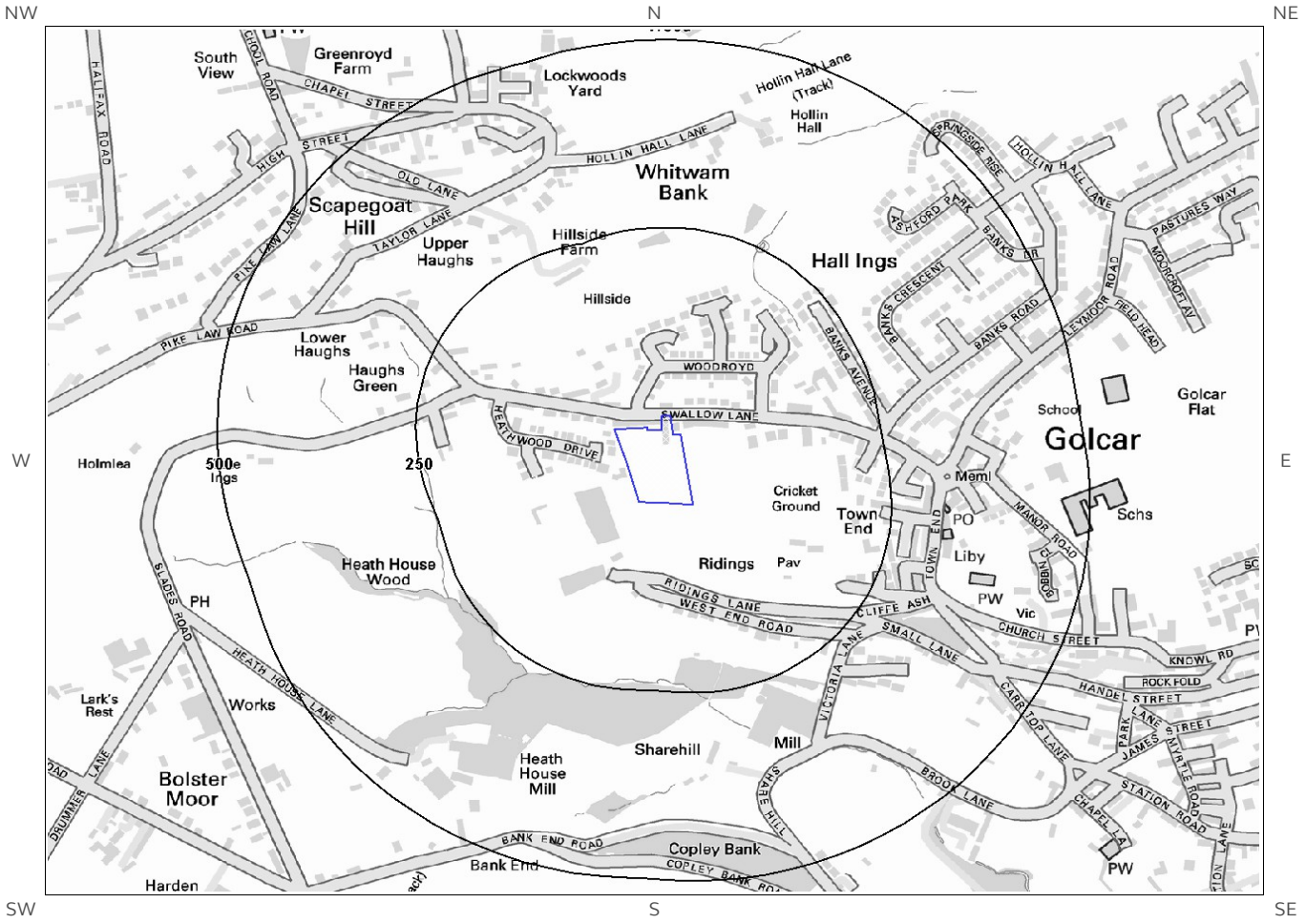
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
HDW-SDST	HUDDERSFIELD WHITE ROCK	SANDSTONE
MARSD-MDSI	MARSDEN FORMATION	MUDSTONE AND SILTSTONE

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

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



Site Outline

Search Buffers (m)
250
500

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

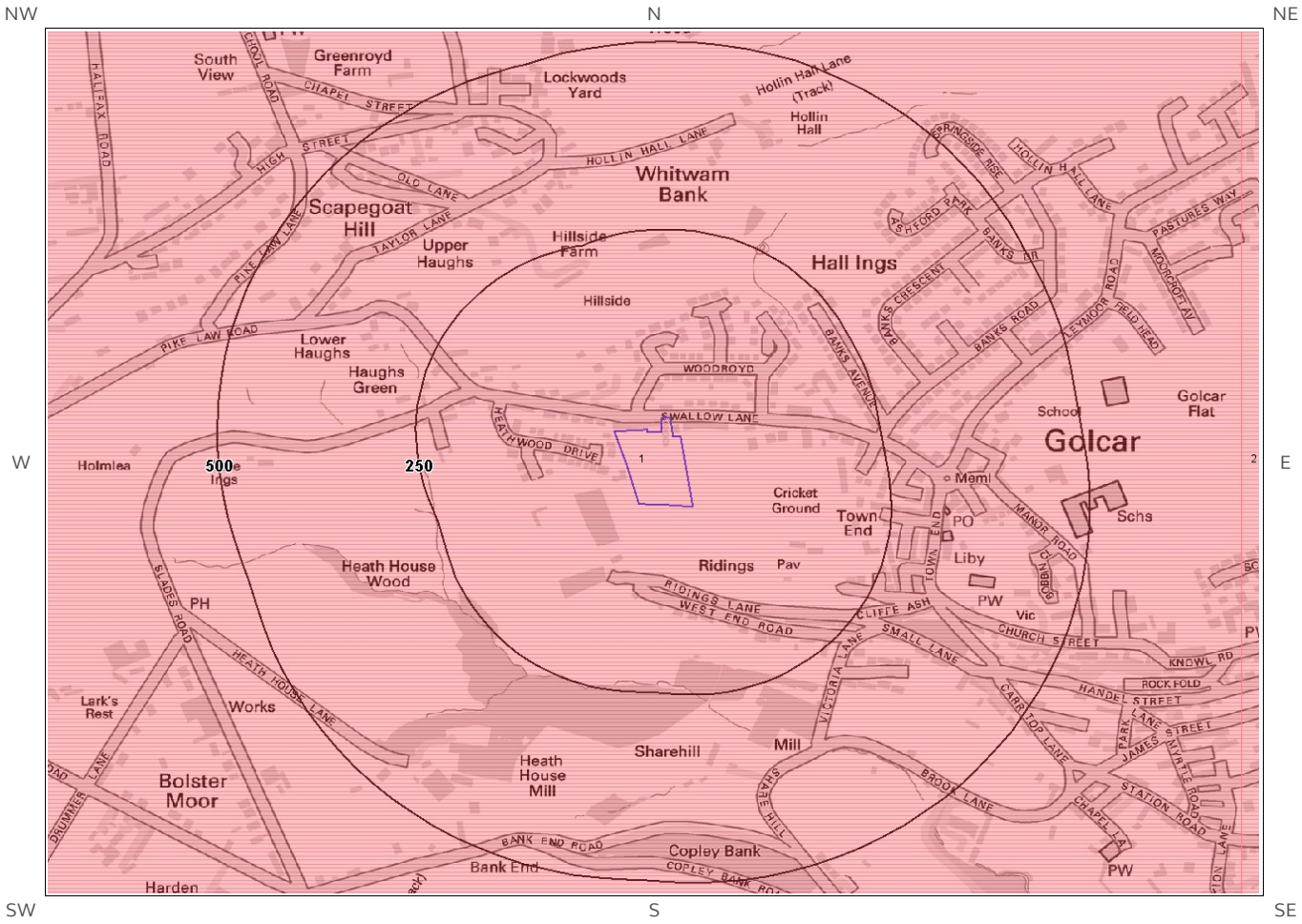
Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

6b. Aquifer Within Bedrock Geology and Abstraction Licences



Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

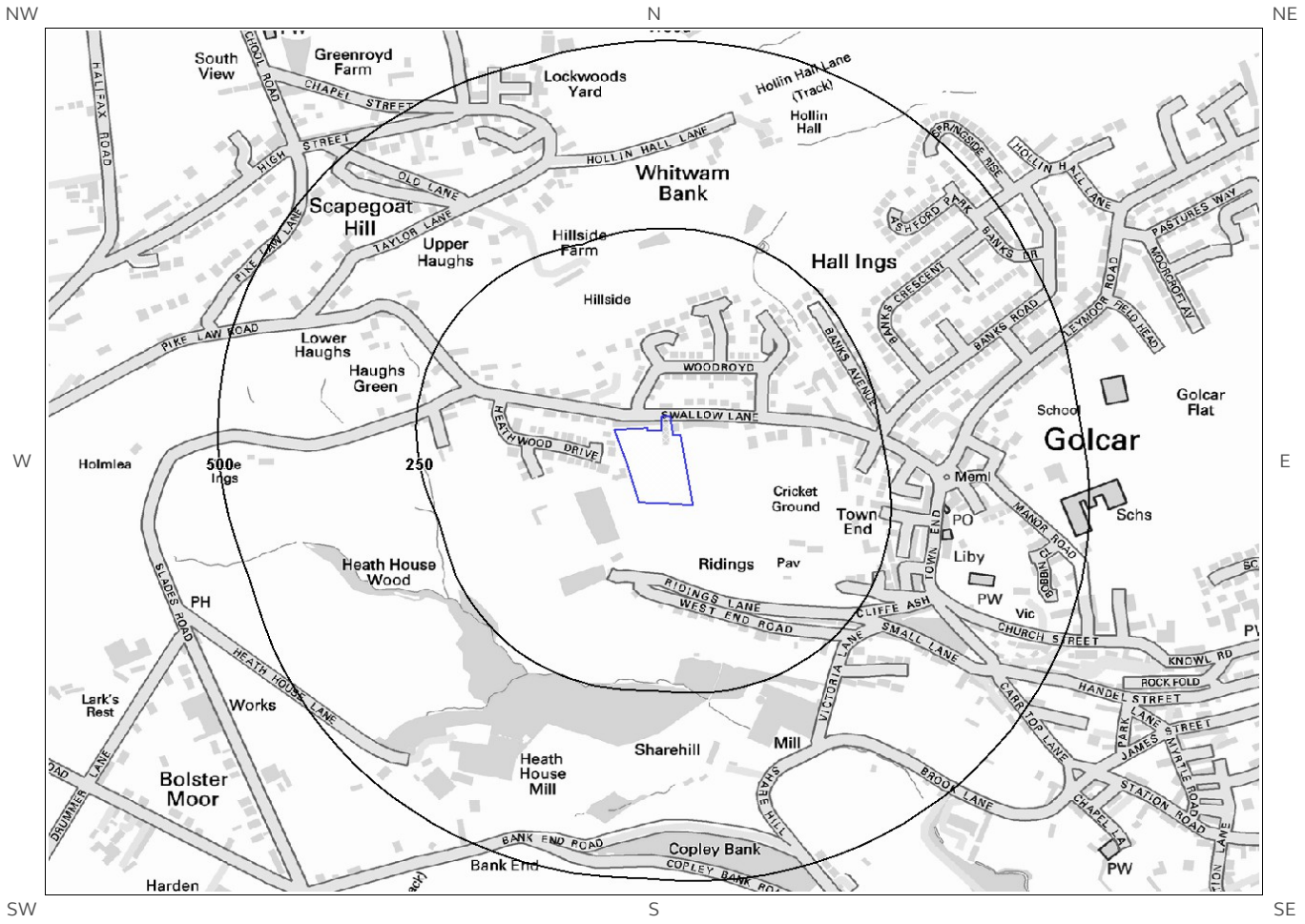
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

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



Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

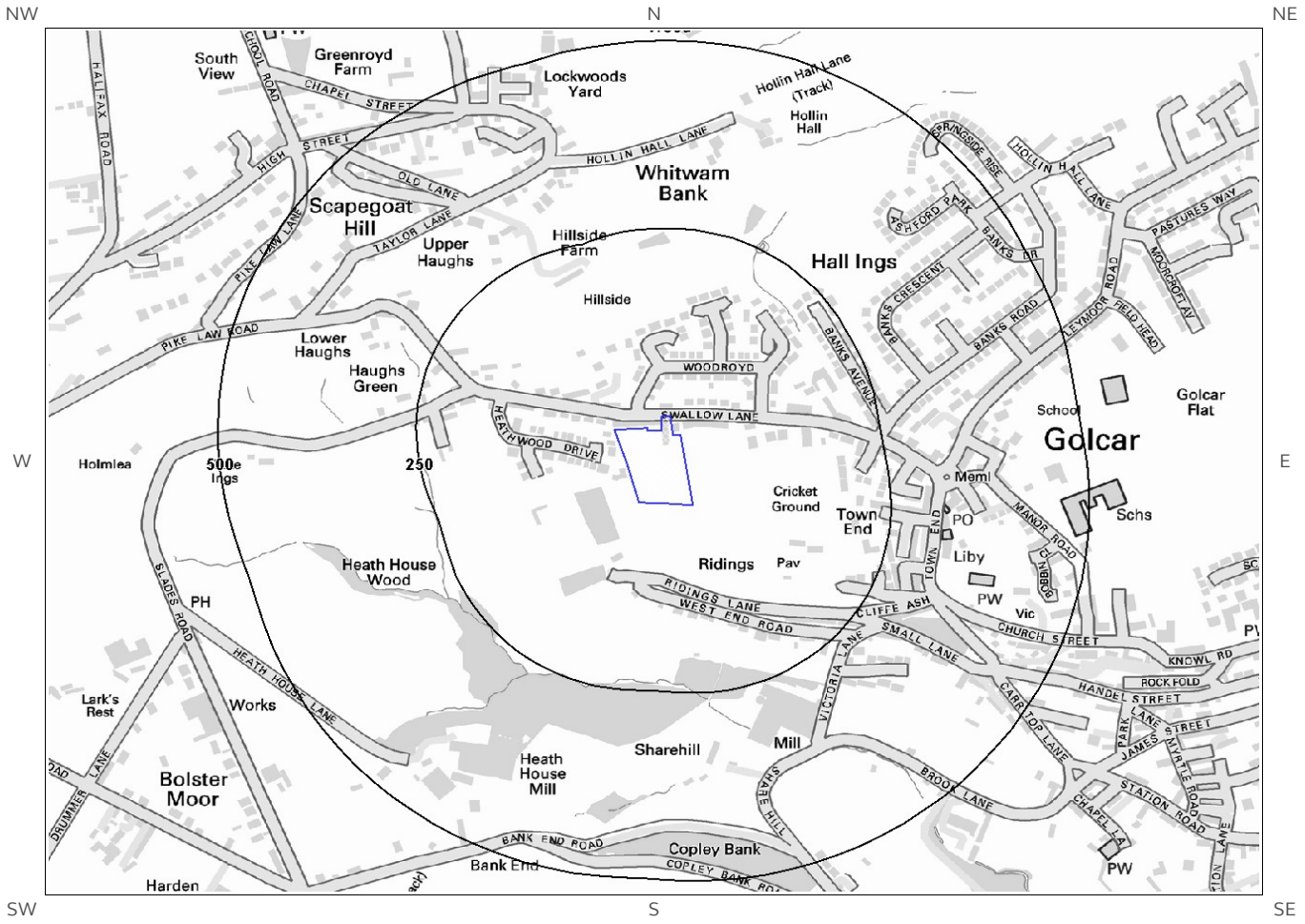
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

