JNP GROUP

CONSULTING ENGINEERS

Phase II Geo-environmental Report

Project: Land Adjacent to:
67 Chapel Gate,
Scholes,
Holmfirth,

Client: EcoHolmes Community Land Trust

Reference: B24367-JNP-XX-XX-RP-G-1002

Date: March 2022

DOCUMENT CONTROL SHEET

Prepared by……
Samuel Pyott BSc (Hons)
Graduate Geo-environmental Engineer

Checked by……
Philip Taylor BSc (Hons) MA CGeol FGS

Associate Geo-environmental Engineer

Sarah Longstaff……..
BSc (Hons) MSc FGS
Principal Hydrogeologist

FOR AND ON BEHALF OF JNP GROUP

Date: 11 March 2022

Document Issue Record

Rev	Date	Description	Prepared	Checked	Approved
P01	March 22	First Issue	SP	PT	SLL

Contents

EXECUTIVE SUMMARY **5**

1 **INTRODUCTION** **7**

1.1 General 7
1.2 Objectives 7
1.3 Methodology 7

2 **SITE DESCRIPTION** **8**

3 **GEOLOGY, HYDROGEOLOGY AND HYDROLOGY** **9**

3.1 Geology 9

4 **CONCEPTUAL SITE MODEL AND PRELIMINARY RISK ASSESSMENT** **10**

4.1 General 10
4.2 Potential Sources of Contamination 10
4.3 Receptors 11
4.4 Pathways 12
4.5 Pollutant Linkages 12

5 **CONCLUSIONS OF DESK STUDY & RECOMMENDATIONS** **16**

5.1 Conclusions 16
5.2 Recommendations 17

6 **SITE WORK AND MONITORING** **18**

6.1 Introduction 18
6.2 Dynamic Sampling Boreholes 19
6.3 Hand Excavated Pits 20
6.4 Monitoring 20

7 **LABORATORY TESTING** **21**

7.1 Geotechnical 21
7.2 Environmental 21

8 **GROUND AND GROUNDWATER CONDITIONS** **22**

8.1 Strata Encountered 22
8.2 Topsoil 22
8.3 Made Ground 22
8.4 Rough Rock Formation 23
8.5 Rough Rock Intact Sandstone 23
8.6 Groundwater 23
8.7 Ground Contamination and Deleterious Material 24
8.8 Ground Gas Conditions 24
8.9 Trees and Tree Roots 24
8.10 Desiccation 24
8.11 Obstructions 25
8.12 Data Gaps and Uncertainties 25

9 HUMAN HEALTH DETAILED QUANTITATIVE RISK ASSESSMENT 26
9.1 INTRODUCTION 26
9.2 CURRENT UK SCREENING VALUES 26
9.3 PETROLEUM HYDROCARBONS 27
10 CONTROLLED WATERS QUANTITATIVE RISK ASSESSMENT 28
10.1 INTRODUCTION 28
11 SOIL AND GROUNDWATER ASSESSMENT RESULTS 29
11.1 SOIL RESULTS 29
11.2 INTERPRETATION 31
11.3 SUMMARY 31
11.4 RISK TO CONTROLLED WATERS 31
11.5 SUMMARY 32
12 GROUND GAS PROTECTION REQUIREMENTS 33
12.1 GUIDANCE AND STANDARDS 33
12.2 DEFINITIONS 33
12.3 RESULTS 33
12.4 INTERPRETATION 34
13 REVISED CONCEPTUAL SITE MODEL AND OVERALL ENVIRONMENTAL RISK 35
13.1 SUMMARY 35
14 GEOTECHNICAL ENGINEERING ASSESSMENT 36
14.1 PROPOSED DEVELOPMENT / REDEVELOPMENT 36
14.2 SUMMARY OF GROUND AND GROUNDWATER CONDITIONS 36
14.3 SITE PREPARATION AND EARTHWORKS 36
14.4 SHALLOW FOUNDATIONS 36
14.5 GROUNDWATER AND EXCAVATIONS 37
14.6 PAVEMENT DESIGN 38
14.7 GROUND AGGRESSIVITY TO BURIED CONCRETE 38
15 CONCLUSIONS AND RECOMMENDATIONS 40
15.1 CONCLUSIONS 40
15.2 RECOMMENDATIONS 40
16 REFERENCES 42
FIGURES / DRAWINGS 46
Appendix A LIMITATIONS 47
INTRODUCTION 48
OBJECTIVES 48
GAS MEMBRANES 49
REMEDIATION AND VERIFICATION REPORTS LIMITATIONS 49
Appendix B THIRD PARTY DRAWINGS 51

Appendix C **PHOTO DOCUMENT** **52**
Appendix D **GROUNDSURE REPORT** **53**
Appendix E **HISTORICAL MAPS** **54**
Appendix F **EXPLORATORY HOLE RECORDS** **55**
Appendix G **MONITORING RESULTS** **56**
Appendix H **GEOTECHNICAL RESULTS** **57**
Appendix I **CHEMICAL TEST RESULTS** **58**

List of Tables

Table 2-1 Surrounding Land Use 8
Table 4-1 Potential Source-Pathway-Receptor Linkages for Human Health Risk Assessment 13
Table 6-1 Exploratory Hole Location Rationale 19
Table 6-2 Response Zone Rationale 20
Table 7-1 Scheduled Geotechnical Laboratory Tests 21
Table 7-2 Scheduled Soil Chemical Analyses 21
Table 8-1 Stratigraphy Encountered 22
Table 8-2 Made Ground - Geotechnical Laboratory Results Summary 22
Table 8-3 Rough Rock Formation – Geotechnical Laboratory Test Results Summary 23
Table 8-4 Summary of groundwater observations 23
Table 8-5 Summary of roots encountered during the investigations 24
Table 10-1 Levels of Assessment 28
Table 11-1 Comparison of Soil Chemical Test Results with Residential with plant uptake Guideline Values 29
Table 12-1 Calculated Gas Screening Values 34
Table 13-1 Updated Conceptual Model and Risk Assessment 35
Table 14-1 Concrete Classification Assessment 38

EXECUTIVE SUMMARY

Site location	Land adjacent to 67 Chapel Gate, Scholes, Holmfirth, HD9 1SX	
Development scheme	Ten affordable two-storey residential properties with private gardens.	
NGR	415861, 407155	
Current use	On-site: Disused overgrown quarry with public footpath running through.	On-site: Residential and agricultural.
Historical use And UXO	The site was undeveloped agricultural land in 1854 and was then quarried by 1888. The shape and size of the quarry did not change from 1888 until 1965-1970, when the topography of the north-western corner of the site changed, with a slope shown falling south-east into the centre of the site; this may represent the site being partially filled with road chippings – as per local anecdotal evidence. The site then remained the same until the present day. In 1854, the surrounding area was mostly occupied by small agricultural fields, with several small villages around the north and east of the site, including residential properties and several inns and mills. There were also several quarries – most of which were labelled as sandstone quarries – immediately north of the site, and between 300m to 750m south and west of the site. By 1888 there were several new mill ponds 250m north of the site, and along Dean Dike, 250m to 400m east of the site. The area around the site largely remained the same until the present day. A low UXO risk has been identified at the site.	
Geology	Rough Rock (sandstone) – Rossendale Formation.	
Hydrogeology	Secondary A Aquifer.	
Hydrology	The Dean Dike / New Mill Dike runs south-west to north-east 270m south-east of the site.	
Environmentally sensitive sites	Based on report ref 4046-CWS-01, Produced by Cotswold Wildlife Services, Dated 20/06/21, the site was concluded to be of low wildlife interest.	
Geology (from GI)	Made ground	Brown to dark brown to black, clay, sand and gravel. The proportion of clay, sand and gravel varied between exploratory holes. The gravel fraction comprised tarmac, brick, pottery, mudstone and glass with rare clinker.
	Rough Rock	Soft/very loose becoming medium dense, yellowish light brown, clayey sandy to very sandy gravel, occasionally gravelly clay, in the upper zones. With all the holes terminating on a strong yellow sandstone with the exception of WS05, this terminating on a weathered grey sandstone.
Groundwater	Trapped pockets of surface water infiltration within the made ground.	

Foundation design	**Traditional strip / trench foundations recommended placed within the intact sandstone of the Rough Rock assuming levels are not altered significantly.** Should foundations be constructed within the influence of trees, a void may be required due to heave forces, this should be in line with NHBC guidance. Design Sulphate Class of **DS4**, with an ACEC of **AC-4**, would apply for the made ground in **WS02**. Made ground in WS6 and natural soils of the Rough Rock Formation recorded a Design Sulphate Class of **DS1** and a ACEC of **AC-1**
Road construction	A **CBR of 3%** is anticipated for the natural shallow strata and <2% for the made ground. This should be checked on site with plate bearing tests.
Contamination	**Medium Risk** - elevated concentrations of lead, beryllium, PAH and TPH in the near surface soils, hence remedial actions at the site are considered necessary in these areas.
Ground gas	**Characteristic situation 1 / Green –** Gas monitoring is still ongoing. To date, no gas protection measures required (slightly elevated CO_2). Risk to construction workers during below ground works due to depleted O_2 levels. . **No radon protection measures required.**

1 INTRODUCTION

1.1 General

1.1.1 JNP Group was instructed by the client to undertake a Phase 2 Ground Investigation of:

Land Adjacent to 67 Chapel Gate,
Scholes,
Holmfirth,
HD9 1SX

hereinafter referred to as 'the site'. This report is subject to the limitations presented in Appendix A.

1.1.2 It is understood that EcoHolmes are seeking planning permission for ten affordable low-energy residential properties with private gardens, parking, and access roads at the site. The proposed redevelopment layout is shown on external Drawing Reference (462)-GWP-01-01-DR-A-(SK)-0001 revision WIP/S (TBA) produced by CWPA (Appendix B).

1.1.3 All comments given are based on the understanding that the proposed redevelopment will be as detailed above.

1.1.4 All comments given are based on the understanding that the proposed redevelopment will be as detailed above.

1.2 Objectives

1.2.1 The purpose of the investigation was to determine the geotechnical and geo-environmental ground conditions at the site and assess the implications of such relative to the proposed residential redevelopment. The scope of work comprised desk-based research, and a site inspection together with intrusive investigation, laboratory testing, and gas and groundwater level monitoring. This report contains details of the site, the work and laboratory testing undertaken, strata encountered, geotechnical and chemical laboratory test results, monitoring results, and provides an interpretative assessment of the ground conditions with regard to geotechnical and contaminated land issues.

1.3 Methodology

1.3.1 This report has been compiled in accordance with the on-line Land contamination: risk management (LCRM) guidance produced by the Environment Agency (June 2019). This can be found on the UK government website: https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks.

1.3.2 With regard to geotechnical aspects, reference is also made to the requirements of BS EN 1997, Eurocode 7, Geotechnical Design, and associated standards.

1.3.3 This report has been prepared following review of a previous Phase I Geo-Environmental Report undertaken on by JNP Group 'B24367-JNP-XX-XX-RP-G-1001' dated January 2022.

2 SITE DESCRIPTION

2.1.1 The site is located off Chapel Gate, in Scholes, Holmfirth, approximately 2km south-east of Holmfirth town centre (see Figure 1 Key Plan). The centre of the site is located at National Grid Reference 415861, 407155. The site covers an area of approximately 0.37 hectares.

2.1.2 An engineer from JNP Group visited the site on 13th January 2022, the weather was sunny. There was some pooling of rainwater in the centre of the site. Photos of the site during the site walkover are included within Appendix C.

2.1.3 The boundaries of the site were Chapelgate and Dean Bridge Lane to the north and east, agricultural field boundary fences to the south and west, and a residential property garden fence in the north-western corner of the site.

2.1.4 Adjacent land uses were residential to the north, residential and agricultural to the east, agricultural to the south and west, and residential to the north-west.

2.1.5 The site generally sloped down from all directions into the centre of the site. The southern and western portions of the site were topographically several metres higher than the centre of the site, with exposed vertical rock faces in a 'C' shape around the western and southern margins of the site.

2.1.6 Ground coverage across the site was entirely soft standing, except for where exposed bedrock was visible.

2.1.7 There were no buildings on the site, and there was no visible evidence of any former buildings.

2.1.8 The margins of the site were very overgrown with trees, shrubs, etc., but the centre of the site was largely open and free of dense vegetation.

2.1.9 The site was in a generally good condition, with very limited fly-tipping.

2.1.10 No invasive species were noted during the site work. However, JNP Group recommend that a specialist ecologist or arboreal consultant be consulted regarding this.

2.1.11 The surrounding land uses are summarised in Table 2-1 below.

Table 2-1 Surrounding Land Use

Direction	Land Use
North	Road infrastructure, residential.
East	Residential, agricultural land.
South	Agricultural land.
West	Agricultural land, residential to north west

3 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

3.1 Geology

3.1.1 The geology of the site has been determined by reference to the 1:50,000 scale British Geological Survey (BGS) online Geoindex Tool (**http://mapapps2.bgs.ac.uk/geoindex/home.html**) as well as to the BGS 1:50,000 Series published geological map, Sheet 86 Glossop (Solid and Drift, dated 2012), accessed via the website (**http://www.bgs.ac.uk/data/maps/home.html**); these were both accessed on 14/01/2022.

3.1.2 No recorded artificial or made ground is indicated at the site, however, from the site walkover, and looking at the previous use of the site (quarry later infilled with road chippings), it is suspected that there will be a thickness of road chippings or other artificial deposits across the site.

3.1.3 No recorded superficial geology is indicated to be present at the site.

3.1.4 The underlying "bedrock" geology is indicated to be the Rough Rock of the Rossendale Formation, which is described by the BGS as "*coarse-grained feldspathic sandstone, cross-bedded*", and shown to dip around 3˚ to 6˚ to the north-east.

3.1.5 There is a north-west to south-east trending normal fault 260m north-east of the site, with the downthrown fault block on the north-eastern side of the fault.

4 CONCEPTUAL SITE MODEL AND PRELIMINARY RISK ASSESSMENT

4.1 General

4.1.1 This section uses information from field observations, a Groundsure Report (Appendix D) and all the data sources presented herein to provide a conceptual model and qualitative assessment of the potential risks posed to human health and environmental receptors from potential on-site and off-site sources of contamination. The assessment is presented as a 'source-pathway-receptor' model in accordance with Part IIA of the Environmental Protection Act 1990.

4.1.2 The conceptual site model has been developed assuming that the site will be redeveloped for residential housing with private gardens.

4.2 Potential Sources of Contamination

4.2.1 Potential On-Site Sources of Contamination

- The earliest available maps (Appendix E) show the site was a sandstone quarry from the late 19th century and has not been developed since. Local anecdotal evidence suggests that the quarry was later partially infilled with road chippings, and the historical maps indicate that the topography of the site changed slightly between 1955 and 1965, which could be a result of this infilling. However, there is nothing to suggest the original depth of the quarry, and the thickness of any infill material.
- Heavy metals, hydrocarbons, and soil gas associated with limited made ground materials may be present due to the quarry being partially infilled with imported and site generated fill materials – particularly given the potential composition of the infill material (road chippings, containing coal tar), which may cause significantly elevated concentrations of hydrocarbons to be present.
- Based upon guidance given in CL:AIRE research bulletin RB17 (CL:AIRE 2012), as the depth of the infilled ground is unlikely to be greater than 5.00m, and the soil atmosphere is likely to be aerobic and of small area, the former quarry is unlikely to generate significant volumes of ground gas. RB17 indicates that even where ground gas is present from made ground and recycled soils, it generally does not pose a risk. In addition, RB17 indicates that based upon available case studies, sites where fill is >30 years old, the gassing regime results in a characteristic situation 1 classification, where gas protection measures are not required. The likely date of infilling was between 1955 and 1965, so if the pit was backfilled or partially backfilled, it was over 50 years ago.

4.2.2 Potential Off-Site Sources of Contamination

- The nearest disused quarry indicated by Groundsure Report is 39m northwest of the site. It is also of note that there are several disused quarries around the site, which may have been infilled or partially infilled. The material used to infill these quarries is unknown and should therefore be considered a potential source of hazardous land gas. However, based on the age of the quarries, and the likely age of the fill, JNP Group considers the risk of ground gas generation to be low. In addition, JNP Group consider that material used would have most likely to have been inert, with a low organic content, such as recycled soils, or rubble rather than domestic waste, chemical or industrial waste.

- Based upon guidance given in CL:AIRE research bulletin RB17 (CL:AIRE 2012), as thedepth of the infilled ground is unlikely to be greater than 5m, and the soil atmosphere is likely to be aerobic and of small area, the former quarries are unlikely to generate significant volumes of ground gas. RB17 indicates that even where ground gas is present from made ground and recycled soils, it generally does not pose a risk. In addition, RB17 indicates that based upon available case studies, sites where fill is > 30 years old, the gassing regime results in a characteristic situation 1 classification, where gas protection measures are not required. The quarry 70m north-west of the site does not change shape from 1893, although it does appear to be partially infilled by 1976-1977 – if it was infilled or partially infilled, it was over 40 years ago.
- There are no other potential off-site sources of contamination that could impact ground conditions at the site. The site is surrounded by residential properties and agricultural fields. In addition, all the mills to the north, north-east, and east of the site are topographically and hydrologically downgradient of the site, and as such should not have had any impact on the site.

4.3 Receptors

4.3.1 The site is to be redeveloped for residential housing with private gardens. In addition, the site overlies a Secondary-A Aquifer (Rossendale Formation). The primary receptors, considered to be potentially at risk from any identified contamination are as follows:

Human Health

- Construction workers during the redevelopment phase.
- Residential end users.

Controlled Waters

- The Rossendale Formation beneath the site is classified as a Secondary-A Aquifer. Although there are no licensed groundwater abstractions or source protection zones within 1km of the site, there is a well indicated to be present 30m to the east of the site, hydrogeologically and hydrologically downgradient of the site. Therefore, JNP Group considers groundwater to be a sensitive receptor.
- The nearest controlled surface water is 229m to the south-east of the site. It is a sensitive receptor because it is hydrologically downgradient from the site.

Ecological

- The site is located within an area of green belt.
- Given the site setting sensitive species are considered unlikely to be present at the site (subject to any ecological survey undertaken).

Property / Infrastructure

- Concrete vulnerability to aggressive ground conditions.
- Build-up of gases with potential for explosion.
- Water supply pipework.

4.4 Pathways

4.4.1 Potential contaminant migration pathways considered relevant to the site are:

Human Health

- Ingestion of contaminated soils and dust particles.
- Direct physical contact with near surface soils and contaminated dust particles.
- Inhalation of wind-blown contaminated dust.
- Inhalation of vapours and gases, migrating vertically into the atmosphere.
- Inhalation of vapours and gases, migrating vertically into buildings and confined spaces.
- Consumption of vegetables cultivated in contaminated soils.
- Consumption of soil attached to vegetables cultivated in contaminated soils.
- Consumption of contaminated potable water.

Controlled Waters

- Leaching of contaminants in made ground / natural ground into groundwater.
- Lateral migration of contaminated groundwater into the New Mill Dike.
- Vertical migration of contaminated shallow groundwater impacting deeper groundwater in the aquifer sequence.
- Run-off of site-derived contamination into the New Mill Dike during construction.

Ecological

- Migration of contamination through groundwater and subsequent uptake by plant roots.
- Direct contact between ecological receptors and contaminated surface water.
- Direct contact between ecological receptors and contaminated soils.
- Ingestion of contaminated soils/surface waters by ecological receptors.
- Inhalation of vapours or wind-blown dust by ecological receptors.

Property

- Direct physical contact with near surface soils.
- Migration of vapours and gases into buildings and confined spaces.

4.5 Pollutant Linkages

4.5.1 A 'pollutant linkage' describes the relationship between a contaminant, a pathway and a receptor, a 'pollutant' being the contaminant in a pollutant linkage. A contaminant, pathway and receptor must all be present for a pollutant linkage to exist, which forms the basis for determination that a piece of land is Contaminated Land. Potential sources, pathways and receptors have been assessed. The following Tables summarise the significant pollutant linkages potentially active at the site.

Table 4-1 Potential Source-Pathway-Receptor Linkages for Human Health Risk Assessment

Source	Pathway	Receptor
Contaminated soils and waters	Ingestion of soil	On-site female child: 0 - 6 yrs old
		On-site construction worker
	Ingestion of household dust	On-site female child: 0 - 6 yrs old
	Ingestion of contaminated vegetables	On-site female child: 0 - 6 yrs old
	Ingestion of soil attached to vegetables	On-site female child: 0 - 6 yrs old
	Dermal contact	On-site female child: 0 - 6 yrs old
		On-site construction worker
	Dermal contact with household dust	On-site female child: 0 - 6 yrs old
	Inhalation of fugitive soil dust	On-site construction worker
		On-site female child: 0 - 6 yrs old
	Inhalation of fugitive household dust	On-site female child: 0 - 6 yrs old
	Inhalation of vapours in outdoor air	On-site female child: 0 - 6 yrs old
		On-site construction worker
	Inhalation of vapours in indoor air	On-site female child: 0 - 6 yrs old
	Consumption of contaminated potable water	On-site female child: 0 - 6 yrs old
Ground gas and landfill gas	Vertical and lateral migration	End users

Table 4.2 Source Pathway Receptor Linkages for Controlled Waters Risk Assessment

Source	Pathway	Receptor
Contaminated soils	Leaching mechanisms	Groundwater stored in the Rossendale Formation
	Runoff during construction works	New Mill Dike
Contaminated groundwater	Vertical migration	Groundwater stored in the Rossendale Formation
	Lateral and vertical migration (baseflow)	New Mill Dike

Table 4.3 Potential Source-Pathway-Receptor Linkages for Ecological Risk Assessment

Source	Pathway	Receptor
Contaminated soils and waters	Migration of contamination through groundwater and subsequent uptake by plant roots;	Ecological receptors
	Direct contact between ecological receptors and contaminated surface water;	
	Direct contact between ecological receptors and contaminated soils;	
	Ingestion of contaminated soils/surface waters by ecological receptors;	
	Inhalation of vapours or wind-blown dust by ecological receptors.	
Ground gas and landfill gas	Inhalation of gases	

Table 4.4 Potential Source-Pathway-Receptor Linkages for Property Risk Assessment

Source	Pathway	Receptor
Contaminated soils	Contact with contaminated soils	Concrete
		Water supply pipe materials
Ground gas and landfill gas	Vertical and lateral migration and accumulation in voids	Residential housing / Commercial properties

Table 4-5 Preliminary Risk Assessment

Risk Receptor	Risk		Justification
HUMAN HEALTH	MEDIUM		Historical land use as a quarry, suspected to be partially infilled with road chippings, suggests potential sources of contamination present on site. Potential for direct contact / inhalation of vapours or gases with residential receptors.
GROUNDWATER	MEDIUM		The site is located on productive strata (Secondary Aquifer) and is not within a SPZ, although there is a well 30m east of the site.
SURFACE WATER	MEDIUM		The nearest surface water course is located 270m to the south-west, hydrologically downgradient of the site.
ECOLOGY	NONE		Based on the assumption that there are no sensitive/ protected species on site (subject to any ecological survey undertaken).
PROPERTY & INFRASTRUCURE	MEDIUM		Historic land use as a partially infilled quarry suggests potential sources of contamination present on site. Potential sources of vapours or gases on-site or migration of gases may occur form off-site sources.