6d. Hydrogeology – Source Protection Zones within confined aquifer



Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Site Outline

250 — 500 — Search Buffers (m)

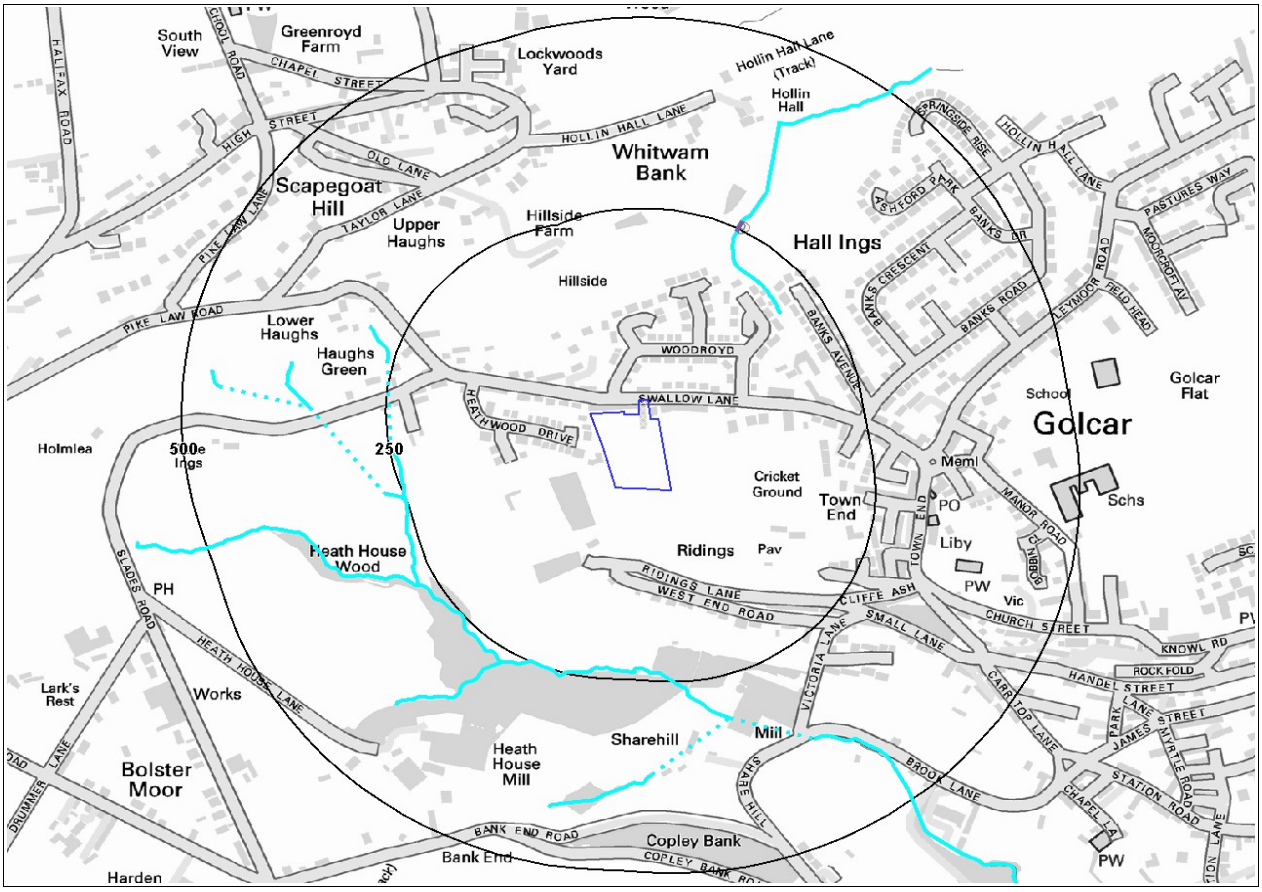
Potable Water Abstraction Licence

6e. Hydrology – Watercourse Network and River Quality

NW N NE

W E

SW S SE



Site Outline

250 / 500 Search Buffers (m)

Watercourse type

- Tidal River
- Inland River
- Canal
- Lock or Flight of Locks
- Lake, Reservoir, or Marsh
- Foreshore
- Drain or Transfer

Watercourse level

- On ground surface
- Underground or Elevated
- Level unknown

- General Quality Assessment: Biology
- General Quality Assessment: Chemistry

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property No

Database searched and no data found.

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

6.2 Aquifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property Yes

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

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

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

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site Identified

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1180	NE	410100 416900	Status: Historical Licence No: 2/27/11/117 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING Data Type: Point Name: SHEARD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 28/04/1966 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1180	NE	410100 416900	Status: Historical Licence No: 2/27/11/117 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING - LONGWOOD Data Type: Point Name: SHEARD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 28/04/1966 Version End Date:
Not shown	1278	S	409740 414730	Status: Historical Licence No: 2/27/11/191 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: GROUNDWATERS Point: BOREHOLE-COAL MEASURES-TITANIC MILLS-LINTHWAITE Data Type: Point Name: LOWRY HOMES PLC	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 12/03/2005 Version End Date:
Not shown	1278	S	409740 414730	Status: Historical Licence No: 2/27/11/191 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: GROUNDWATERS Point: BOREHOLE-MILLSTONE GRIT-TITANIC MILLS-LINTHWAITE Data Type: Point Name: LOWRY HOMES PLC	Annual Volume (m^3): 54,000 Max Daily Volume (m^3): 150 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 08/02/2008 Version End Date:
Not shown	1278	S	409740 414730	Status: Active Licence No: NE/027/0011/007 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: GROUNDWATERS Point: BOREHOLE-MILLSTONE GRIT-TITANIC MILLS-LINTHWAITE Data Type: Point Name: PROPERTY RENAISSANCE LTD	Annual Volume (m^3): 43,070 Max Daily Volume (m^3): 118 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 21/02/2011 Version End Date:
Not shown	1421	S	409800 414600	Status: Historical Licence No: 2/27/11/045 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - LINTHWAITE Data Type: Point Name: JAMES DYSON LTD	Annual Volume (m^3): 175,000 Max Daily Volume (m^3): 650 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 17/01/2002 Version End Date:
Not shown	1465	SE	410100 414700	Status: Historical Licence No: 2/27/11/057 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRINGS Data Type: Point Name: ROBERTS	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 27/01/1966 Version End Date:
Not shown	1504	S	408800 414500	Status: Historical Licence No: 2/27/11/019 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: BOREHOLE-MILLSTONE GRIT-GOLCAR Data Type: Point Name: P & R WHITWAM	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 30/06/2000 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1660	NW	408421 417494	Status: Active Licence No: NE/027/0011/003 Details: Spray Irrigation - Direct Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - HUDDERSFIELD Data Type: Point Name: OUTLANE GOLF CLUB LTD	Annual Volume (m^3): 6,750 Max Daily Volume (m^3): 45 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 23/08/2010 Version End Date:
Not shown	1675	NW	408400 417500	Status: Historical Licence No: 2/27/11/185 Details: Spray Irrigation - Direct Direct Source: GROUNDWATERS Point: BOREHOLE - OUTLANE GOLF CLUB - MILLSTONE GRIT Data Type: Point Name: OUTLANE GOLF CLUB LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 03/04/2000 Version End Date:
Not shown	1675	NW	408400 417500	Status: Historical Licence No: 2/27/11/185 Details: Spray Irrigation - Direct Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - HUDDERSFIELD Data Type: Point Name: OUTLANE GOLF CLUB LTD	Annual Volume (m^3): 6,750 Max Daily Volume (m^3): 45 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 03/04/2000 Version End Date:
Not shown	1745	S	409250 414190	Status: Historical Licence No: 2/27/11/016 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: SPRING - MILLSTONE GRIT - LINTHWAITE Data Type: Point Name: GEORGE COCK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 22/05/2001 Version End Date:
Not shown	1804	S	409260 414130	Status: Historical Licence No: 2/27/11/050 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - KINDERSCOUT GRIT - LINTHWAITE Data Type: Point Name: GEORGE COCK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 22/05/2001 Version End Date:
Not shown	1837	S	409200 414100	Status: Historical Licence No: 2/27/11/016 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: SPRING - COAL MEASURES - WATER TO MILL DAM Data Type: Point Name: GEORGE COCK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 20/01/1966 Version End Date:
Not shown	1837	S	409200 414100	Status: Historical Licence No: 2/27/11/050 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: GEORGE COCK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 20/01/1966 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1863	E	411097 416494	Status: Active Licence No: NE/027/0011/018 Details: Process Water Direct Source: GROUNDWATERS Point: BOREHOLE - COAL MEASURES - WOODLAND MILL Data Type: Point Name: Wooltex UK Ltd	Annual Volume (m^3): 164,250 Max Daily Volume (m^3): 450 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 13/11/2018 Version End Date:
Not shown	1976	SE	410450 414320	Status: Historical Licence No: 2/27/11/105 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL Data Type: Point Name: HINCHCLIFFE & HAIGH	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 28/04/1966 Version End Date:
Not shown	1976	SE	410450 414320	Status: Historical Licence No: 2/27/11/105 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL - MILLSTONE GRIT - LINTHWAITE Data Type: Point Name: HINCHCLIFFE & HAIGH	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 28/04/1966 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site — Identified

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1037	NE	409700 417000	Status: Historical Licence No: 2/27/11/066 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: LONGWOOD UPPER AND LOWER RESERVOIRS Data Type: Line Name: YORKSHIRE WATER SERVICES LTD	Annual Volume (m^3): 818,297 Max Daily Volume (m^3): 2,242 Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 27/01/1966 Version End Date:
Not shown	1038	NE	410000 416800	Status: Historical Licence No: 2/27/11/123 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: CLAYWOOD BROOK Data Type: Point Name: PARKWOOD MILLS CO LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/05/1966 Version End Date:
Not shown	1220	SE	410200 415100	Status: Historical Licence No: 2/27/11/042 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE - LINTHWAITE Data Type: Point Name: HARTFORD HOLDINGS LTD	Annual Volume (m^3): 31,822 Max Daily Volume (m^3): 159 Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/05/1989 Version End Date:
Not shown	1220	SE	410200 415100	Status: Historical Licence No: 2/27/11/042	Annual Volume (m^3): 31,822 Max Daily Volume (m^3): 159

ID	Distance (m)	Direction	NGR	Details	
				Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: HARTFORD HOLDINGS LTD	Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/05/1989 Version End Date:
Not shown	1220	SE	410200 415100	Status: Active Licence No: 2/27/11/042 Details: Process Water Direct Source: SURFACE WATER Point: RIVER COLNE - LINTHWAITE Data Type: Point Name: HARTFORD HOLDINGS LTD	Annual Volume (m^3): 31,822 Max Daily Volume (m^3): 159 Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/05/1989 Version End Date:
Not shown	1237	S	409400 414700	Status: Historical Licence No: 2/27/11/013 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: SURFACE WATER Point: SPRING-LINTHWAITE-HUDDERSFIELD Data Type: Point Name: COLNE VALLEY SPINNING CO LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 101 Version Start Date: 16/07/2002 Version End Date:
Not shown	1261	SE	410400 415300	Status: Active Licence No: 2/27/11/006 Details: Process Water Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: HARTFORD HOLDINGS LTD	Annual Volume (m^3): 30,117 Max Daily Volume (m^3): 146 Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 17/03/1989 Version End Date:
Not shown	1261	SE	410400 415300	Status: Historical Licence No: 2/27/11/006 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: HARTFORD HOLDINGS LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 17/03/1989 Version End Date:
Not shown	1261	SE	410400 415300	Status: Historical Licence No: 2/27/11/006 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: HARTFORD HOLDINGS LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 17/03/1989 Version End Date:
Not shown	1261	SE	410400 415300	Status: Active Licence No: 2/27/11/006 Details: Boiler Feed Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: HARTFORD HOLDINGS LTD	Annual Volume (m^3): 30,117 Max Daily Volume (m^3): 146 Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 17/03/1989 Version End Date:
Not shown	1356	NE	410330 416910	Status: Historical Licence No: 2/27/11/123 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: CLAY WOOD BROOK-PARKWOOD ROAD-LONGWOOD Data Type: Point Name: PARKWOOD MILLS CO LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 102 Version Start Date: 30/08/2002 Version End Date:
Not	1365	S	409600	Status: Historical	Annual Volume (m^3): -

ID	Distance (m)	Direction	NGR	Details	
shown			414600	Licence No: 2/27/11/013 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: COLNE VALLEY SPINNING CO LTD	Max Daily Volume (m³): - Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 14/12/1965 Version End Date:
Not shown	1365	S	409600 414600	Status: Historical Licence No: 2/27/11/013 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: SURFACE WATER Point: RIVER COLNE-LINTHWAITE Data Type: Point Name: COLNE VALLEY SPINNING CO LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 14/12/1965 Version End Date:
Not shown	1365	S	409600 414600	Status: Historical Licence No: 2/27/11/013 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: COLNE VALLEY SPINNING CO LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 14/12/1965 Version End Date:
Not shown	1365	S	409600 414600	Status: Historical Licence No: 2/27/11/013 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE-LINTHWAITE Data Type: Point Name: COLNE VALLEY SPINNING CO LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 14/12/1965 Version End Date:
Not shown	1365	S	409600 414600	Status: Active Licence No: 2/27/11/013(A) Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE-LINTHWAITE Data Type: Point Name: PROPERTY RENAISSANCE LTD	Annual Volume (m³): 9,092 Max Daily Volume (m³): 45 Application No: - Original Start Date: 16/07/2002 Expiry Date: - Issue No: 1 Version Start Date: 01/04/2008 Version End Date:
Not shown	1405	NE	410400 416900	Status: Historical Licence No: 2/27/11/115 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: CLAY WOOD BROOK/OAKSCAR RESERVOIR Data Type: Point Name: PARKWOOD MILLS CO LTD	Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 101 Version Start Date: 22/04/2002 Version End Date:
Not shown	1438	S	409200 414500	Status: Historical Licence No: 2/27/11/111 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE-WESTWOOD MILLS-LINTHWAITE Data Type: Point Name: MICHAEL WILSON RESTORATIONS	Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 101 Version Start Date: 10/12/2002 Version End Date:
Not shown	1486	S	409700 414500	Status: Historical Licence No: 2/27/11/111 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point	Annual Volume (m³): - Max Daily Volume (m³): - Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/01/1991