4.5.7 In line with BS ISO 18400-202:2018 based on the conceptual site model as above the site is considered to be probably contaminated.

5 CONCLUSIONS OF DESK STUDY & RECOMMENDATIONS

5.1 Conclusions

5.1.1 The desk-based research has identified that:

- The geological succession below the site comprises the Rough Rock sandstone of the Rossendale Formation.
- The Aquifer Maps contained in the Groundsure Report indicates that the site is underlain by a Secondary-A Aquifer. The aquifer status refers to the Rossendale Formation.
- It identifies that the site has an historic potentially contaminative use as a partially infilled quarry.

Potential On-Site Sources of Contamination:

- The earliest available maps show the site was a sandstone quarry from the late 19th century and has not been developed since. Local anecdotal evidence suggests that the quarry was later partially infilled with road chippings, and the historical maps indicate that the topography of the site changed slightly between 1955 and 1965, which could be a result of this infilling. However, there is nothing to suggest the original depth of the quarry, and the thickness of any infill material.
- Heavy metals, hydrocarbons, and soil gas associated with limited made ground materials may be present due to the quarry being partially infilled with imported and site generated fill materials – particularly given the potential composition of the infill material (road chippings, containing coal tar), which may cause significantly elevated concentrations of hydrocarbons to be present.
- Based upon guidance given in CL:AIRE research bulletin RB17 (CL:AIRE 2012), as likely depth of the infilled ground is unlikely to be greater than 5.00m, and the soil atmosphere is likely to be aerobic and of small area, the former quarry is unlikely to generate significant volumes of ground gas. RB17 indicates that even where ground gas is present from made ground and recycled soils, it generally does not pose a risk. In addition, RB17 indicates that based upon available case studies, sites where fill is >30 years old, the gassing regime results in a characteristic situation 1 classification, where gas protection measures are not required. The likely date of infilling was between 1955 and 1965, so if the pit was backfilled or partially backfilled, it was over 50 years ago.

Potential Off-Site Sources of Contamination:

- There are several disused quarries around the site, which may have been infilled or partially infilled. The material used to infill these quarries is unknown and should therefore be considered a potential source of hazardous land gas. However, based on the age of the quarries, and the likely age of the fill, JNP Group considers the risk of ground gas generation to be low. In addition, JNP Group consider that material used would have most likely to have been inert, with a low organic content, such as recycled soils, or rubble rather than domestic waste, chemical or industrial waste.
- Based upon guidance given in CL:AIRE research bulletin RB17 (CL:AIRE 2012), as likely depth of the infilled ground is unlikely to be greater than 5m, and the soil atmosphere is likely to be aerobic and of small area, the former quarries are unlikely to generate

significant volumes of ground gas. RB17 indicates that even where ground gas is present from made ground and recycled soils, it generally does not pose a risk. In addition, RB17 indicates that based upon available case studies, sites where fill is > 30 years old, the gassing regime results in a characteristic situation 1 classification, where gas protection measures are not required. The quarry 70m north-west of the site does not change shape from 1893, although it does appear to be partially infilled by 1976-1977 – if it was infilled or partially infilled, it was over 40 years ago.

- There are no other potential off-site sources of contamination that could impact on ground conditions at the site. The site is surrounded by residential properties and agricultural fields. In addition, all the mills to the north, north-east, and east of the site are topographically and hydrologically downgradient of the site, and as such should not have had any impact on the site.

5.1.2 No radon protection measures are required.

5.1.3 The site lies with an area of Low risk of unexploded ordnance (UXO).

5.1.4 The site is not in an area predicted to be at risk of fluvial flooding. The centre of the site is at risk of surface water flooding.

5.1.5 Based on information contained within desk study or from the previous investigation, it is the opinion of JNP Group that the potential site conditions provide a MEDIUM to LOW environmental risk and hence further investigation and assessment is required.

5.2 Recommendations

5.2.1 Based on the conclusions from the desk study and the intended redevelopment of the site JNP Group recommends that the following intrusive works are undertaken:

- One day of dynamic sampling boreholes (to target depths of 5m bgl) with representative sampling and in-situ testing.
- Three gas and groundwater monitoring standpipe installations with six monitoring visits over three months.
- Engineering laboratory testing of recovered soil samples, including testing to identify volume change potential of any cohesive material, and concrete classification.
- Chemical laboratory testing of soil samples. The testing should comprise an extensive suite of contaminants, particularly those associated with road chippings/asphalt, including metals, Total Petroleum Hydrocarbons, and Polycyclic Aromatic Hydrocarbons.

6 SITE WORK AND MONITORING

6.1 Introduction

6.1.1 The intrusive site work was undertaken by JNP Group on 16 February 2022 and comprised seven dynamic sampling boreholes, and four hand pits. Six return gas and groundwater level monitoring visits are scheduled to be undertaken between the 4th March to 31st May 2022.

6.1.2 All site work was completed under the instruction and supervision of JNP Group with the ground investigation procedures and sample descriptions given in the following publications:

- BS 5930 (2015).Code of Practice for Site Investigations;
- BS 10175 (2001+A1:2013+A2:2017). Investigation of potentially contaminated sites - code of practice;
- BS EN ISO 14688-1. "Soil - Identification and Description;
- BS EN ISO 14688-2. Soil - Classification principles and quantification of descriptive characteristics;
- BS EN ISO 14689. Rock - Identification and description;
- BS 18400-104:2018. Soil Quality – Sampling. Part 104: Strategies;
- BS 18400-202:2018. Soil Quality – Sampling. Part 202: Preliminary Investigations;
- BS 18400-203: 2018. Soil Quality – Sampling. Part 203: Investigation of potentially contaminated sites;
- BS 18400-205: 2018. Soil Quality – Sampling. Part 205: Guidance on the procedure for investigation of natural, near natural and cultivated sites;

6.1.3 For sites affected by asbestos impacted soils, the guidance given in the following publications has been followed:

- Industry Guidance on Interpretation for Managing & Working with Asbestos in Soil and Construction and Demolition Materials (CL:AIRE 2016);
- Asbestos in Soil and made ground: a guide to understanding and managing risks (CIRIA C733 2014).

6.1.4 The design and installation of groundwater quality monitoring points has been undertaken following the guidance given in the Environment Agency science report:

- SC020093. Guidance on the design and installation of groundwater quality monitoring points. 2006.

6.1.5 The locations of the exploratory holes are shown on JNP Group Drawing No. B24367-JNP-XX-ZZ-DR-Z-0001 Exploratory Hole Location Plan. The exploratory hole records including strata and groundwater encountered, in-situ testing and samples taken are presented in Appendix F. The full details of the site work undertaken are summarised in the following sections.

6.1.6 The purpose of the intrusive sitework was to obtain data to support planning application requirements, and assess the risk posed from contamination and geotechnical issues.

6.1.7 The site investigation strategy comprised judgemental locations considered to be sensitive as part of the development, with the remainder of the positions providing a systemic

distribution across the site to suit the proposed redevelopment and address relevant spatial locations considered most likely to be sensitive. Table 6-1 shows the rationale for the location of each exploratory hole.

Table 6-1 Exploratory Hole Location Rationale

Exploratory Hole Reference	Rationale
WS01, WS05	To establish the depth to natural strata in the quarry base.
WS02, WS03, and WS04	To target areas of spoil heaps.
WS06, WS07	To target raised area in north-west of the site.
HP1 and HP3	To target eastern area of the site.
HP2 and HP4	To target made ground spoil heaps on the site.

6.1.8 The general sampling strategy was to take representative soil samples from the ground to characterise the strata encountered and to provide suitable horizontal distribution, however, where visible contamination was present or suspected, targeted spot samples were taken.

6.1.9 Sampling from stockpiles was undertaken using a composite approach, 4 no. of small samples were taken from around each stockpile for HP4 and then combined to form one composite sample of soil from which the sub-sample for analyses was taken from.

6.2 Dynamic Sampling Boreholes

6.2.1 Seven dynamic sampling boreholes, designated WS01 to WS07 (inclusive) were formed on 16 February 2022, to depths of between 1.50 m and 5.60 m below ground level (bgl) at various locations across the site. The majority of the holes were formed to depths of around 2.00 m bgl; obstructions limited the maximum depths of WS01, WS02, WS03, WS04, WS05 and WS06. WS07 was continued to 5.60 m bgl.

6.2.2 The dynamic sampling technique uses a lightweight tracked rig to advance a borehole by 1 m intervals using 1 m long steel sampler tubes, at diameters of 100 mm, reducing to 70 mm. The soils are then recovered from each sample tube as continuous core samples, which are logged and sub-sampled on site. Environmental soil samples were generally taken from each made ground material, together with any materials suspected of containing elevated concentrations of contaminants, based on visual and olfactory evidence. The environmental samples comprised a small volatiles jar, and an amber glass jar. Bulk and small plastic tub samples were also taken from selected materials, for laboratory geotechnical testing. In situ Standard Penetration Tests (SPTs) were undertaken in accordance with BS 5930 (2015) at 1.0 m depth intervals in the boreholes in order to obtain in situ strength or relative density parameters for geotechnical design.

6.2.3 Three boreholes (WS02, WS04 and WS06) were completed with 50 mm gas monitoring standpipe installations, with flush fitting steel covers set in concrete at ground level. The remaining boreholes were backfilled with arisings and the ground surface left in a safe and tidy manner.

6.2.4 Response zones within the installations were installed between depths of 1 m bgl to 4 m bgl in order to target the underlying made ground and Rough Rock.

5.3 Hand Excavated Pits

5.3.1 Four trial pits were excavated using hand-tools in order to investigate areas where the dynamic sampler rig was unable to access. The pits were formed to depths of between 0.50m and 0.60 m bgl.

5.4 Monitoring

5.4.1 Monitoring of the installed standpipes is scheduled to be undertaken on six occasions between the 4th of March to 31st May 2022, after the completion of the site work.

5.4.2 Monitoring involves the measurement of the ground gas composition at each of the installations for methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) concentrations, together with atmospheric pressure, and flow rates, using a Gas Data GFM430 gas meter. After the measurement of gas concentrations, the depth to any groundwater within the standpipe was recorded. To date, 1No. monitoring rounds have been completed.

5.4.3 The frequency and duration of gas monitoring was selected based on the guidance given in the following publications:

- CIRIA C665. Assessing risks posed by hazardous gases to buildings. 2007;
- BS 8485. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. 2015;
- CL:AIRE RB 17. A Pragmatic Approach to Ground Gas Risk Assessment. 2012.

5.4.4 Guidance presented in Tables 5a and 5b in CIRIA C665 was used to assess the number a frequency of monitoring visits. Six visits over three months was chosen due to the sensitivity of the proposed development being high and potential source of generation being very low.

5.4.5 Groundwater monitoring is scheduled to be undertaken between the 4th of March to 31st May 2022, after the completion of the site work. Table 6-2 justifies the response zones selected for each monitoring borehole.

Table 6-2 Response Zone Rationale

Exploratory Hole Reference	Response Zone (m bgl)	Rationale
WS02 and WS06	1-2 m	To monitor groundwater concentrations and levels within the made ground and Rough Rock Formation.
WS04	0.9-2 m	To monitor groundwater concentrations and levels within the Rough Rock Formation.

5.4.6 It should be noted that long-term groundwater levels may vary from those reported due to seasonal fluctuation or weather events, such as droughts, significant rainfall, or recent flooding.

5.4.7 The monitoring results are presented in Appendix G.

5.4.8 If should be noted that once the groundwater monitoring boreholes are no longer required, they need to be decommissioned following the guidance given in the EA science report SC020093 (EA 2008).

7 LABORATORY TESTING

7.1 Geotechnical

7.1.1 A programme of laboratory testing was scheduled by JNP Group to determine geotechnical properties of selected soil samples obtained from the investigation. The details of the geotechnical testing are summarised below:

Table 7-1 Scheduled Geotechnical Laboratory Tests

Test Description	Number of Tests
Atterberg limits including moisture content	3
Ground Aggressivity Suite (in accordance with BRE SD1)	4

7.1.2 Tests were undertaken in accordance with BS1377 (1990) "Methods of test for Soils for Civil Engineering purposes". The results of the geotechnical testing are presented in Appendix H.

7.2 Environmental

7.2.1 A programme of chemical laboratory testing was scheduled by JNP Group on selected soil samples taken from various depths in the made ground and natural ground recovered from the exploratory holes. Samples of any soils displaying visual or olfactory evidence of contamination were also collected and submitted for laboratory analyses. The samples were placed into suitable containers for the required chemical analyses.

7.2.2 All samples were transported, on the day of collection, to i2 Analytical Testing Services in Watford which is accredited under UKAS and MCerts. The following table summarises the contaminants scheduled:

Table 7-2 Scheduled Soil Chemical Analyses

Determinant	No
Metals and semi-metals (arsenic, beryllium, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc)	8
Polycyclic Aromatic Hydrocarbons (PAH) 16 USEPA Speciated	8
TPH Criteria Working Group (TPH CWG)	2
pH	8
Soil Organic Matter (SOM)	3
Asbestos screening	8
Waste Acceptance Criteria test	3

7.2.3 The results of the laboratory chemical testing are interpreted in Section 11 and are presented in full in Appendix I.

8 GROUND AND GROUNDWATER CONDITIONS

8.1 Strata Encountered

8.1.1 The ground conditions encountered during the intrusive investigation were generally consistent with the published geological map. A variable thickness of made ground was found to be underlain by both granular and cohesive Rough Rock, this graded from soft, very loose to strong sandstone with increasing depth. This strong sandstone was encountered at the base of all window sampler holes. This varied from 1.40m bgl in WS01 to 5.50m bgl in WS07. In the north-western corner of the site, a considerable thickness of made ground was encountered.

8.1.2 A summary of the stratigraphy encountered during the investigation is presented in Table 8-1 and described in the following sections, but for full details and descriptions, reference should be made to the exploratory hole records presented in Appendix F.

Table 8-1 Stratigraphy Encountered

Stratum	Depth to Top (m bgl)	Depth to Base (m bgl)	Thickness (m)
Made ground All exploratory holes	Ground level	0.10 – 4.00	0.10 – 4.00
Rough Rock Weathered All exploratory hole locations except for HP2 and HP4.	0.10 – 4.00	1.40 - 5.50	0.55 – 1.70
Rough Rock Intact All window sampler locations	1.40 - 5.50	Unproven	Unproven

8.2 Topsoil

8.2.1 A dark black to brown clayey topsoil with rootlets and high organic content was encountered at the exploratory hole locations of WS04, HP1, and HP3.

8.3 Made Ground

8.3.1 The made ground consisted of brown to dark brown to black, clay, sand and gravel. The proportion of clay, sand and gravel varied between exploratory holes. The gravel fraction comprised tarmac, brick, pottery, mudstone and glass with rare clinker.

Table 8-2 Made Ground - Geotechnical Laboratory Results Summary

Property	Number of Tests	Range	Mean	Assessment
Natural Moisture Content	1	32	32	Low volume change potential. Silt Low Plasticity
% passing 425 sieve	1	100	100	
Liquid Limit %	1	42	42	
Plastic Limit %	1	26	26	
Plasticity Index %	1	16	16	
Modified Plasticity Index %	1	16	16	
SPT 'N' Values (granular)	7	4 - 8	5	Loose

8.3.2 The SPT N value / depth profile is presented as Figure 2, the undrained shear strength / depth profile as Figure 3, and a plasticity chart is presented as Figure 4.

8.4 Weathered Rough Rock

8.4.1 Strata of the Rough Rock was encountered in all exploratory holes except for HP2 and HP4 which were terminated in the made ground. The depth to the top of the weathered Rough Rock varied from 0.10 m bgl in WS04 to 4m bgl in WS07. The base of the weathered rough rock varied from 0.55m bgl to 1.70m bgl.

8.4.2 The lithological unit was found to comprise soft/very loose becoming medium dense, yellowish light brown, clayey sandy to very sandy gravel, occasionally gravelly clay, in the upper zones.

Table 8-3 Rough Rock Weathered – Geotechnical Laboratory Test Results Summary

Property	Number of Tests	Range	Mean	Assessment
Natural Moisture Content	2	12-16	14	Low volume change potential. Silt Low Plasticity
% passing 425 sieve	2	28-35	31	
Liquid Limit %	2	43 – 46	44	
Plastic Limit %	2	25 – 32	28	
Plasticity Index %	2	14 - 18	16	
Modified Plasticity Index %	2	5	5	
SPT 'N' Values (granular)	5	4 - 11	8	Loose

8.4.3 The SPT N value / depth profile is presented as Figure 2, the undrained shear strength / depth profile as Figure 3, and a plasticity chart is presented as Figure 4.

8.5 Unweathered Rough Rock ISandstone

8.5.1 Unweathered sandstone was encountered at the base of all window sampler holes. This varied from 1.40m bgl in WS01 to 5.50m bgl in WS07. SPT results within the unweathered Rough Rock Sandstone were all in excess of N 50.

8.6 Groundwater

8.6.1 Details of groundwater strikes recorded during the site work period, and levels recorded subsequently during the monitoring visit, are summarised in the table which follows. Note that monitoring is ongoing.

Table 8-4 Summary of groundwater observations

Exploratory Location	Groundwater during site work		Groundwater during monitoring
	Strikes (m bgl)	Comments	Range
WS02	-	-	1.41
WS05	1.20	-	-
WS06	-	-	3.75

8.6.2 During the ground investigation, groundwater was only encountered in WS05 at 1.20m bgl. This is noted to be within the gravelly clay made ground and as such is possibly perched groundwater.

8.7 Ground Contamination and Deleterious Material

8.7.1 Ash, and fragments of broken glass, pottery, and tarmac were observed in the made ground at WS01, WS02, WS03, WS06, WS07, HP2, and HP4.

8.7.2 A white fibrous material was noted within the made ground of WS02 from 1.50m to 1.80m bgl. Laboratory testing of this material did not identify asbestos within the sample.

8.8 Ground Gas Conditions

8.8.1 At the time of writing this report, 1 no. monitoring visit had been undertaken. During the visit the methane concentration remained below detection levels, and a maximum concentration of carbon dioxide of 1.0% was recorded, with negligible flow rates. Full details of the gas concentrations and flow rates recorded during the monitoring period are presented in Appendix G.

8.9 Trees and Tree Roots

8.9.1 A number of mature trees are present around the perimeter of the site. These vary from mature to semi-mature and are also located in close proximity to the footprints of the proposed plots. Tree roots were recorded in WS06, this area featuring several trees in the immediate surrounding area.

Table 8-5 Summary of roots encountered during the investigations

Exploratory Location	Depth (m bgl)	Comments
WS04	0.10	Rootlets
WS06	0.20 – 2.60	Roots
WS07	0.30	Rootlets
HP1	0.40	Rootlets
HP3	0.40	Rootlets

8.10 Desiccation

8.10.1 Following laboratory testing of cohesive soils, two commonly accepted methods for determining the degree of desiccation (as stated in BRE 412 'Desiccation in Clay Soils') are as follows:

1. Desiccation has occurred when the moisture content is less than the Plastic Limit;
2. Significant desiccation has occurred when the moisture content is less than 0.4 x the Liquid Limit (this is known as the Driscoll Limit).

8.10.2 When the results of laboratory testing are compared with Method 1, samples at WS03 at 1.5m and WS04 at 0.6m are indicated to be desiccated.

8.10.3 When the results of laboratory testing are compared with Method 2, samples at WS03 at 1.5m and WS04 at 0.6m are indicated to be significantly desiccated.

8.10.4 A plot comparing moisture contents with the Liquid Limits and the Driscoll Limits is included as Figure 5.

8.11 Obstructions

8.11.1 The exploratory hole locations of HP1, HP2, HP3 could not be accessed by the tracked window sampler rig due to dense vegetation and undulating ground conditions. Hand excavated pits were undertaken to investigate the ground conditions at these locations.

8.11.2 All window sample holes refused on rock and could not be progressed further. Any service trenches / excavations undertaken into the rock are likely to require mechanically breaking out.

Data Gaps and Uncertainties

8.11.3 There are not believed to be any data gaps or uncertainties.

9 HUMAN HEALTH DETAILED QUANTITATIVE RISK ASSESSMENT

9.1 Introduction

9.1.1 Qualitative assessment of risks may be sufficient in many cases to eliminate the possibility of significant pollutant linkages. However, quantitative risk assessment is formally required to determine whether there is a 'significant possibility of significant harm being caused'. Part IIA of the Environmental Protection Act 1990 recommends that 'authoritative and scientifically based guideline values for concentrations of the potential pollutants in or under the land' be used to quantify the risk posed by contamination.

9.1.2 Under the Planning Regime, a quantitative risk assessment can be used to decide whether the site is suitable for the proposed use. In addition, the National Planning Policy Framework (March 2012) also indicates that after remediation, as a minimum land should not be capable of being determined as contaminated land under Part IIA.

9.2 Current UK Screening Values

9.2.1 The UK technical guidance for assessing risks to human health is issued from various UK bodies, including the Environment Agency (EA), DEFRA, Contaminated Land: Applications in Real Environment (CL:AIRE), Chartered Institute of Environmental Health (CIEH), and Land Quality Management (LQM) Ltd (part of the University of Nottingham).