ID	Distance (m)	Direction	NGR	Details	
				Name: MICKMAN	Version End Date:
Not shown	1486	S	409700 414500	Status: Historical Licence No: 2/27/11/111 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER COLNE - LINTHWAITE Data Type: Point Name: MICKMAN	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/01/1991 Version End Date:
Not shown	1575	S	408900 414400	Status: Historical Licence No: 2/27/11/011 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: COLLINS & PRESTWICH & CO LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 14/12/1965 Version End Date:
Not shown	1605	W	407625 415781	Status: Historical Licence No: NE/027/0011/015 Details: Hydroelectric Power Generation Direct Source: SURFACE WATER Point: CRIMBLE CLOUGH AT WALLER CLOUGH, HUDDERSFIELD Data Type: Point Name: Garside	Annual Volume (m^3): 145,152 Max Daily Volume (m^3): 484 Application No: - Original Start Date: 18/07/2013 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 18/07/2013 Version End Date:
Not shown	1759	S	408820 414230	Status: Historical Licence No: 2/27/11/179 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: SURFACE WATER Point: RIVER COLNE - LINTHWAITE Data Type: Line Name: GROSVENOR CHEMICALS LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 09/02/1996 Expiry Date: - Issue No: 100 Version Start Date: 09/02/1996 Version End Date:
Not shown	1759	S	408820 414230	Status: Historical Licence No: 2/27/11/179 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Line Name: GROSVENOR CHEMICALS LIMITED	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: 09/02/1996 Expiry Date: - Issue No: 100 Version Start Date: 09/02/1996 Version End Date:

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site — Identified

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

ID	Distance (m)	Direction	NGR	Details	
Not shown	1037	NE	409700 417000	Status: Historical Licence No: 2/27/11/066 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: LONGWOOD UPPER AND LOWER RESERVOIRS Data Type: Line Name: YORKSHIRE WATER SERVICES LTD	Annual Volume (m^3): 818,297 Max Daily Volume (m^3): 2,242 Original Application No: - Original Start Date: 27/01/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not	1237	S	409400	Status: Historical	Annual Volume (m^3): -

ID	Distance (m)	Direction	NGR	Details	
shown			414700	Licence No: 2/27/11/013 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: SURFACE WATER Point: SPRING-LINTHWAITE-HUDDERSFIELD Data Type: Point Name: COLNE VALLEY SPINNING CO LTD	Max Daily Volume (m^3): - Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 101 Version Start Date: Version End Date:
Not shown	1278	S	409740 414730	Status: Historical Licence No: 2/27/11/191 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: GROUNDWATERS Point: BOREHOLE-MILLSTONE GRIT-TITANIC MILLS-LINTHWAITE Data Type: Point Name: LOWRY HOMES PLC	Annual Volume (m^3): 54,000 Max Daily Volume (m^3): 150 Original Application No: - Original Start Date: 12/03/2005 Expiry Date: 31/12/2010 Issue No: 2 Version Start Date: Version End Date:
Not shown	1278	S	409740 414730	Status: Historical Licence No: 2/27/11/191 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: GROUNDWATERS Point: BOREHOLE-COAL MEASURES-TITANIC MILLS-LINTHWAITE Data Type: Point Name: LOWRY HOMES PLC	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 12/03/2005 Expiry Date: 31/12/2010 Issue No: 1 Version Start Date: Version End Date:
Not shown	1278	S	409740 414730	Status: Active Licence No: NE/027/0011/007 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: GROUNDWATERS Point: BOREHOLE-MILLSTONE GRIT-TITANIC MILLS-LINTHWAITE Data Type: Point Name: PROPERTY RENAISSANCE LTD	Annual Volume (m^3): 43,070 Max Daily Volume (m^3): 118 Original Application No: - Original Start Date: 21/02/2011 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: Version End Date:
Not shown	1365	S	409600 414600	Status: Historical Licence No: 2/27/11/013 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: SURFACE WATER Point: RIVER COLNE-LINTHWAITE Data Type: Point Name: COLNE VALLEY SPINNING CO LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1365	S	409600 414600	Status: Historical Licence No: 2/27/11/013 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: COLNE VALLEY SPINNING CO LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1575	S	408900 414400	Status: Historical Licence No: 2/27/11/011 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: SURFACE WATER Point: RIVER COLNE Data Type: Point Name: COLLINS & PRESTWICH & CO LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site — None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site — None identified

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

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site — Identified

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
81	NW	Minor Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site — Identified

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

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

The following Chemical Quality records are shown on the Hydrology Map (6e):

					Chemical Quality Grade				
ID	Distance (m)	Direction	NGR	River Quality Grade	2005	2006	2007	2008	2009
Not shown	1413	S	409571 414545	River Name: River Colne Reach: Crimble Clough Hoyle House Brook End/Start of Stretch: End of Stretch NGR	B	A	A	A	A
Not shown	1413	S	409571 414545	River Name: River Colne Reach: Hoyle House Brook Longwood Beck End/Start of Stretch: Start of Stretch NGR	B	A	A	A	A
Not shown	1446	S	409710 414544	River Name: River Colne Reach: Crimble Clough Hoyle House Brook End/Start of Stretch: Sample Point NGR	B	A	A	A	A
Not shown	1446	S	409710 414544	River Name: River Colne Reach: Hoyle House Brook Longwood Beck End/Start of Stretch: Sample Point NGR	B	A	A	A	A
Not shown	1446	S	409710 414544	River Name: River Colne Reach: Longwood Beck River Holme End/Start of Stretch: Sample Point NGR	B	A	A	A	A

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

This watercourse information is provided by Ordnance Survey MasterMap Water Network. The data provides a detailed centre line following the curve of the waterway precisely, so all distances provided in the report should be understood as measurements to the centreline rather than a measurement to the nearest point of the watercourse. Underground watercourses are inferred from entry and exit points so caution is advised in using these to indicate precise locations of underground watercourses when planning site investigation and development.

The following Ordnance Survey MasterMap Water Network records are represented on the Hydrology Map (6e):

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	198 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
14	198 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
2	235 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
15	235 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
3	242 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
16	242 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
4	245 NE	-	Lake, loch or reservoir.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.1
5	245 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
17	245 NE	-	Lake, loch or reservoir.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 4.1
18	245 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
6	251 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
7	251 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions)

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				Average Width in Watercourse Section (m): Not Provided
8	251 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
19	251 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
20	251 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
21	251 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
9	257 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
22	257 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
10	261 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
23	261 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
11	267 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
24	267 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
12	272 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
13	272 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
25	272 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
26	272 SW	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
14	306 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
15	306 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	306 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	306 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
16	308 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	308 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
17	343 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
18	343 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
30	343 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
31	343 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
19	369	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	SE			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.9
Not shown	369 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.9
20	372 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	372 S	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
21	395 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	395 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
22	396 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	396 NE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
23	451 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	451 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
24	453 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
Not shown	453 SE	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.8
25	456 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions)

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				Average Width in Watercourse Section (m): Not Provided
Not shown	456 W	-	Inland river not influenced by normal tidal action.	Catchment Area: Aire and Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

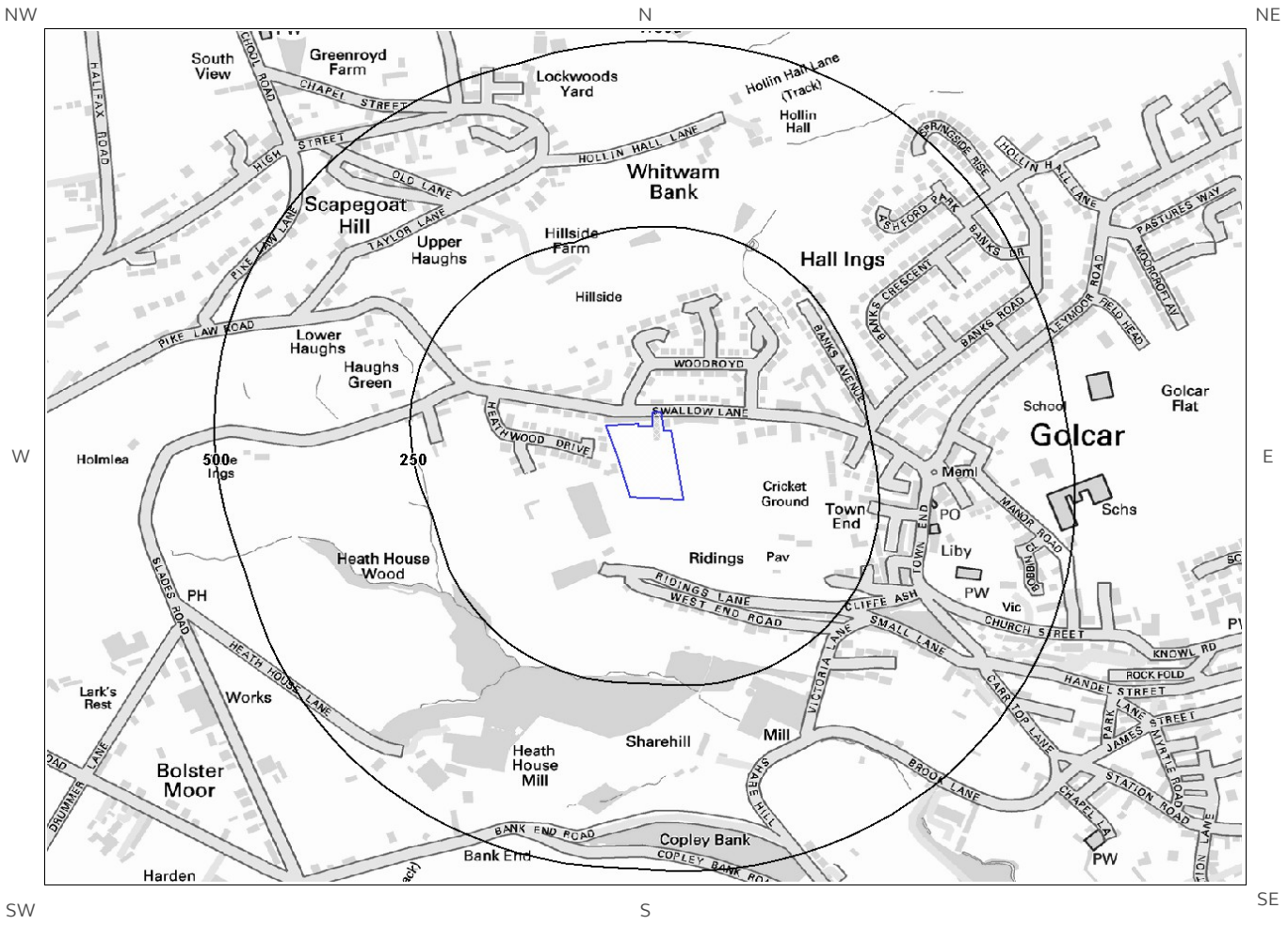
6.11 Surface Water Features

Surface water features within 250m of the study site Identified

The following surface water records are not represented on mapping:

Distance (m)	Direction
198	NE
235	S
242	W

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



Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

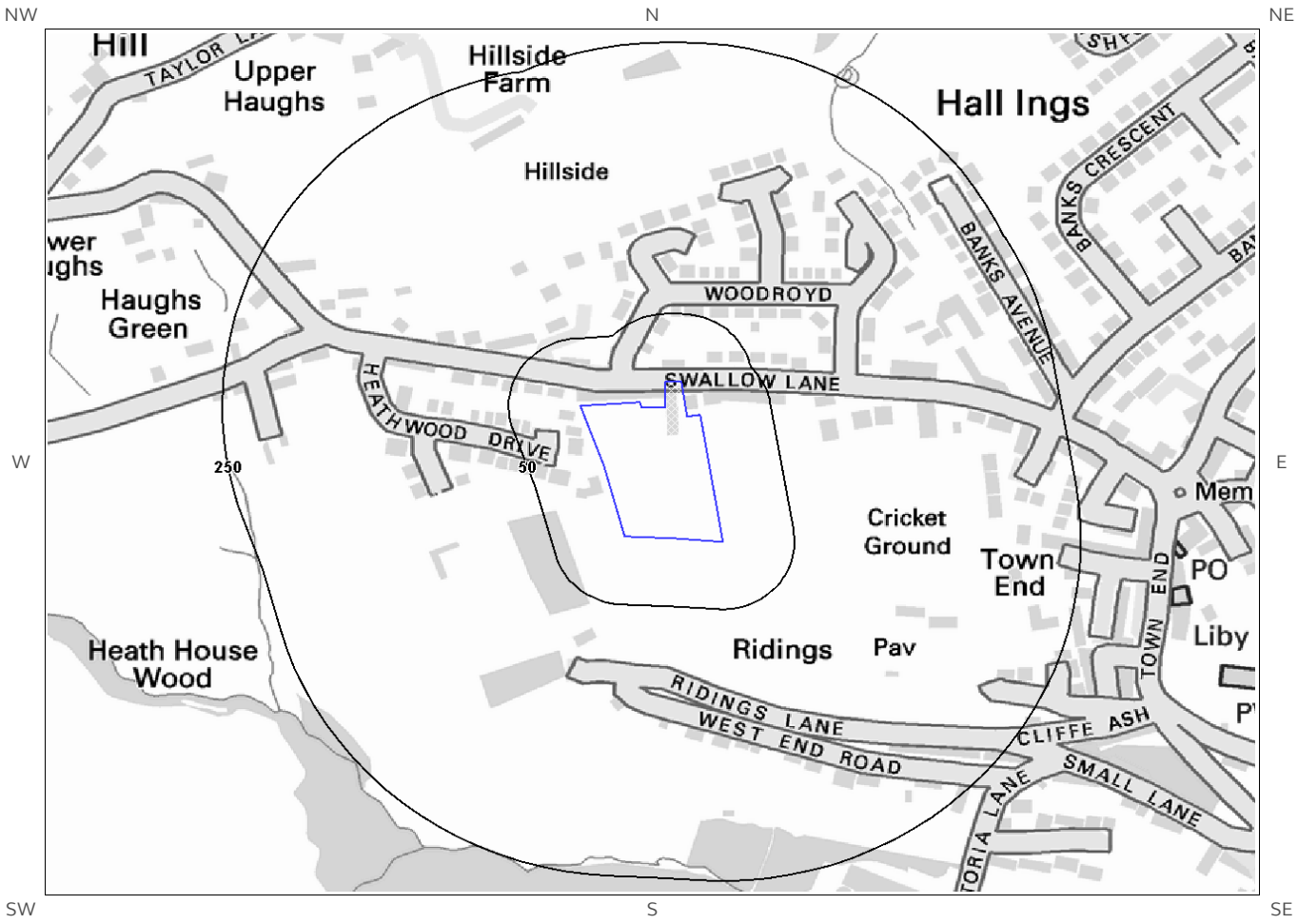
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

Very Low

Low

Medium

High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m — None identified

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

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m — None identified

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

Database searched and no data found.