9.2.2 New and updated screening values in the form of provisional Category 4 Screening Levels (C4SL) (published in 2014), and Suitable for Use Levels (S4UL), (published 2015), have been produced by DEFRA and CIEH / LQM respectively using modified versions of the EA's Contaminated Land Exposure Assessment (CLEA) software.

9.2.3 C4SL

9.2.4 Provisional C4SL have been derived by CL:AIRE (project team for DEFRA's SP1010 project) following revised statutory guidance, and as a tool to assist in applying the Part IIA Category 1- 4 classifications to a site. The purpose of the C4SL is to provide a simple test for deciding that land is suitable for use, and definitely not contaminated land under Part IIA. They describe a level of risk that is above minimal, but is still low.

9.2.5 In calculating provisional C4SL some of the exposure modelling scenarios and exposure parameters used in the CLEA software have been modified. These modifications are not discussed further, but reference should be made to the original CL:AIRE / DEFRA publications should further information or clarification be required. A list of the new publications is included in the references section at the end of this report.

9.2.6 To date, six contaminants have been assigned provisional C4SL: arsenic; benzene; benzo[a]pyrene; cadmium; chromium VI, and lead, for the standard land uses (residential with, and without plant uptake, allotments, commercial, and public open space (parks and residential).

9.2.7 The C4SL are also considered suitable to be used under the planning regime, and DEFRA have confirmed this to all local authorities.

9.2.8 S4UL

9.2.9 The LQM / CIEH S4UL represent generic assessment criteria based on minimal or tolerable risk that are intended to be protective of human health. They have been derived in

accordance with current UK legislation using a modified version of the CLEA software, and are still based on many conservative assumptions. They represent values above which further assessment of the risks or remedial actions may be needed.

9.2.13 S4UL have been derived for a comprehensive list of metals, non–metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, chlorinated hydrocarbons, phenolic compounds, explosives, and pesticides, for the standard land uses (residential with, and without plant uptake, allotments, commercial, and public open space (residential and park)).

9.2.14 For details of the exposure parameters and scenarios used to derive the S4UL the reader is reference to the original LQM / CIEH document "The LQM/CIEH S4UL for Human Health Risk Assessment" (2015).

9.2.15 Both sets of screening values can be used to undertake a generic risk assessment by comparing the data directly to the screening value which is considered a conservative approach or statistically to the screening value. Alternatively and if a sufficient dataset is available, a statistical assessment can be undertaken following the guidance given in the joint Chartered Institute of Environmental Health (CIEH) and the Contaminated Land: Applications in Real Environment (CL:AIRE) organisation publication "Guidance On Comparing Soil Contamination Data with a Critical Concentration" (CIEH / CL:AIRE May 2008).

9.3 Petroleum Hydrocarbons

9.3.1 JNP Group have followed the guidance given in the Environment Agency publication 'The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils' (Environment Agency, 2005). LQM S4UL values have been published based on carbon banded hydrocarbons with aliphatic and aromatic split, corresponding to the TPH CWG bands.

9.3.2 The Society of Brownfield Risk Assessment (SoBRA) have produced some Generic Assessment Criteria for assessing chronic risks from the inhalation of vapours arising from groundwater (GAC_{gwvap}) for a short list of 66 organic contaminants (SoBRA February 2017). These are designed to a defensible screening criteria to assist in evaluating this exposure pathway. They represent concentrations below which the chronic risks from vapour migration and inhalation can be considered low / tolerable. GAC_{gwvap} have been developed in line with current UK risk assessment guidance, and CLEA v1.07 software was used for residential and commercial land use scenarios.

9.3.3 Further details of the input parameters selected for use to generate the GAC_{gwvap} can be found in the SoBRA report, and have not been reproduced here. However, it should be noted that they have been derived using some conservative assumptions:

- Impacted ground / perched water is beneath the buildings;
- An infinite source term is present;
- There is no biodegradation;
- Groundwater depth is 0.65m below ground;
- Use of a sand soil type (in line with SR3)

10 CONTROLLED WATERS QUANTITATIVE RISK ASSESSMENT

10.1 Introduction

10.1.1 Risks to controlled waters have been assessed by following the guidance given in the following publications:

- Remedial Targets Methodology. Hydrogeological Risk Assessment for Land Contamination. EA. 2006;
- Petroleum Hydrocarbons in Water. CL:AIRE .2017
- BS 15175:2018. Soil Quality – Characterisation of contaminated soil related to groundwater protection. 2018.

10.1.2 This guidance presents a recommended methodology for deriving site specific remedial objectives for contaminated soils and / or groundwater to protect the aquatic environment. The methodology is based upon an approach comprising four levels of assessment, as shown in the table below. The more detailed levels of assessment derive a Remedial Target Value (RTV).

Table 10-1 Levels of Assessment

Assessment Level	Soil Source	Groundwater Source
1	Partition into leachate*	Not applicable, assessment starts at level 2
2	As above, plus attenuation in the unsaturated zone and dilution in the aquifer	Direct comparison with quality standards only
3	As above, plus lateral attenuation in the saturated zone to off-site compliance point	Lateral attenuation in the saturated zone to off-site compliance point

*Soil leachate extraction test results used if available and appropriate.

11 SOIL AND GROUNDWATER ASSESSMENT RESULTS

11.1 Soil Results

11.1.1 The results of chemical testing of 11 no. samples of made ground and 2 no. samples of natural soils have been compared with the C4SL and the LQM S4UL values for a 'residential with gardens end use'. These comparisons are summarised in the following tables.

11.1.2 The following determinants were recorded at concentrations less than their respective limits of laboratory detection, and hence have not been included in this assessment: asbestos, mercury, selenium, benzene, toluene, ethylbenzene, p & m-xylene, o-xylene, MTBE, phenols, TPH aromatic bands C_5-C_{12} and TPH aliphatic bands C_5-C_{10}

11.1.3 Two SOM tests were undertaken on the two materials types identified at the site. These were the made ground and the natural soils. A SOM of 1% is applicable to the natural soils encountered at the site, and a SOM of 2.5% is applicable to the made ground soils.

Table 11-1 Comparison of Soil Chemical Test Results with Residential with plant uptake Guideline Values

Determinant	Maximum Measured Concentration		Background Concentration	LQM/CIEH S4UL: Residential with plant uptake (mg/kg)			Number of tests	Number of exceedances
	Made ground	Natural Ground						
Arsenic	19	3.4	15	37			8	0
Beryllium	4.4	0.39	-	1.7			8	MG WS01 @ 0.05m.
Boron	2.2	0.3	-	290			8	0
Cadmium	0.8	< 0.2	1.8	11			8	0
Chromium (trivalent or total)*	670	9.3	60-90	910			8	0
Copper	110	7.2	36	2400			8	0
Lead	1400	31	100	200**			8	MG WS02 @ 1.60m.
Nickel	24	8.1	15	180			8	0
Vanadium	120	11	76	410			8	0
Zinc	900	36	88	3700			8	0
				1%	**2.5%**	**6%**		
Naphthalene	0.99	< 0.05	-	2.3	5.6	13	8	0
Acenaphthylene	0.79	< 0.05	-	170	420	920	8	0
Acenaphthene	15	< 0.05	-	210	510	1100	8	0
Fluorene	8.5	< 0.05	-	170	400	860	8	0
Phenanthrene	95	< 0.05	-	95	220	440	8	0
Anthracene	25	< 0.05	-	2400	5400	11000	8	0
Fluoranthene	160	< 0.05	-	280	560	890	8	0
Pyrene	140	< 0.05	-	620	1200	2000	8	0
Benzo(a)anthracene	90	< 0.05	-	7.2	11	13	8	MG WS01 @ 0.05m
Chrysene	75	< 0.05	-	15	22	27	8	MG 1No.

Determinant	Maximum Measured Concentration		Background Concentration	LQM/CIEH S4UL: Residential with plant uptake (mg/kg)			Number of tests	Number of exceedances
	Made ground	Natural Ground						
								WS01 @ 0.05m
Benzo(b)fluoranthene	87	< 0.05	-	2.6	3.3	3.7	8	MG 3No. WS01@ 0.05m WS03 0.40m WS06 @ 1m
Benzo(k)fluoranthene	35	< 0.05	-	77	93	100	8	0
Benzo(a)pyrene	79	2.8	-	2.2	2.7	3.0	8	MG 3No N 1No. WS01@ 0.05m WS02 @ 0.20m WS04 @ 0.05m WS06 @ 1m
Indeno(1,2,3-c,d)pyrene	31	< 0.05	-	27	36	41	8	0
Dibenzo(a,h)anthracene	10	0.36	-	0.24	0.28	0.3	8	MG 4No. N 1No. WS01 @ 0.05m WS02 @ 0.20m WS03 @ 0.40 WS04 @ 0.05 WS06 @ 1m
Benzo(g,h,i)perylene	33	< 0.05	-	320	340	350	8	0
TPH Aliphatic $C_{10} – C_{12}$	7.8	-	-	130	330	760	2	0
TPH Aliphatic $C_{12} – C_{16}$	19	-	-	1100	2400	4300	2	0
TPH Aliphatic $C_{16} – C_{35}$	81	-	-	65000	92000	110000	2	0
TPH Aromatic $C_{12} – C_{16}$	220	-	-	140	330	660	2	0
TPH Aromatic $C_{16} – C_{21}$	980	-	-	260	540	930	2	MG 1No. WS01 @ 0.05m
TPH Aromatic $C_{21} – C_{35}$	1600	-	-	1100	1500	1700	2	MG 1No. WS01 @ 0.05m
TPH C_{25}-C_{40} (TPH aromatic C_{21}-C_{35}***)	1600	-	-	1100	1500	1700	2	MG 1No. WS01 @ 0.05m

*assumes all chromium on site is in trivalent form
** provisional C4SL
***most sensitive fraction within wider TPH band (specified)

11.2 Interpretation

11.2.1 The analyses recorded elevated concentrations of some heavy metals (beryllium and lead), PAH's benzo(a)anthracene, chrysene, bezo(b)fluoranthene, bezo(a)pyrene, dibenzo(a,h)anthracene, and TPH bands C16-C35 with respect to the selected screening values. These occurrences are discussed in the following sections.

Heavy Metals

11.2.2 An elevated concentration of lead was found in WS02 at 1.60m bgl. This exploratory hole location is in an area of road planing spoil heaps. Pottery and brick were noted to be present within the gravel matrix at the same depth, these all being possible sources of lead.

11.2.3 One elevated concentration of beryllium was noted at the sample location of WS01 at 0.05m bgl. This was located in the central northern area of the site. Abundant tarmac was noted to be present within the gravel matrix at this location.

Elevated PAH

11.2.4 Elevated concentrations of benzo(a)anthracene, chrysene, bezo(b)fluoranthene, bezo(a)pyrene, dibenzo(a,h)anthracene, were found at the sample locations of WS01 0.05m bgl, WS02 0.20m bgl, WS03 0.40m bgl, WS04 0.05m bgl and WS06 1m bgl. Tarmac was present within all the made ground sample locations. Exceedances were noted within the natural topsoil strata of WS04 at 0.05m bgl. No obvious source was noted to be present within the gravel fraction or from nearby human activities.

Petroleum Hydrocarbons

11.2.5 Exceedance of the TPH C_{16}-C_{21} of 980 mg/kg and TPH C C_{21}-C_{35} of 1600 mg/kg were recorded in WS01 at 0.05 m, located in the central northern area of the site, when compared to the most stringent TPH fraction S4UL. This window sampler location was noted to feature tarmac within the gravel matrix. This location is also positioned near what is assumed to be the original vehicle access route onto the site.