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

Highest risk of flooding onsite — Very Low

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

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

7.4 Flood Defences

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site — None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site	None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site	Identified
Clearwater Flooding or Superficial Deposits Flooding	Clearwater Flooding

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

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

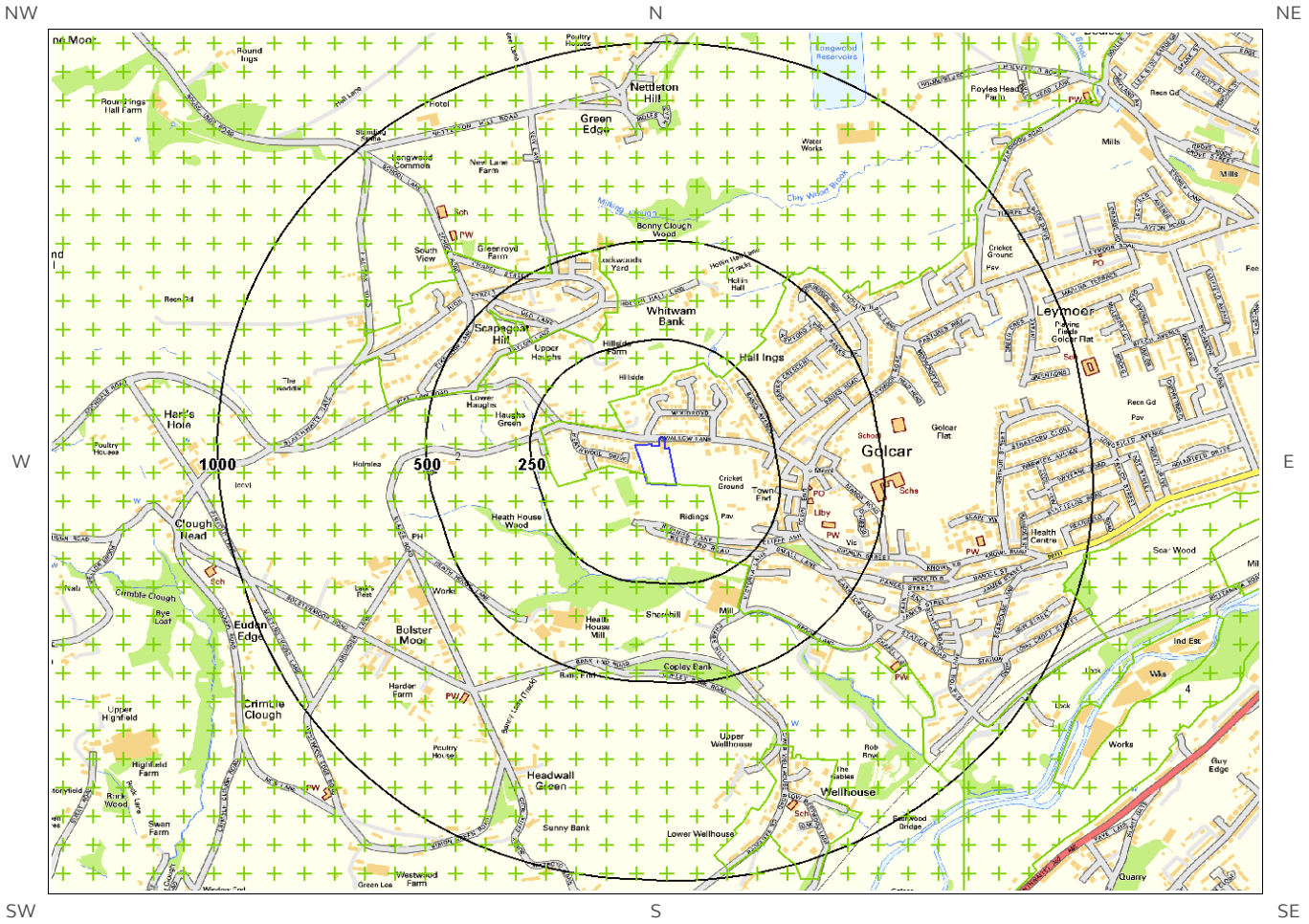
7.8 Groundwater Flooding Confidence Areas

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

8. Designated Environmentally Sensitive Sites Map



8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site	Identified

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1512	N	Unknown	Ancient Replanted Woodland

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

5

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
2	0	On Site	Liverpool, Manchester and West Yorks Greenbelt	Kirklees District (B)
3	864	NE	Liverpool, Manchester and West Yorks Greenbelt	Kirklees District (B)
4	943	SE	Liverpool, Manchester and West Yorks Greenbelt	Kirklees District (B)
Not shown	1584	SE	Liverpool, Manchester and West Yorks Greenbelt	Kirklees District (B)
Not shown	1967	NW	Liverpool, Manchester and West Yorks Greenbelt	Calderdale District (B)

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

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

9.1.1 Shrink Swell

Maximum Shrink-Swell*[*] hazard rating identified on the study site — Very Low

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

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

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site — Low

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

Hazard
Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site — Negligible

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

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

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

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site — Negligible

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

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

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site — Very Low

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

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

9.1.6 Running Sand

Maximum Running Sand** hazard rating identified on the study site — Negligible

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

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

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

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The site is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site — None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary — Identified

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

Distance (m)	Direction	Name	Commodity	Assessment of likelihood
0.0	On Site	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

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

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site — None identified
Guidance: No Guidance Required.

Contact Details

e.Michael D Joyce Associates LLP
Telephone: (0)1924 360458
mdja@geoenvironmental.co.uk

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

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506
Web: **www.environment-agency.gov.uk**
Email: enquiries@environment-agency.gov.uk

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

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: Kirklees Council
Phone: 01484 221 000
Web: http://www.kirklees.gov.uk/
Address: Civic Centre 3, Market Street, Huddersfield, HD1 2EY

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

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:

https://www.groundsure.com/terms-and-conditions-feb11-2019

Michael D Joyce Associates LLP

6, South Parade,
Wakefield, WF1 1LR

Report Reference: HMD-354-6394125

Your Reference: Swallow_Lane_-_Golcar_-_Phase_2

Report Date 11 Oct 2019

Report Delivery Method: Email - pdf

Geo Insight

Address: 409327, 415985,

Dear Sir/ Madam,

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

If you need any further assistance, please do not hesitate to contact our helpline on (0)1924 360458 quoting the above report reference number.

Yours faithfully,

Michael D Joyce Associates LLP

Enc.
Groundsure Geo Insight

Geo Insight

Address:	**409327, 415985,**
Date:	**11 Oct 2019**
Reference:	**HMD-354-6394125**
Client:	**Michael D Joyce Associates LLP**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	26-Mar-2012
Grid Reference:	409261,415987
Site Size:	0.7439ha

Groundsure
LOCATION INTELLIGENCE

mdja

Contents Page

Overview of Findings

The Groundsure Geo Insight 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 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

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

Section 1: Geology 1:10,000 Scale		
1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	No
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	Yes
1.3 Bedrock, Solid Geology and linear features	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 of linear features within 500m of the study site boundary at 1:10,000 scale?	Yes

Section 2: Geology 1:50,000 Scale		
2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	No
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	No
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	Yes
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and linear features	2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?	Yes
	2.3.3 Are there any records of linear features within 500m of the study site boundary?	Yes

Section 3: Radon

3. Radon	3.1Is 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 1 and 3% of properties are above the Action Level.
	3.2Radon Protection	No radon protective measures are necessary.

Section 4: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	2	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	0	12

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	1	0	0	0	2
5.5 Non–Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Cornwall and Devon Metalliferous Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0

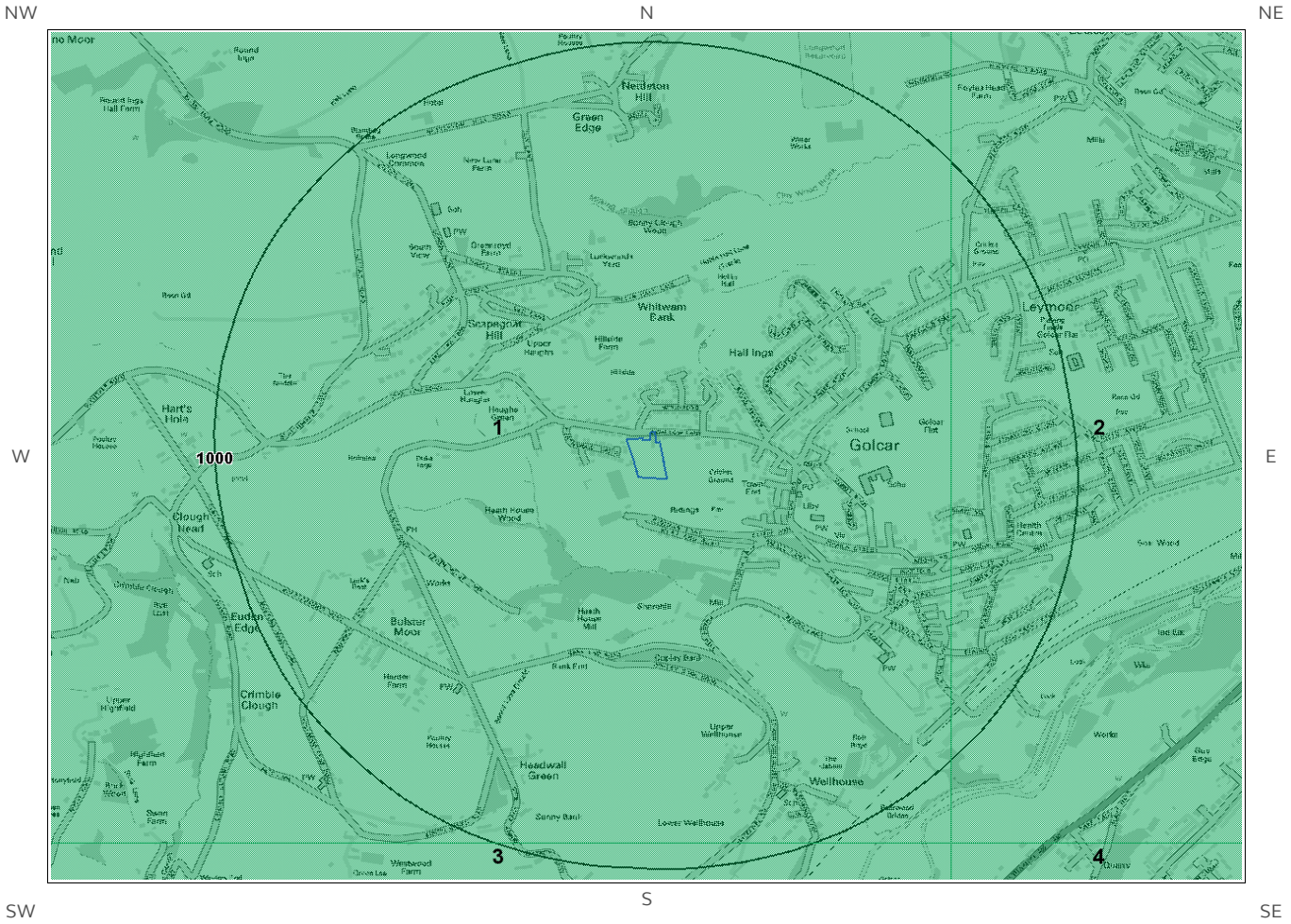
Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Very Low
6.2 Landslides	Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Negligible
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Negligible

Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	0	0	4

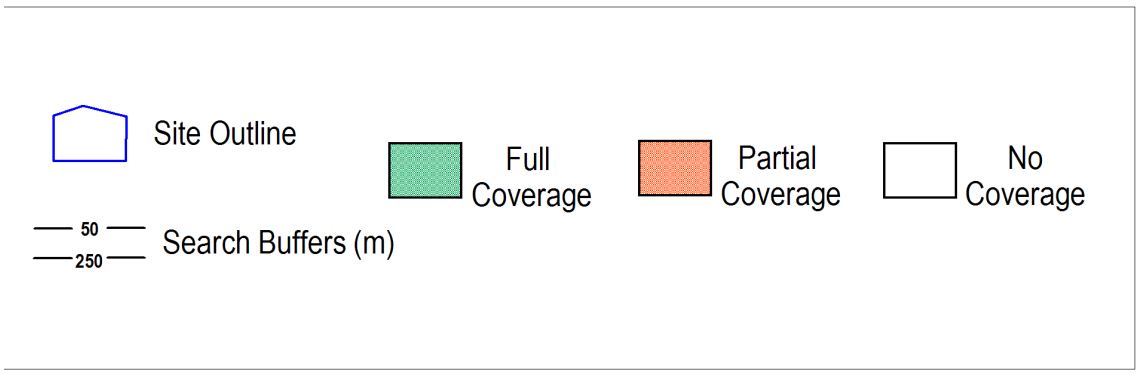
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	3	1	0

Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500
9.1 Tunnels	0	0	0	Not Searched
9.2 Historical Railway and Tunnel Features	0	0	0	Not Searched
9.3 Historical Railways	0	0	0	Not Searched
9.4 Active Railways	0	0	0	Not Searched
9.5 Railway Projects	0	0	0	0

1:10,000 Scale Availability



1_10,000 Availability Legend



Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	Some deposits are mapped
2	690.0	Some deposits are mapped	Full	Full	Some deposits are mapped
3	934.0	Some deposits are mapped	Full	Full	Some deposits are mapped
4	1161.0	Some deposits are mapped	Full	Full	Some deposits are mapped

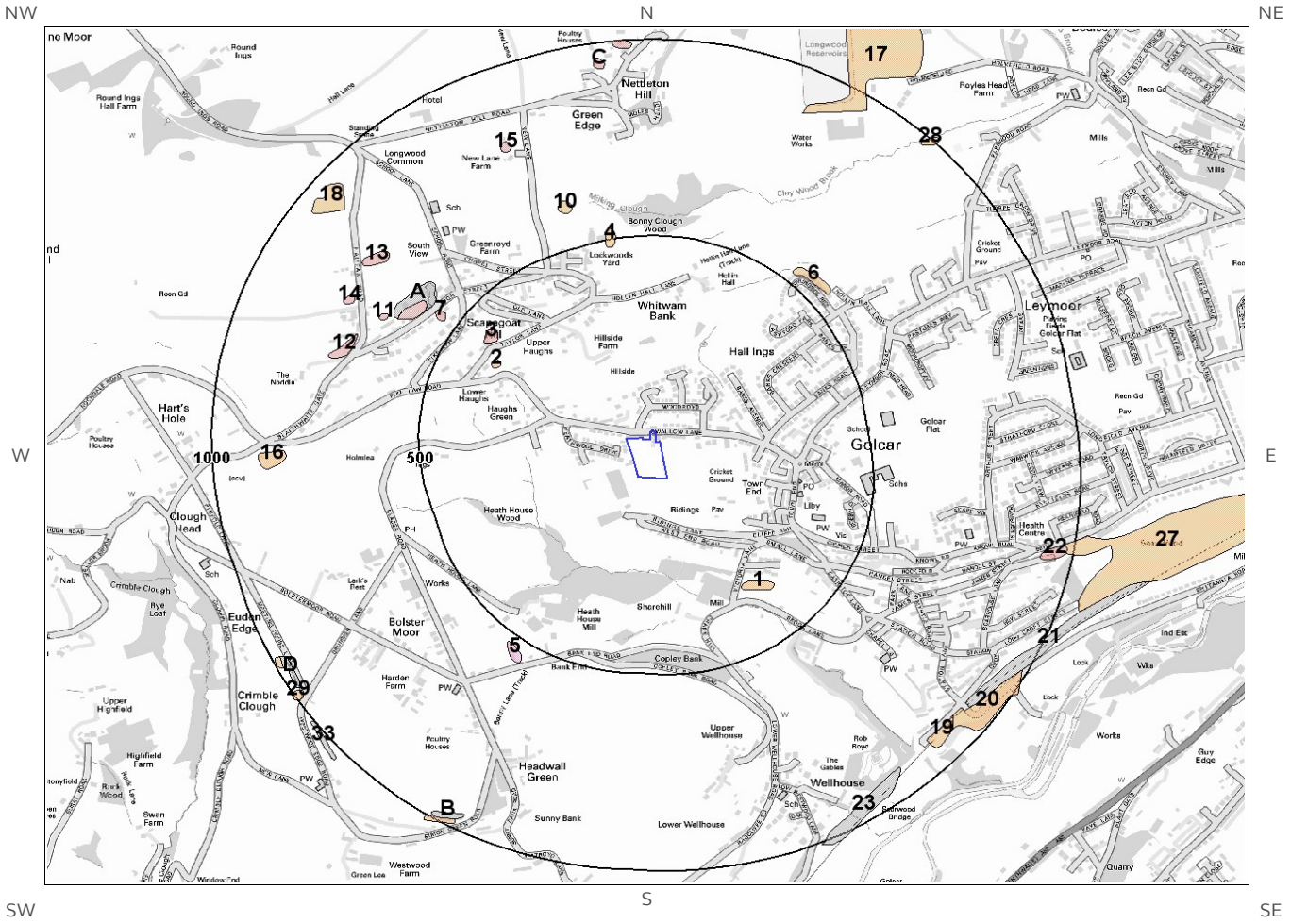
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

1 Geology (1:10,000 scale).

1.1 Artificial Ground map (1:10,000 scale)



Artificial Ground Legend

Site Outline

Search Buffers (m)

500

1000

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

1. Geology 1:10,000 scale

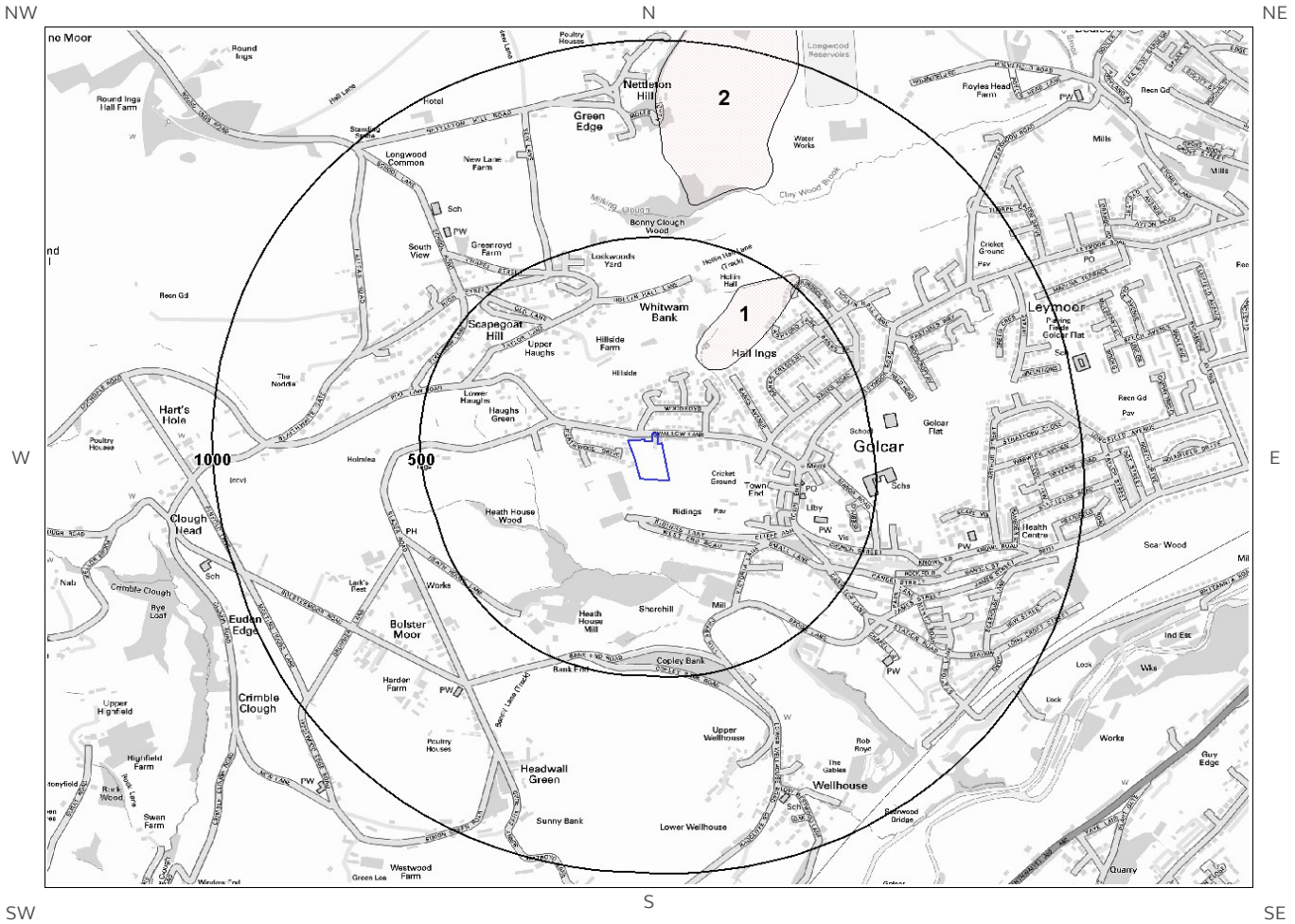
1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	325.0	SE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	356.0	NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	399.0	NW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
4	481.0	N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

1.2 Superficial Deposits and Landslips map (1:10,000 scale)



Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

1.2.2 Landslip

Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale?

Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	205.0	NE	SLIP-UKNOWN	Landslide Deposits	Unknown/unclassified Entry

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

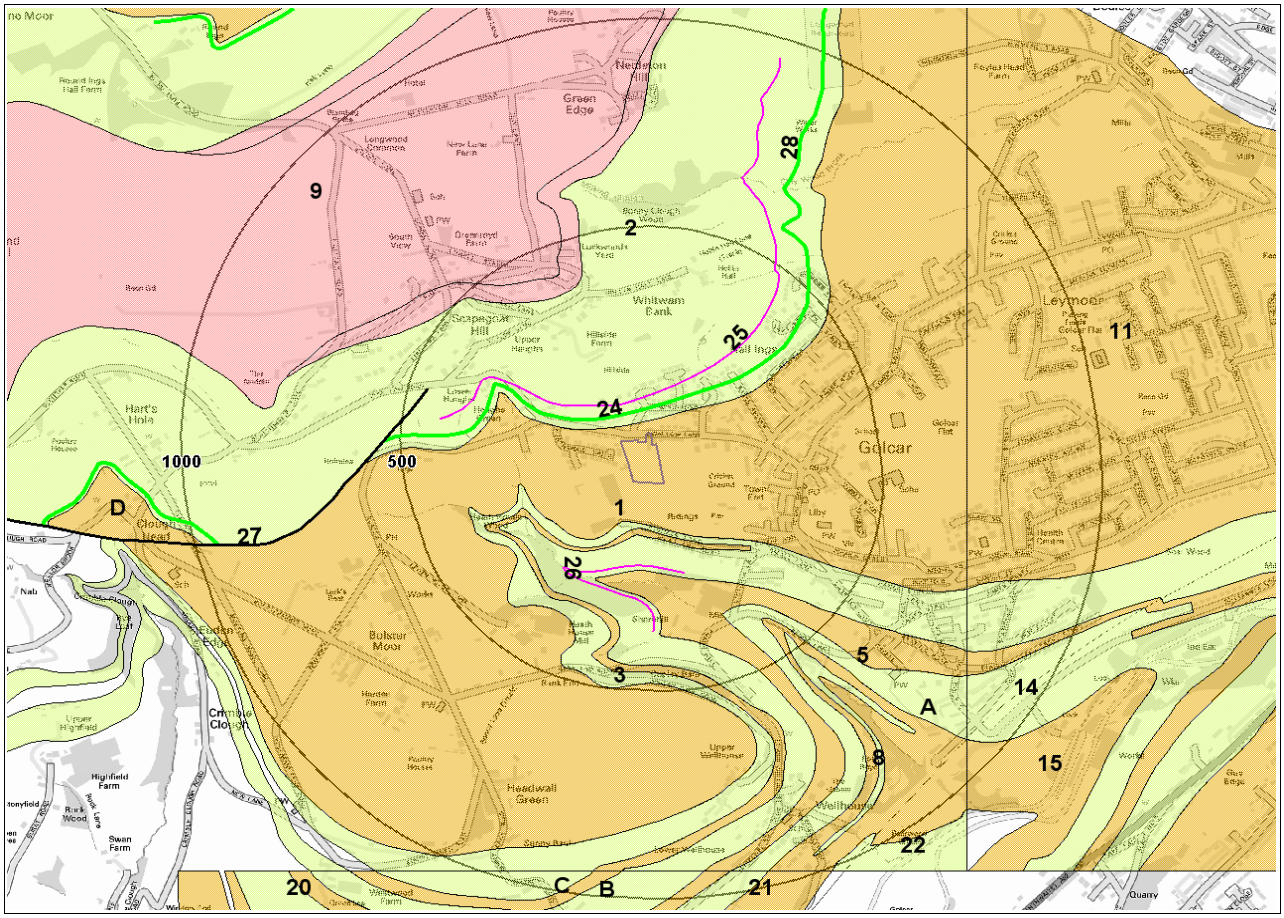
This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and linear features map (1:10,000 scale)

NW N NE

W E

SW S SE



Bedrock and linear features Legend

Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and linear features

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	HDW-SDST	Huddersfield White Rock - Sandstone	Marsdenian Sub-age
2	31.0	N	MG-MDSS	Millstone Grit Group [see Also Migr] - Mudstone, Siltstone And Sandstone	Namurian Age
3	97.0	S	MG-MDSS	Millstone Grit Group [see Also Migr] - Mudstone, Siltstone And Sandstone	Namurian Age
4	111.0	S	MGCZ-SDST	Unnamed Sandstone Of Marsdenian Age (in Millstone Grit Group) - Sandstone	Marsdenian Sub-age
5	212.0	S	GSYG-SDST	Guiseley Grit - Sandstone	Marsdenian Sub-age
6A	337.0	SE	MG-MDSS	Millstone Grit Group [see Also Migr] - Mudstone, Siltstone And Sandstone	Namurian Age
7	377.0	N	RF-SDST	Rough Rock Flags - Sandstone	Yeadonian Sub-age
8	396.0	SE	MGG-SDST	Midgley Grit - Sandstone	Marsdenian Sub-age
9	424.0	N	RR-SDST	Rough Rock - Sandstone	Yeadonian Sub-age
10A	451.0	SE	MG-MDSS	Millstone Grit Group [see Also Migr] - Mudstone, Siltstone And Sandstone	Namurian Age

1.3.2 Linear features

Are there any records of linear features within 500m of the study site boundary at 1:10,000 scale? Yes