Asbestos

11.2.6 Eight samples were submitted for an asbestos screen, no asbestos was identified in any of the samples tested.

11.3 Summary

11.3.1 On the basis of the chemical testing undertaken, JNP Group considers that a viable risk to human health exists from elevated concentrations of beryllium, lead, PAHs and heavier TPH fractions in the near-surface soils. Hence, remedial actions at the site are considered necessary in these areas for the proposed development.

11.4 Risk to Controlled Waters

11.4.1 Regarding the risks to controlled waters, New Mill Dike is located 225m southeast of the site. New Mill Dike is located down gradient from the site. It is likely that any surface water run off generated from the site will flow towards New Mill Dike.

11.4.2 A well is also noted circa 30m to the east of the site on OS mapping. Any groundwater below the site will likely to flow towards these receptors.

11.4.3 Based upon a review of the contaminants recorded in Table 11.1, highly mobile organic hydrocarbons, such as BTEX, lighter TPH fractions, or naphthalene, were not recorded within the made ground. The metal concentrations recorded are similar to typical background concentrations, with the only exceptions being lead and beryllium.

11.4.4 The lead concentrations ranged between 14-1400 mg/kg. The greatest elevated concentration lead was encountered in WS02 at 1.60m bgl. Based upon a review of the exploratory hole logs for this sample location sources of lead are noted from the presence of glazed ceramics, tarmac and brick within the gravel matrix of this location.

11.4.5 Lead is known to sorb to clay (SoBRA 2012) and is considered to have low mobility and solubility in the environment (CL:AIRE 2013, SoBRA 2012), hence the concentrations of lead recorded at the site are not considered likely to pose a significant risk to the water environment.

11.4.6 Based on the low mobility of contaminants noted at elevated concentrations, the risk to controlled waters is considered to be low.

11.5 Summary

11.5.1 On the basis of the chemical testing undertaken, JNP Group consider that a risk to human health is present from elevated concentrations of lead, beryllium, PAH and TPH in the near surface soils and deeper deposits, hence remedial actions at the site are considered necessary in these areas.

12 GROUND GAS PROTECTION REQUIREMENTS

12.1 Guidance and Standards

12.1.1 JNP Group has used the guidance given in the following document to assess the risks from ground gases

- CIRIA C665. Assessing risks posed by hazardous gases to buildings. 2007;
- BS 8485. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. 2015 +A1 2019;
- CL:AIRE RB 17. A Pragmatic Approach to Ground Gas Risk Assessment. 2012.

12.1.2 It is intended that the proposed new build will be low rise housing.

12.1.3 The level of gas protection is determined by comparing the following parameters to reference values prescribed within BS 8485 (2015):

- "Typical Maximum Concentrations" for initial screening purposes;
- Risk based "Gas Screening Values" (GSV) for consideration where the typical maximum concentrations are exceeded.

12.1.4 The GSV is calculated using the following equation, and the resulting GSVs are compared to the Site Characteristic GSV given in Table 2 of BS 8485: 2015 +A1 2019.

- Maximum gas concentration (%) x worst case borehole flow rate (l/h)

12.2 Definitions

12.2.1 In accordance with Table 4 of BS 8485: 2015 +A1 2019, varying levels of protection are required for each category of risk for 'Type A' buildings (private housing), 'Type B' buildings (hotels, managed apartments, small commercial/retail), 'Type C' buildings (commercial, retail, industrial), and 'Type D' buildings (large industrial / commercial / warehouse).

- A 'CS1' determination requires no ground gas protection measures to be installed.
- A 'CS2' determination requires ground gas protection measures to be installed. The level of ground gas protection required should be equal or greater than 3.5 points for a Type A building, when at least two items from the following three: Table 5 (structural barrier); Table 6 (ventilation), and Table 7 (gas resistant membrane) within BS 8485: 2015 +A1 2019 are selected.

12.3 Results

12.3.1 The maximum CO_2 concentrations, the maximum flow rate, and the screening values for each borehole during the site work periods, are summarised in the following table.

12.3.2 The raw and collated results of the ground gas monitoring undertaken are presented in Appendix G. This includes a graph showing the atmospheric pressure trend throughout the monitoring period.

Table 12-1 Calculated Gas Screening Values

Location	Maximum CH4 Concentration (% v/v)	Maximum CO2 Concentration (% v/v)	Maximum Flow Rate (l/hr)	Maximum Gas Screening Value (l/hr)
WS02	<0.1	0.5	0.2	0.001
WS04	<0.1	0.8	0.2	0.0016
WS06	<0.1	1.0	0.13	0.0013

12.4 Interpretation

12.4.1 A 'CS1' determination was derived from the monitoring results undertaken to date. However confirmation of the gas protection measures required will be determined on completion of the gas monitoring.

13 REVISED CONCEPTUAL SITE MODEL AND OVERALL ENVIRONMENTAL RISK

13.1 Summary

13.1.1 Following the ground investigation and subsequent assessment undertaken, the conceptual site model and overall environmental risk assessment have been updated as detailed in the following table.

Table 13-1 Updated Conceptual Model and Risk Assessment

Issue	Risk		Justification
HUMAN HEALTH	MEDIUM		Elevated concentrations of heavy metals and hydrocarbons are present within the made ground and natural topsoil in localised parts of the site. Remediation is required at the site to reduce the risks to acceptable levels. No elevated concentrations of gases have been recorded.
GROUNDWATER	LOW		No mobile species of metals or hydrocarbons present
SURFACE WATER	LOW		No mobile species of metals or hydrocarbons present
PROPERTY & INFRASTRUCTURE	LOW		No elevated concentrations of gases have been recorded to date however monitoring ongoing. An ACE4 – DS4 has been calculated for the made ground around the location of WS02.
ECOLOGY	NONE		Based on report ref 4046-CWS-01, Produced by Cotswold Wildlife Services, Dated 20/06/21, the site was concluded to be of low wildlife interest.

14 GEOTECHNICAL ENGINEERING ASSESSMENT

14.1 Proposed Development / Redevelopment

14.1.1 It is proposed to redevelop the site with approximately 10 affordable low-energy residential properties, all with private gardens. In addition, access roads are to be constructed, this requiring a ramp in the north western corner of the site to access Chapel Gate. The proposed redevelopment layout is shown on external Drawing Reference (462)-GWP-01-01-DR-A-(SK)-0001 revision WIP/S (TBA) produced by CWPA (Appendix B).

14.2 Summary of Ground and Groundwater Conditions

14.2.1 The ground conditions encountered during the intrusive investigations were generally consistent with the published geological records. In general, a variable thickness of made ground was encountered across the whole site, underlying grass, moss, and hardstanding. The made ground was found to overlie a very loose to loose, soft to stiff granular and cohesive weathered Rough Rock deposits. Underlying this a weathered to strong sandstone was noted. This was encountered from a minimum depth of 1.40m bgl in WS01 to a maximum depth of 5.50m bgl in WS07.

14.3 Site Preparation and Earthworks

14.3.1 The site has several spoil heaps in the eastern, southern, and western areas of the site. These have been proven by the ground investigation to mainly consist of road planing materials. Where spoil heaps are not present, in the central areas of the site, a mostly tarmac hardstanding was noted. In the north western area of the site, significant made ground deposits were encountered to a maximum depth of 4m bgl in WS07. These made ground deposits appear to have been mounded against a possible quarry headwall. The site features dense vegetation and mature trees in all of its boundaries.

14.3.2 Given the size of the site and the type of proposed development, it is assumed that the road planing spoil heaps will be removed off site. Once this is complete, breaking out of the tarmac hardstanding and a vegetation strip can occur. Exploratory holes undertaken in the far eastern area of the site indicate that a dark black to brown clayey topsoil is present. It is suggested that this is stripped and additional testing undertaken, due to PAH exceedances noted within the natural topsoil strata of WS04 at 0.05m bgl. This will determine if this can be retained and reused for the final development.

14.3.3 A review of Drawing Reference (462)-GWP-01-01-DR-A-(SK)-0001 revision WIP/S (TBA) produced by CWPA (Appendix B) indicates that an access road is proposed with an associated retaining wall in the north western corner of the site. Made ground deposits of circa 4m thick were encountered within this area. It is suggested that if the made ground deposits are retained without any earthworks undertaken, then a CBR value of less than 2% should be assumed. Given the granular nature of the made ground deposits, a further option could be re-engineering of the made ground deposits to achieve a higher CBR value. It is also of note that although not proven by the GI, it is predicted that the quarry highwall is present within the area of the proposed road. Possible re-enforcing of the roadway is suggested to control differential settlement if spanning of this feature is required.

14.4 Shallow Foundations

14.4.1 The made ground deposits are considered unsuitable to support foundation loads due to their poor engineering characteristics, and inherent variability.

14.4.2 Traditional strip, trench or pad foundations are considered feasible, placed within the Rough Rock, provided site levels are not changing significantly and the spoil mounds are removed.

14.4.3 Foundation excavations should be taken through all topsoil and made ground deposits, and foundations placed within the unweathered Rough Rock Sandstone. This was encountered from a minimum founding depth of 1.40 m bgl. An allowable bearing pressure in excess of 250 kN/m^2 would be available placed within the unweathered Rough Rock Sandstone, based upon standard 0.60 m wide foundations. The allowable bearing capacity includes an overall factor of safety of three against bearing capacity failure, whilst ensuring total settlements are maintained at less than 25mm.

14.4.4 In accordance with National House Building Council (NHBC) guidance Chapter 5.2 the depth of made ground deposits cannot exceed 0.60m where ground floor slabs are to be placed. Given the thickness of made ground generally being greater than 0.60m at the proposed plot locations, suspended ground floor slabs would be recommended.

14.4.5 Where foundations are to be constructed within the influence of existing, felled or proposed trees, they are likely to need heave precautions in accordance with National House Building Council (NHBC) Chapter 4.2 'Building Near Trees', based upon soils of low volume change potential. JNP Group recommends that a tree species survey is undertaken, to ascertain what implications existing trees will have on the proposed foundations.

14.4.6 Tree roots were encountered to depths of WS06 at 0.20-2.60. Due to the presence of trees, roots are likely to exist in several areas around the site. It would be prudent for all foundation excavations to be visually inspected by an appropriate engineer in order to verify that tree roots are not present.

14.4.7 It should be noted that trench fill foundations deeper than 2.50 m would only be acceptable by the NHBC if they were designed by an engineer.

14.5 **Groundwater and Excavations**

14.5.1 All window sampler locations remained stable during excavation however, collapse or spalling could occur in localised areas given the inherent variability of made ground deposits. In addition, groundwater was encountered at the location of WS05 at 1.20m bgl. This is assumed to be perched within the made ground encountered at the site, therefore localized groundwater inflow could present practical difficulties during foundation excavation.

14.5.2 Trial pits, trenches or boreholes carried out as part of this, or previous investigations may represent soft spots and conduits/sumps for groundwater or surface water. In excavations, such materials may also be loose and unstable. Unless specifically stated, exploratory hole locations should be regarded as approximate. Consideration should be given to accurate location of such features where it is considered they may impact on the proposed development.