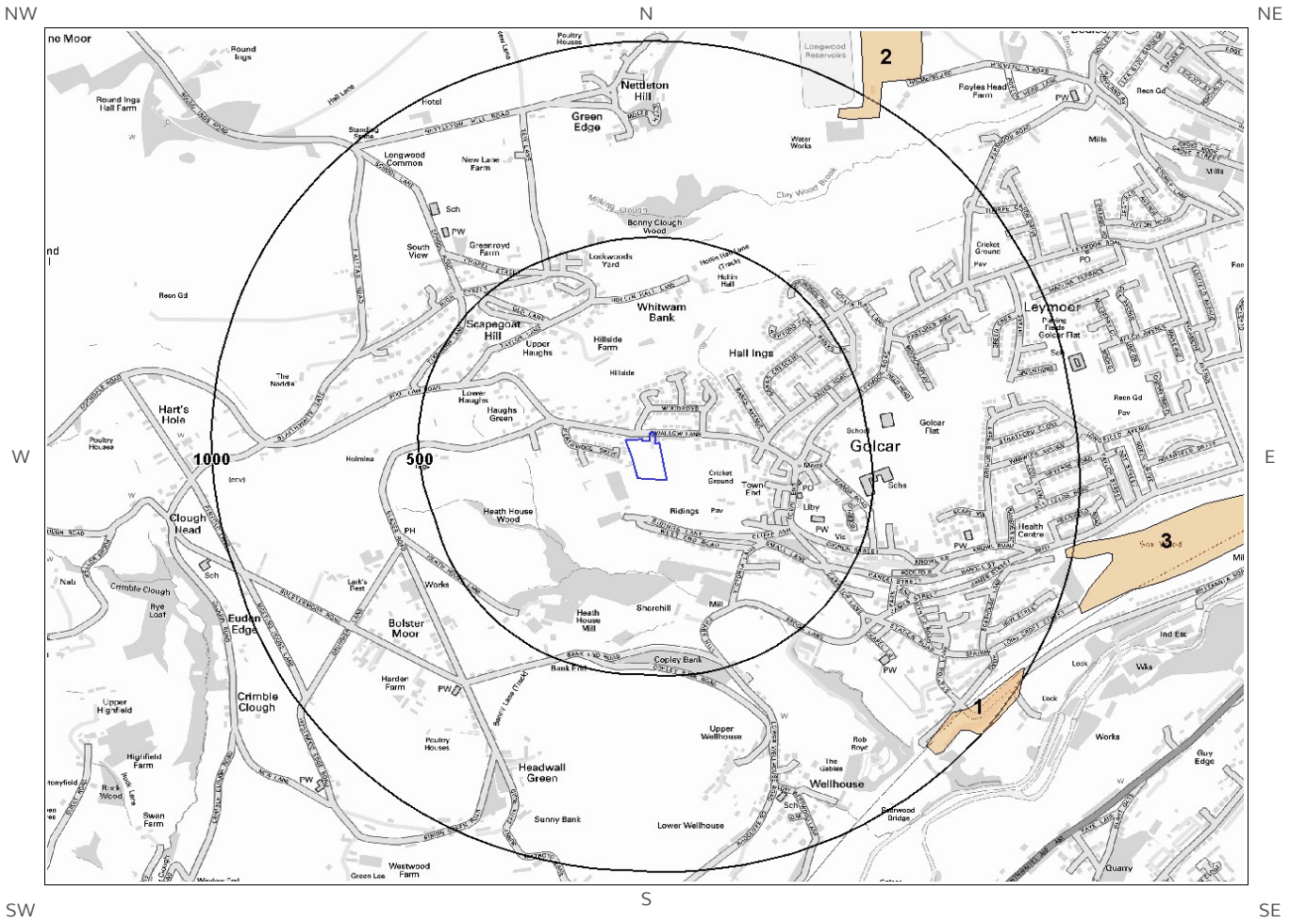
ID	Distance (m)	Direction	Category Description	Feature Description
24	59.0	N	ROCK	Coal seam, inferred
25	85.0	N	FOSSIL_HORIZON	Fossil horizon, marine band
26	202.0	S	FOSSIL_HORIZON	Fossil horizon, marine band
27	455.0	W	FAULT	Normal fault, inferred; crossmarks on downthrow side

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

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

2 Geology 1:50,000 Scale

2.1 Artificial Ground map



Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 077

2.1.1 Artificial/ Made Ground

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

Database searched and no data found.

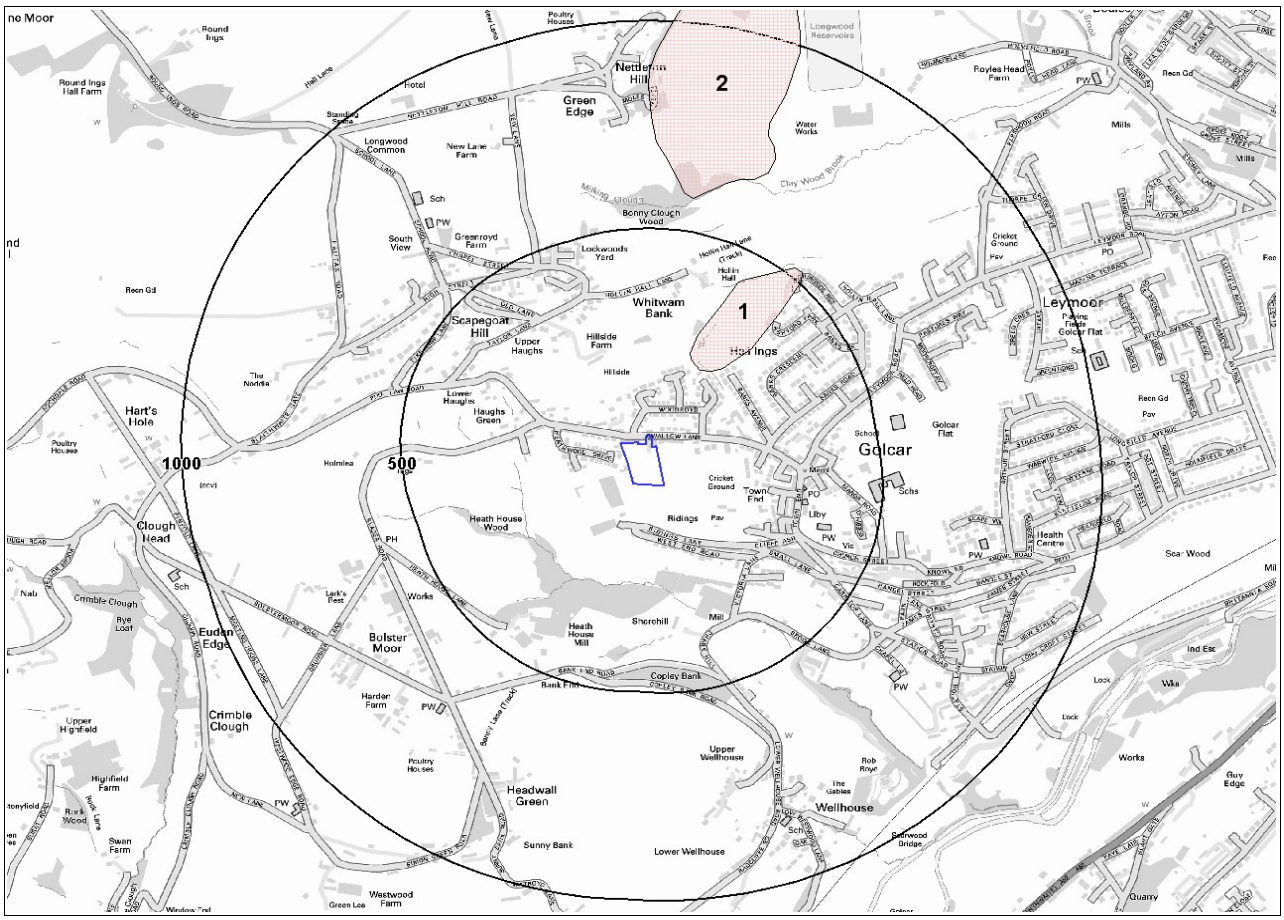
2.1.2 Permeability of Artificial Ground

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

Database searched and no data found.

2.2 Superficial Deposits and Landslips map (1:50,000 scale)

NW N NE



W E

SW S SE

Site Outline

500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? No

Database searched and no data found.

2.2.2 Permeability of Superficial Ground

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

Database searched and no data found.

2.2.3 Landslip

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	195.0	NE	SLIP-UKNOWN	LANDSLIDE DEPOSITS	UNKNOWN/UNCLASSIFIED ENTRY

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

This Geology shows the main components as discrete layers, there 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.

2.2.4 Landslip Permeability

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

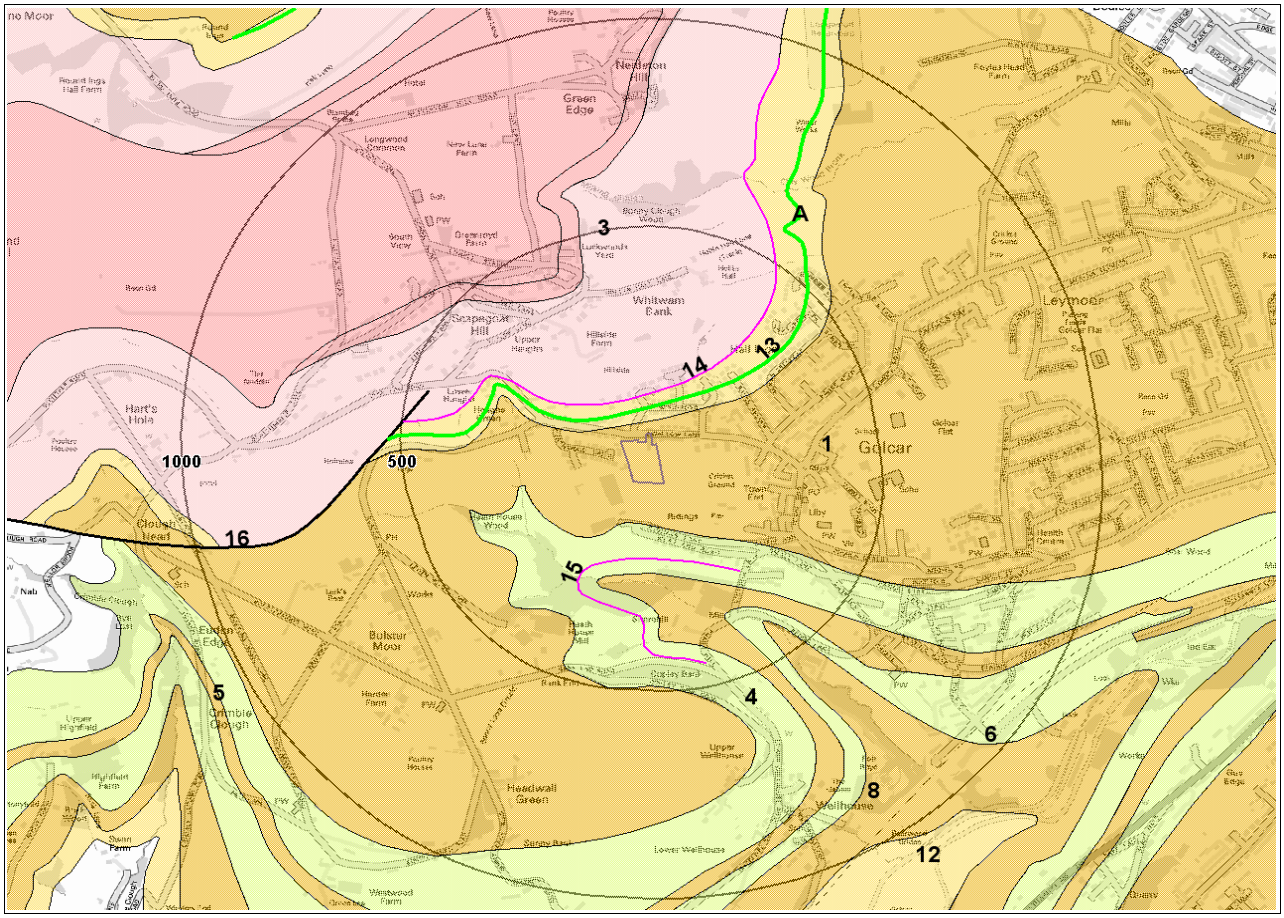
Database searched and no data found.

2.3 Bedrock and linear features map (1:50,000 scale)

NW N NE

W E

SW S SE



Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & linear features

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 077

2.3.1 Bedrock/Solid Geology

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

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	HDW-SDST	HUDDERSFIELD WHITE ROCK - SANDSTONE	NAMURIAN
2A	30.0	N	MARSD-MDSI	MARSDEN FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
3	92.0	N	ROSSE-MDSI	ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
4	99.0	S	MG-MDSS	MILLSTONE GRIT GROUP [SEE ALSO MIGR] - MUDSTONE, SILTSTONE AND SANDSTONE	NAMURIAN
5	218.0	S	GSYG-SDST	GUISELEY GRIT - SANDSTONE	NAMURIAN
6	340.0	SE	MG-MDSS	MILLSTONE GRIT GROUP [SEE ALSO MIGR] - MUDSTONE, SILTSTONE AND SANDSTONE	NAMURIAN
7	375.0	N	RF-SDST	ROUGH ROCK FLAGS - SANDSTONE	NAMURIAN
8	402.0	SE	MGG-SDST	MIDGLEY GRIT - SANDSTONE	NAMURIAN
9A	425.0	N	RR-SDST	ROUGH ROCK - SANDSTONE	NAMURIAN

2.3.2 Permeability of Bedrock Ground

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

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	High	Moderate
30.0	N	Fracture	Moderate	Low

2.3.3 Linear features

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

ID	Distance	Direction	Category Description	Feature Description
13	60.0	N	ROCK	Coal seam, inferred
14	92.0	N	FOSSIL_HORIZON	Marine band
15	183.0	S	FOSSIL_HORIZON	Marine band
16	451.0	W	FAULT	Fault, inferred

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

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

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3 Radon Data

3.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

3.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

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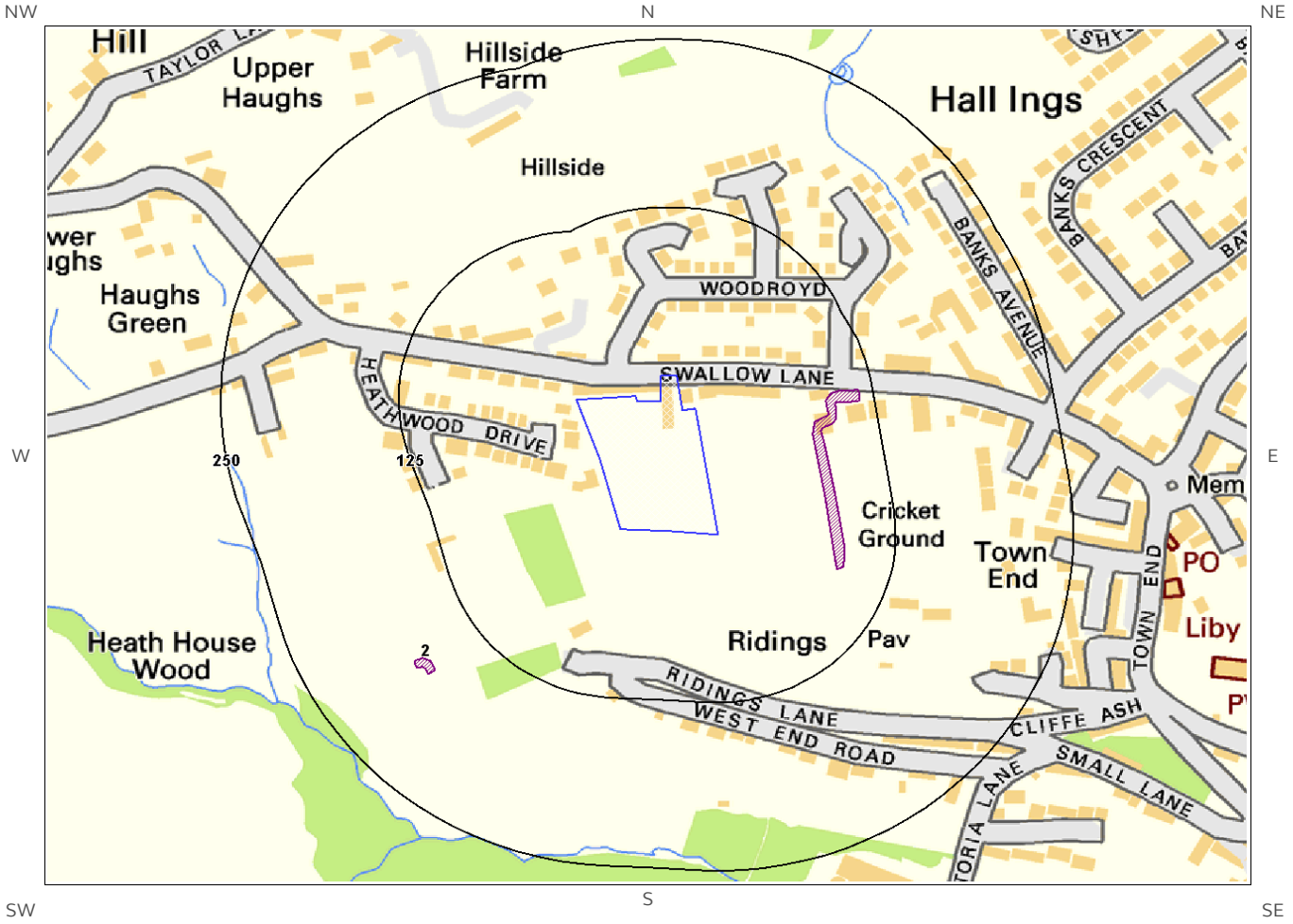
4 Ground Workings map



Ground Workings Legend

Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

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

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

ID	Distance (m)	Direction	NGR	Use	Date
1	78.0	E	409386 415974	Unspecified Ground Workings	1905
2	165.0	SW	409104 415836	Unspecified Ground Workings	1905

4.2 Historical Underground Working Features derived from Historical Mapping

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

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

4.3 Current Ground Workings

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

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

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

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	546.0	NW	408762 416346	Sandstone	Pike Law Lane	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	612.0	NW	408732 416416	Sandstone	Pike Law Delf	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	621.0	NW	408692 416376	Sandstone	Pike Law Delf	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	652.0	NW	408630 416330	Sandstone	Pike Law Delf	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	757.0	NW	408605 416488	Sandstone	Halfway Road	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	787.0	N	408914 416763	Sandstone	New Lane	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	818.0	NW	408518 416470	Sandstone	Halfway Road	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	880.0	N	409193 416928	Sandstone	Nettleton Hill	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	943.0	N	409137 416985	Sandstone	Park	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	974.0	SW	408790 415074	Sandstone	Dyke End	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	984.0	SW	408376 415468	Sandstone	Westwood Edge	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	994.0	N	409184 417042	Sandstone	Nettleton Hiill	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

5 Mining, Extraction & Natural Cavities map

Mining, Extraction and Natural Cavities Legend

Site Outline

Search Buffers (m) — 250 — 500

Historical Mining

Non-Coal Mining Cavities

Natural Cavities (point data)

Natural Cavities (polygon data)

Non-Coal Mining

Highly likely

Likely

Unlikely

Highly unlikely

Rare

5 Mining, Extraction & Natural Cavities

5.1 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.

5.2 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? No

Database searched and no data found.

5.3 Johnson Poole and Bloomer

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

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

The following information provided by JPB is not represented on mapping: Database searched and no data found.

5.4 Non-Coal Mining

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

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

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

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
2	690.0	E	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
Not shown	934.0	S	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

5.5 Non-Coal Mining Cavities

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

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

Database searched and no data found.

5.6 Natural Cavities

This dataset provides information based on the Peter Brett Associates natural cavities database. The dataset is made up of points and polygons. Where polygons are used these represent an area in which it is expected the cavities could be found. It does not indicate that cavities are present everywhere within the polygon, and caution should be used in the interpretation of this data.

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

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Cheshire Brine Subsidence Compensation Board.

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

Database searched and no data found.

5.8 Gypsum Extraction

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

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

Database searched and no data found.

5.9 Cornwall and Devon Metalliferous Mining

This dataset provides information on metalliferous mining areas in Cornwall/Devon and is derived from records held by Mining Searches UK.

Are there any Cornwall and Devon Metalliferous Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.10 Clay Mining

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

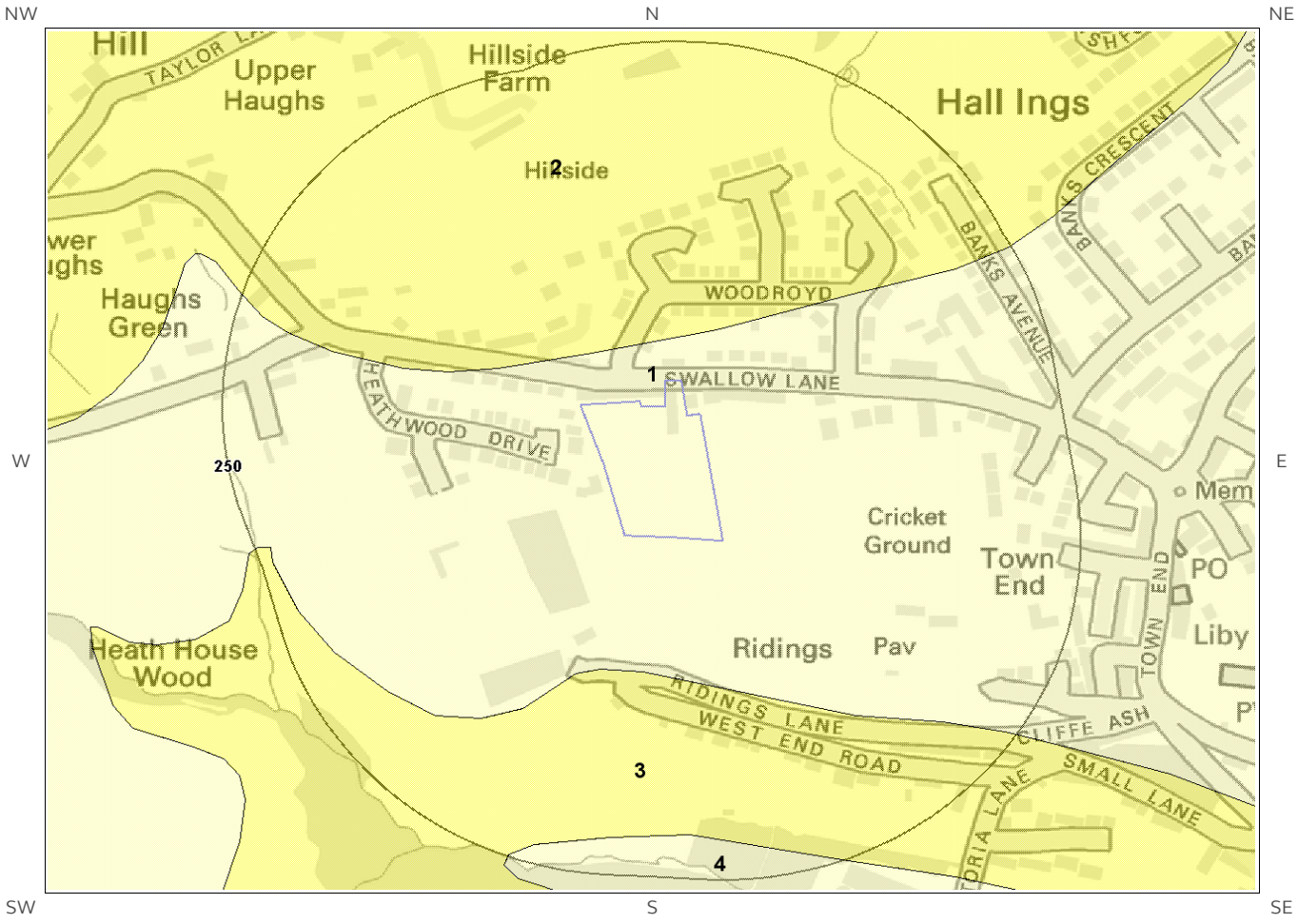
Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay map



Shrink Swell Clay Legend

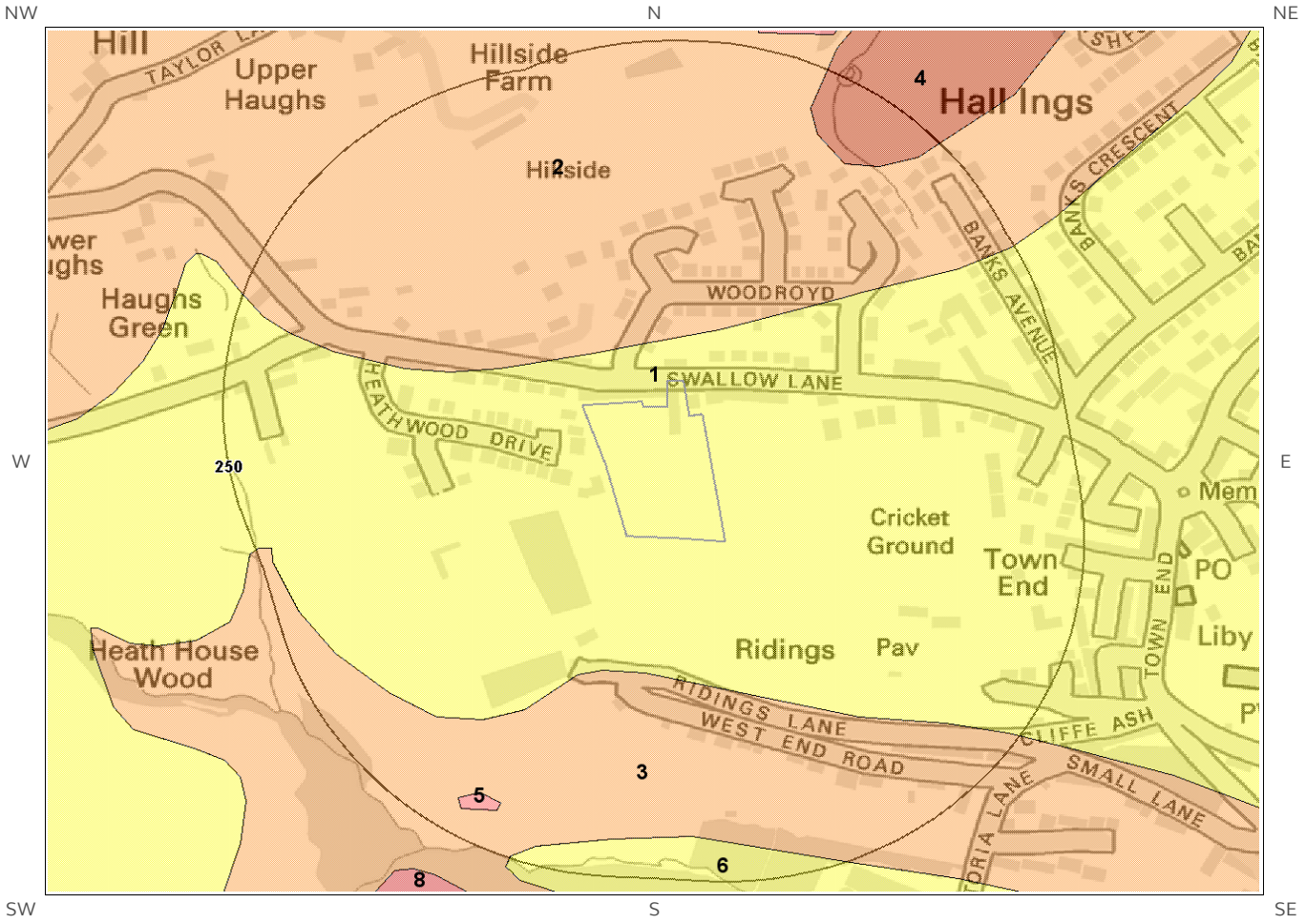
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.2 Landslides map