14.5.3 Conventional mechanical backhoe excavators should be suitable for excavation through the made ground encountered at the site. However, any trenches or excavations required within the intact rock is likely to require larger capacity excavators and pneumatic/hydraulic breakout equipment may be necessary.

14.5 Pavement Design

California Bearing Ratio

14.5.1 It is assumed that the pavement subgrade/formation would be in near surface soils at an approximate depth of 0.60 m below existing ground levels. If ground levels are to be reduced, the formation level would need to be adjusted accordingly, and the specifying geotechnical engineer informed, so that an assessment of the appropriate soil layer can be made.

14.5.2 A mean Plasticity Index value of 16 % was recorded in the near surface soils, which indicates an equilibrium subgrade CBR value of 3% (based upon Table 3.1 in Interim Advice Note 73/06 Rev 1 2009), assuming average construction conditions, and high water table.

14.5.3 It is recommended that the subgrade CBR value is verified immediately before placement of the pavement capping/subbase to confirm the minimum design CBR value. The design CBR value should not be increased on the basis of these tests. Should testing indicate a subgrade CBR less than the design value, then measures should be taken to improve the subgrade before proceeding with pavement construction.

14.5.4 It is also anticipated that the quarry highwall may cross beneath the proposed site access and as such there is the potential for differential settlement of the road. As such there may be a requirement to reengineer the made ground in this area and / or the provision of geotextile reinforcement.

Frost Susceptibility

Cohesive Soils

14.5.5 Soils with a Plasticity Index of greater than 15% would not generally be frost-susceptible (i.e. susceptible to ice lenses formation in frosty conditions) (Croney and Jacobs, 1967). Cohesive soils with a Plasticity Index of 12% were encountered at the sample location of WS03 at 1.50m bgl. Given the depth of this sample frost susceptibility would only become an issue if levels were altered in this area.

14.7 Ground Aggressivity to Buried Concrete

14.7.1 Chemical analyses of 4 no. samples have been undertaken in accordance with BRE SD1 2005 “Concrete in aggressive ground” to determine their concrete classification.

Table 14-1 Concrete Classification Assessment

Strata	Details	Range	Concrete Class
Made ground	Number of Tests	2	DS1 & DS4 AC1 & AC4
	Water Soluble Sulphates (mg/l)	200	
	pH	8	
	Total Potential Sulphate %	1.20 – 2.75	
Rough Rock Formation	Number of Tests	2	DS1 – AC1
	Water Soluble Sulphates (mg/l)	400	
	pH	8	
	Total Potential Sulphate %	1.20 – 2.75	

14.7.2 On the basis of the above assessment, and in accordance with BRE SD1 (2005) “Concrete in aggressive ground”, a Design Sulphate Class of DS4, with an ACEC of AC-4, would apply for the made ground in and around the location of WS02. The made ground encountered around the exploratory hole location of WS6 and natural soils of the Rough Rock Formation recorded a Design Sulphate Class of DS1 and a ACEC of AC-1.

15 CONCLUSIONS AND RECOMMENDATIONS

15.1 Conclusions

15.1.1 JNP Group has determined through desk-based research, intrusive investigation, laboratory testing, monitoring, and assessment that:

- Ground conditions at the site comprise a variable thickness of made ground encountered across the whole site, underlying grass, moss, and hard,standing. The made ground was found to overlie a very loose to loose, soft to stiff granular and cohesive weathered Rough Rock deposits. Underlying this a weathered to strong sandstone was noted. This was encountered from a minimum depth of 1.40m bgl in WS01 to a maximum depth of 5.50m bgl in WS07.
- A risk to future residential end users is present from metal and hydrocarbon contaminants in made ground deposits.
- Initial monitoring of ground gas at the site indicates that ground gas protection measures are not required, however the monitoring is ongoing.
- Radon gas protection measures are not required.
- Traditional shallow strip or pad foundations are considered feasible, placed within the unweathered sandstone of the Rough Rock of the Rossendale Formation. An allowable bearing pressure of 250 kN/m^2 would be available placed within the unweathered sandstone.
- The site contains several mature trees in around the boundary, foundations within the influence of these trees may require heave precautions in line with NHBC guidance depending on the foundation solution chosen.
- The pavement subgrade at an approximate depth of 0.6 m below existing ground level has an equilibrium subgrade CBR value of 3.0 % for the natural materials and less than 2% for the made ground.

15.2 Recommendations

15.2.1 In line with the guidelines given LCRM and consequent to the ground investigation conclusions; JNP Group recommends that:

- If infiltration testing is to be undertaken, a sample of the soils within the vicinity of the soakaway location should be taken and tested for highly mobile metal, PAH and TPH contaminants.
- If site generated topsoil deposits are retained and reused as part of the proposed development, additional testing should be undertaken, due to noted PAH exceedances within the natural topsoil strata of WS04 at 0.05m bgl. This will determine if this can be retained and reused for the final development.
- A remediation strategy report should be produced for the site. This would include undertaking an options appraisal of potential remediation options and assess the feasibility of short-listed remedial options, undertaking a hazardous waste assessment, designing a sustainable remediation strategy for the site, and an outline validation plan.
- A materials management plan is required for the site.

- A copy of this report is submitted to the Regulatory Authorities for their approval before any further work is undertaken at the site.

14.2.2 In addition, JNP Group recommends that the proposed development works are undertaken in accordance with the definition of Waste Code of Practice (DoWCoP); in following this guidance and to ensure materials are managed correctly, A Materials Management Plan will need to be prepared and declared in advance by a Qualified Person, then implemented and documented in a Verification Report. If this process is not undertaken, then following recent changes in Landfill Tax Regulations by HMRC. There is a risk of penalties equating to twice the Landfill Tax being applied to the re-use of material o site. If the proposed works are to be undertaken outside the DoWCoP, there would need to be some of Environmental Permitting or suitable equivalent. The requirements of such are likely to be more onerous and may take longer to be granted.

16 REFERENCES

1. AGS: 1999 : Electronic transfer of geotechnical and geo-environmental data (3rd edition). Association of Geotechnical and Geo-environmental Specialists.
2. ASTM : 1992 : Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Designation D1586-84 (reapproved 1992). American Society for Testing and Materials, West Conshohocken, USA.
3. BRE. 1991 (revised 2003). Special Digest 365: Soakaway Design.
4. BRE. 2005. Special Digest 1 : Concrete in Aggressive Ground. Building Research Establishment.
5. BS EN 1997-1:2004 Geotechnical design - Part 1 – General rules, British Standards Institution, London.
6. BS EN ISO 14688-1 Soil – Identification and description, British Standards Institution, London.
7. BS EN ISO 14688-2 Soil – Classification principles and quantitative description characteristics, British Standards Institution, London.
8. BS EN ISO 14689-1 Rock – Identification and description, British Standards Institution, London.
9. BS 1377. 1990. Methods of Test for soils for civil engineering purposes. British Standards Institution. London.
10. BS 5930. 2015 +A1 2019. Code of practice for site investigations. British Standards Institution. London.
11. BS 8485. 2015. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. British Standards Institution. London.
12. BS 8576. 2013. Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOC). British Standards Institution. London.
13. BS 10175. 2001+A1:2013 +A2:2017. Investigation of potentially contaminated sites - code of practice. British Standards Institution. London.
14. BS ISO 17924:2018. Soil quality – Assessment of human exposure from ingestion of soil and soil material – Procedure for the estimation of the human bioaccessibility / bioavailability of metals in soil. British Standards Institution. London.
15. BS ISO 18400-202:2018. Soil quality – Sampling. Part 202: Preliminary investigations. British Standards Institution. London.
16. BS ISO 18400-202:2018. Soil quality – Sampling. Part 203: Investigation of potentially contaminated sites. British Standards Institution. London.
17. BS ISO 18400-202:2018. Soil quality – Sampling. Part 205: Guidance on the procedure for investigation of natural, near-natural and cultivated sites. British Standards Institution. London.
18. BS ISO 18400-104:2018. Soil quality – Sampling. Part 104: Strategies. British Standards Institution. London.
19. Burland J B and M C Burbidge. 1985. Settlement of foundations on sand and gravel. Proc. ICE, Part 1, Vol 78.

20. Card G, Wilson S, Mortimore S. 2012. A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17. CL:AIRE. London.
21. CL:AIRE and Chartered Institute of Environmental Health (CIEH). 2008. Guidance on Comparing Soil Contamination Data with a Critical Concentration. CL:AIRE / CIEH. London.
22. CL:AIRE. 2011. The Definition of Waste: Development Industry Code of Practice, Version 2. CL:AIRE London.
23. CL:AIRE. 2013. SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. CL:AIRE. London.
24. CL:AIRE. 2016. Control of Asbestos Regulations 2012. Interpretation for managing and Working with Asbestos in Soil and Construction and Demolition Materials. Industry Guidance. CL:AIRE. London.
25. CL:AIRE. 2017. Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies. CL:AIRE. London.
26. Clayton C R I. 1990. SPT energy transmission: theory, measurement and significance. Ground Engineering, December.
27. Chengini A and N A Trenter. 1995. The shear strength and deformation behaviour of a glacial till. Proceedings of International Conference on Advances in site investigation practice. ICE, London.
28. Clayton C R I. 1995. The Standard Penetration Test (SPT) : Methods and use. CIRIA Report 143. Construction Industry Research Information Association, London.
29. Croney D and J C Jacobs. 1967. The frost susceptibility of soils and road materials. RRL Report LR90. Transport Research Laboratory (formerly Road Research Laboratory), Crowthorne
30. CIRIA C665. 2007. Assessing Risks Posed by Hazardous Ground Gases to Buildings. CIRIA, London
31. CIRIA C733. 2014. Asbestos in Soil and Made Ground: A Guide to Understanding and Managing risks. CIRIA. London.
32. DEFRA.2014. PB14163. Water Framework Directive implementation in England and Wales: new and updated standards to protect the water environment.
33. DEFRA. 2014. SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document. DEFRA. London.
34. de Mello V F B : 1971 : The Standard penetration Test. State of the Art Report. 4th Pan American Conference on Soil Mechanics and Foundation Engineering. Puerto Rico. Vol 1.
35. Driscoll R. 1983. The influence of vegetation on swelling and shrinking of clay soils in Britain. Geotechnique 23 (2): 93-105
36. Environment Agency. 2005. The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils. P5-080/TR3.
37. Environment Agency. 2006. Remedial Targets Methodology. Hydrogeological Risk Assessment for Land Contamination.