Landslides Legend

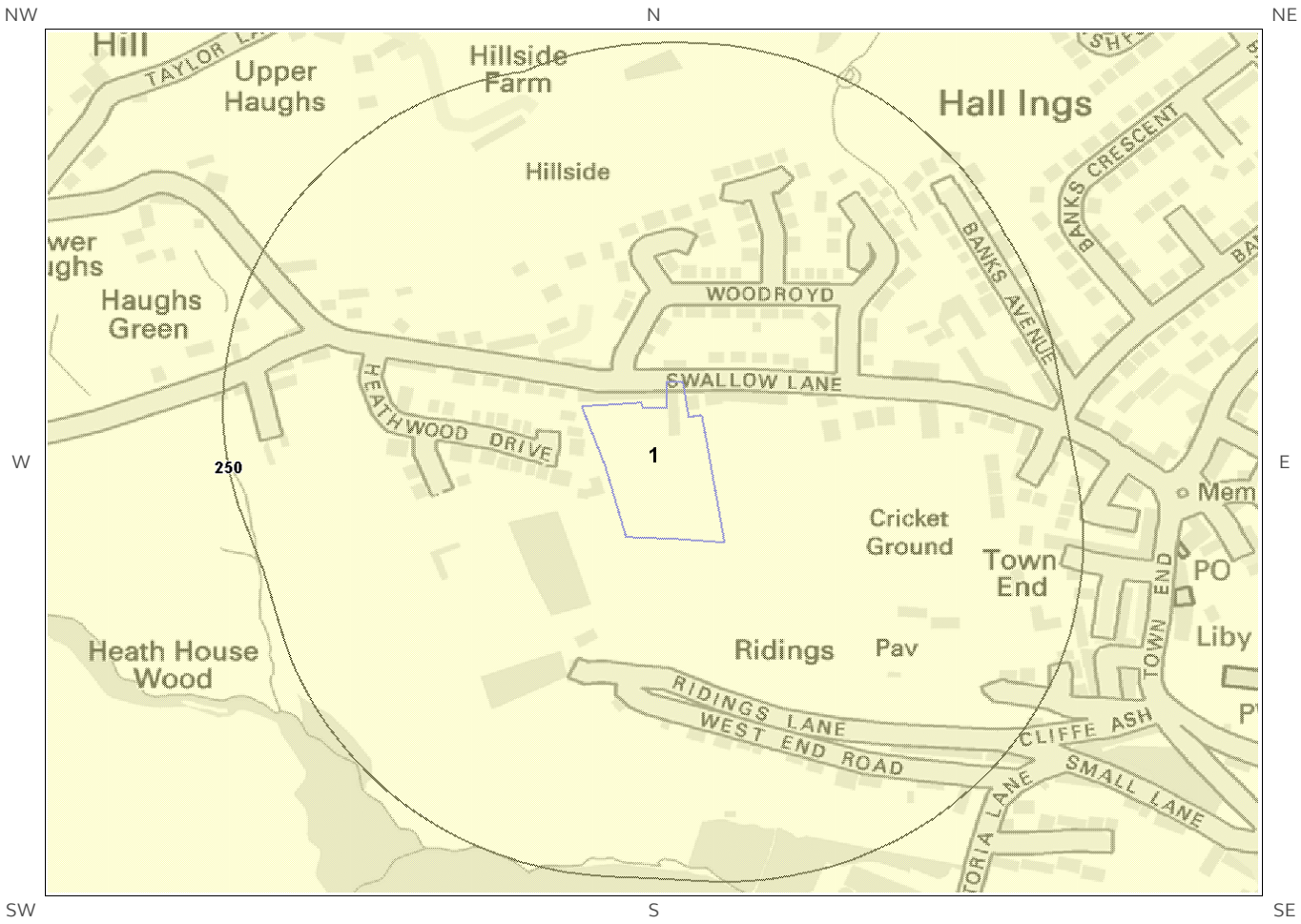
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.3 Ground Dissolution of Soluble Rocks map



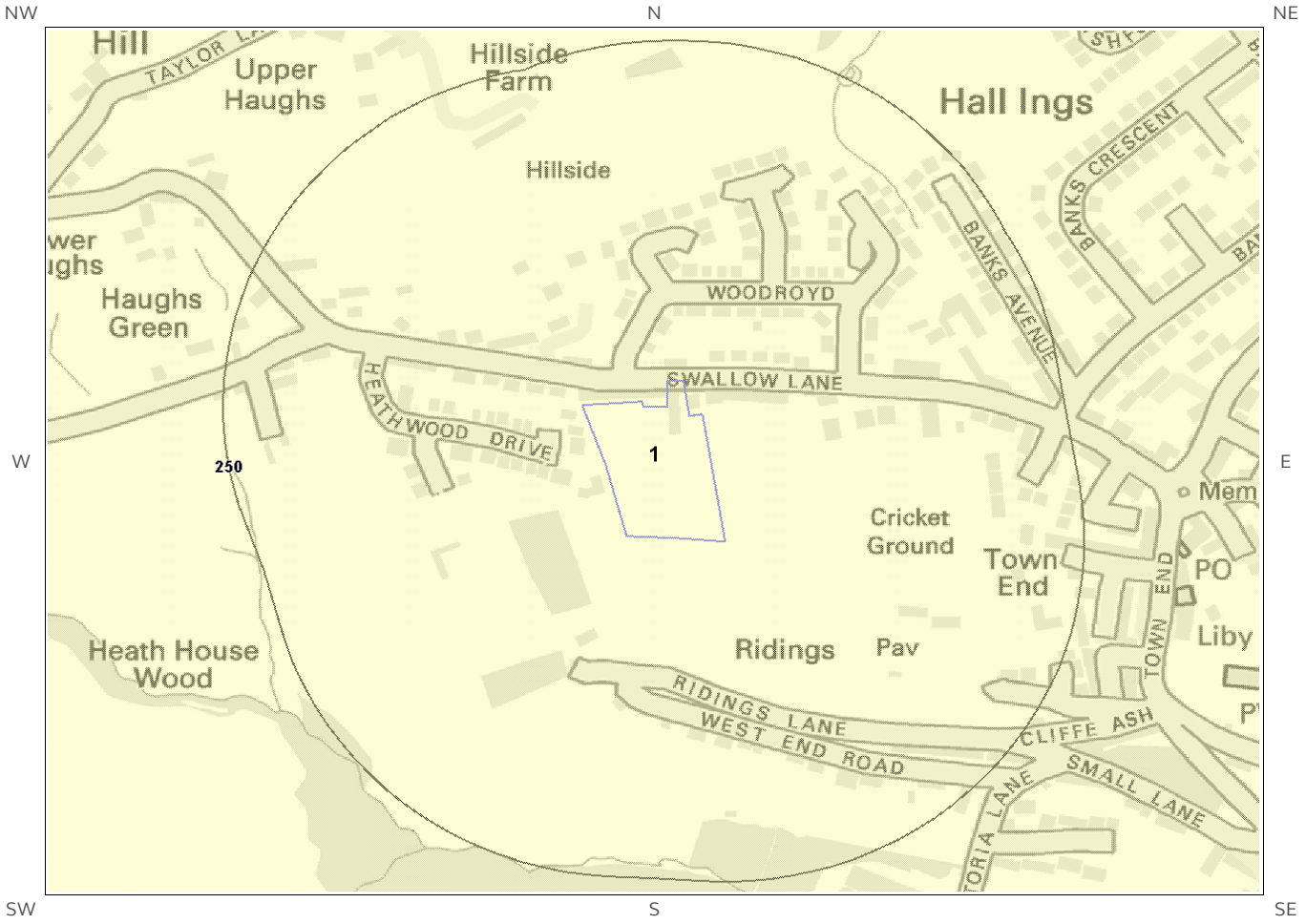
Ground Dissolution Soluble Rocks Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low
Low
Moderate
High

6.4 Compressible Deposits map



Compressible Deposits Legend

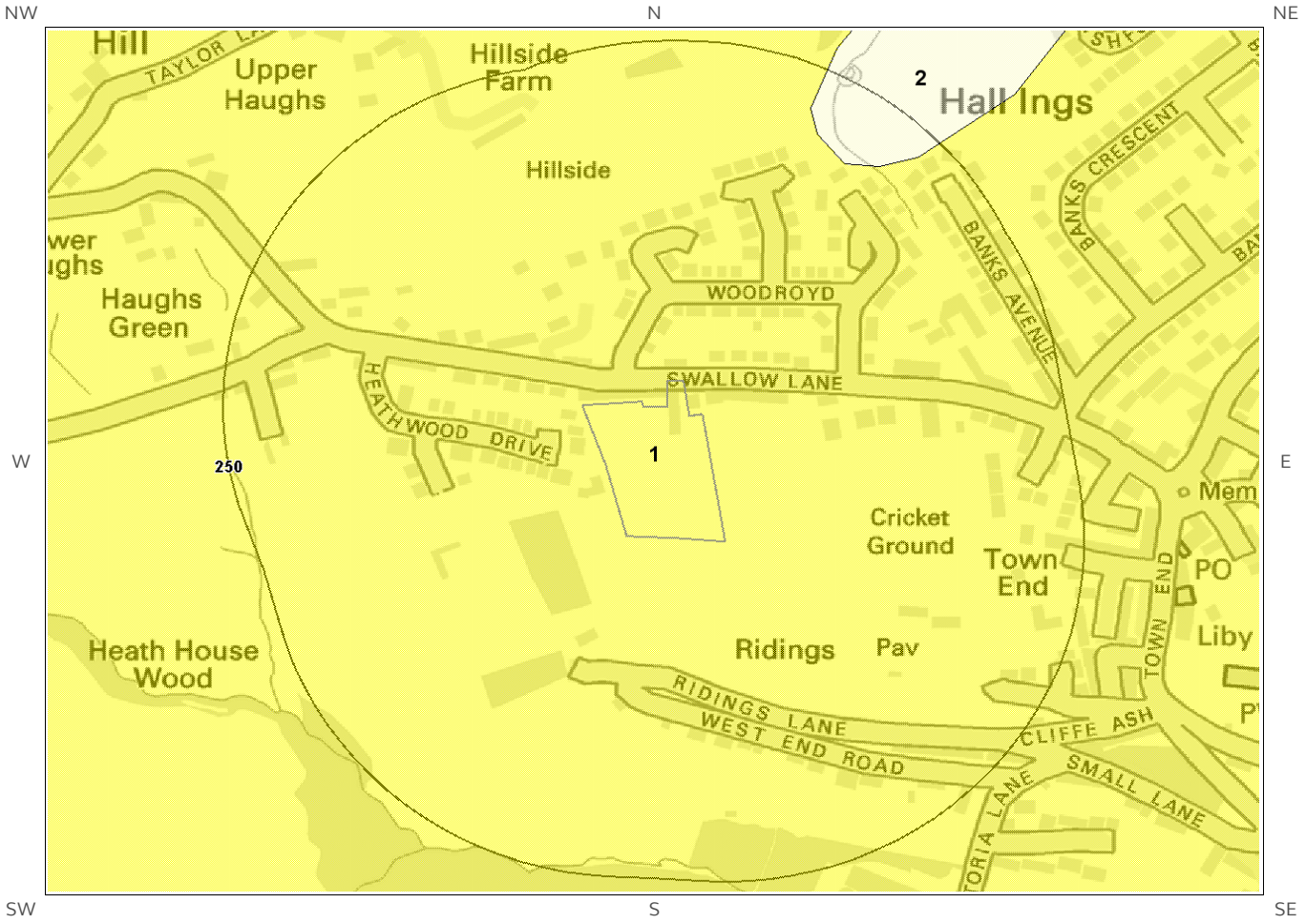
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.5 Collapsible Deposits map



Collapsible Deposits Legend

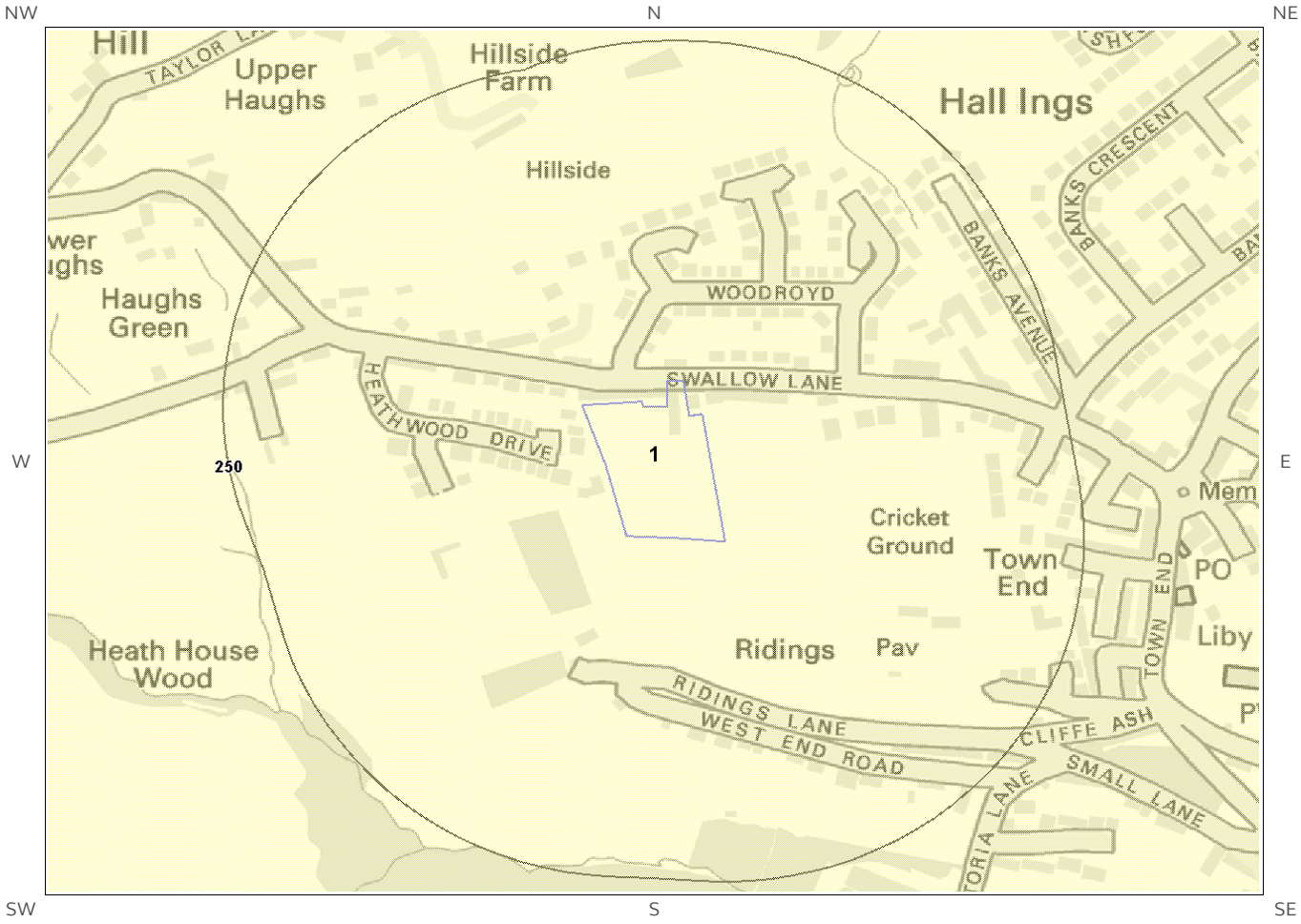
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.6 Running Sand map



Running Sand Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High