38. Environment Agency. 2008. Compilation of Date for Priority Organic Pollutants for Derivation of Soil Guideline Values. Science Report SC050021/SR7.
39. Environment Agency. 2009. Human Health Toxicological Assessment of Contaminants in Soil. Science Report SC050021/SR2. Bristol.
40. Environment Agency. 2009. Updated technical background to the CLEA model. Science Report SC050021/SR3. Bristol.
41. Environment Agency. 2009. CLEA Software (Version 1.06) - Science Report SC050021/SR4. Bristol.
42. Environment Agency. 2010. Waste acceptance at landfills – Guidance on waste acceptance procedures and criteria. Bristol.
43. Environment Agency. 2013. Chemical Standards Database - http://evidence.environment-agency.gov.uk/ChemicalStandards/ChemicalsByName.aspx
44. Environment Agency. 2019. Land Contamination: Risk Management. UK Government Website - https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks.
45. Eurocode 7. 1997. Geotechnical Design - Part 3, Design assisted by field testing. Pre-standard ENV 1997-3. British Standards Institution, London.
46. Gibbs H J and W G Holtz. 1957. Research on determining the density of sands by spoon penetration testing. Proceedings of 4th International Conference on Soil Mechanics and Foundation Engineering, London.
47. HD25/94. 1994. Design Manual for Roads and Bridges Volume 7. The Department of Transport.
48. Hobbs P R N, Hallam J R, Forster A, Entwistle D C, Jones L D, Cripps A C, Northmore K J, Self S J and Meakin J L, 2002. Engineering geology of British rocks and soils – Mudstone of the Mercia Mudstone Group. BGS Research Report PR/01/02.
49. IAN 73/06. 2009. Design Guidance for Road Pavement Foundations (Draft HD25).
50. Land Quality Management & Chartered Institute of Environmental Health (2015) The LQM/CIEH S4UL for Human Health Risk Assessment - LQM CIEH. Land Quality Press, Nottingham.
51. Lord J A, Clayton C R I and Mortimore R N 2002. Engineering in Chalk. CIRIA Report no. C574.
52. Nixon I K. 1982. Standard penetration test. State of the art report. Proceedings of the Second European Symposium on Penetration Testing, Amsterdam.
53. Peck R B, W E Hanson and T H Thornburn. 1974. Foundation Engineering, 2nd Edition. Wiley, New York.
54. Rodin S, B O Corbett, D E Sherwood and S Thorburn. 1974. Penetration testing in the UK, State of the art report. Proceedings of Symposium on Engineering Behaviour of Glacial Materials, Birmingham.
55. Skempton A W. 1986. Standard Penetration Test procedures and the effects in sands of overburden pressure, relative density, particle size, ageing and overconsolidation. Geotechnique 36, No 3.

56. Society of Brownfield Risk Assessment. Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater. Version 1. February 2017.
57. Sowers G F. 1979. Introductory Soil Mechanics and Foundations. Macmillan.
58. Stroud M A. 1974. The standard penetration test in insensitive clays and soft rocks. Proceedings of European Symposium on Penetration Testing, Stockholm.
59. Stroud M A and F G Butler. 1975. The standard penetration test and the engineering properties of glacial materials. Proceedings of Symposium on Engineering Behaviour of Glacial Materials, Birmingham.
60. Stroud M A. 1988. The standard penetration test - its application and interpretation on Penetration Testing in the UK, Birmingham. Thomas Telford, London.
61. Terzaghi K and R B Peck. 1967. Soil Mechanics in Engineering Practice, 2nd Edition. John Wiley, London.
62. Tokimatsu K. 1988. Penetration testing for dynamic problems. Proceedings of First International Symposium on Penetration Testing.
63. TPH Criteria Working Group. 1997. Total Petroleum Hydrocarbon Group Series. Volume 3. Selection of Representative TPH Fractions Based on Fate and Transport Considerations.
64. Water Framework Directive UK Technical Advisory Group. 2014. River and Lake Assessment Method Specific Pollutants (metals); Metal Bioavailability Assessment Took (M-BAT). Scotland.
65. Wilson S, Card G and Haines S.2008. Ground Gas Handbook. Dunbeath. Whittles Publishing.

FIGURES / DRAWINGS

Figure 1

Site Location Plan

Project:

Land Adjacent 67, Chapel Gate Scholes, Holmfirth

Project No:

B24367

Figure 2

SPT / Depth Relationship

Project:

Land Adjacent 67, Chapel Gate Scholes, Holmfirth

Project No:

B24367

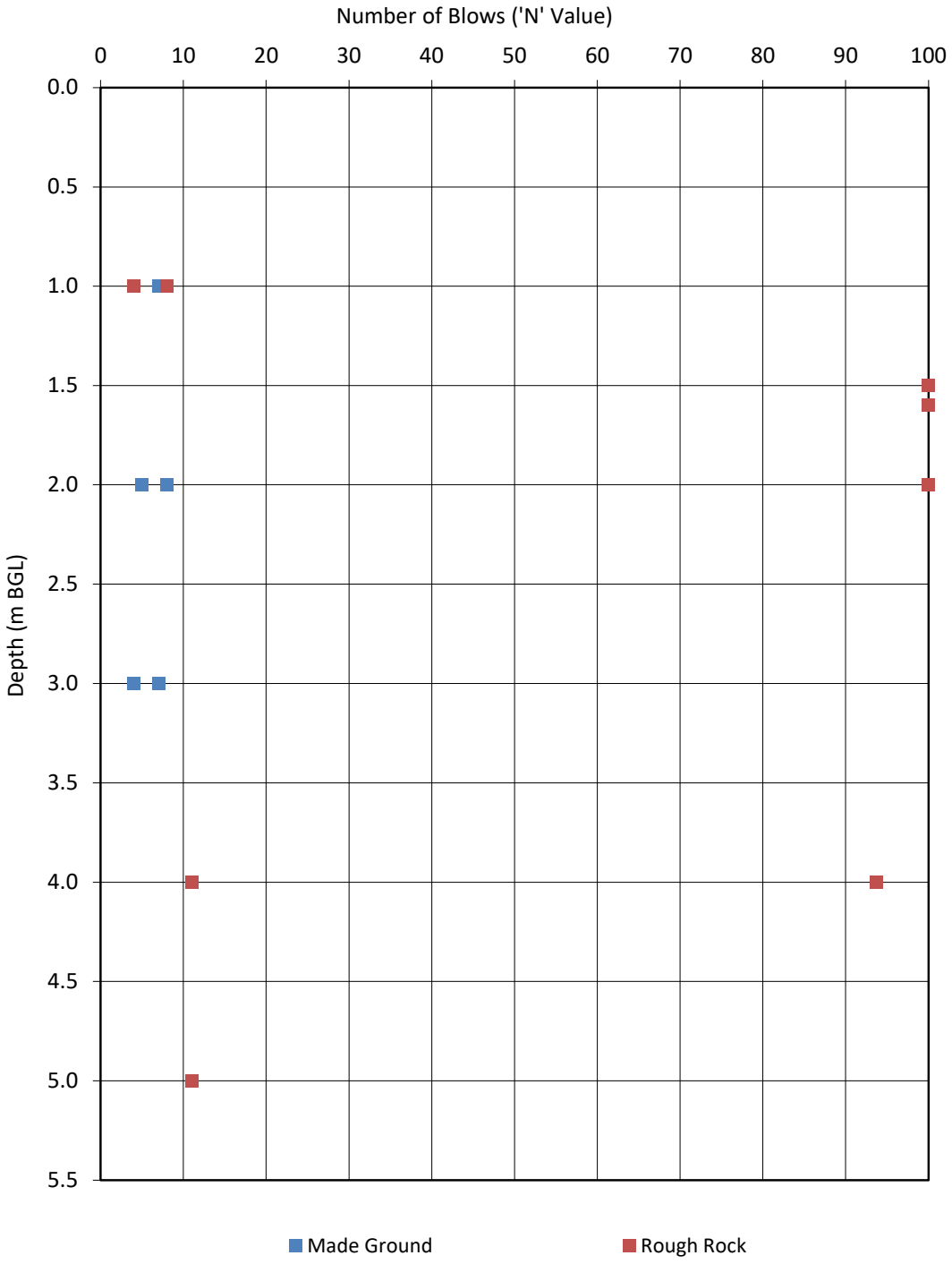


Figure 3

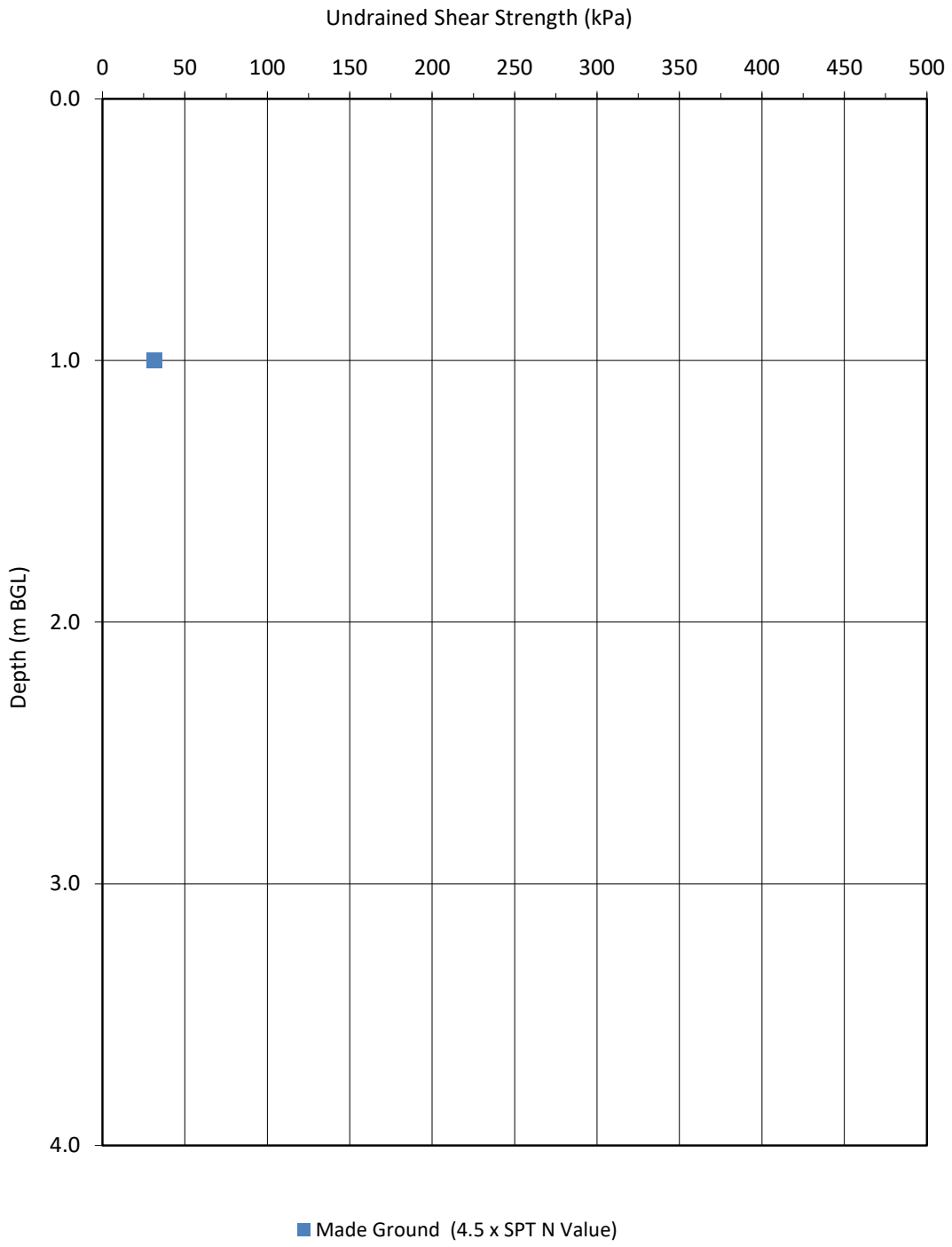
Undrained Shear Strength / Depth Relationship

Project:

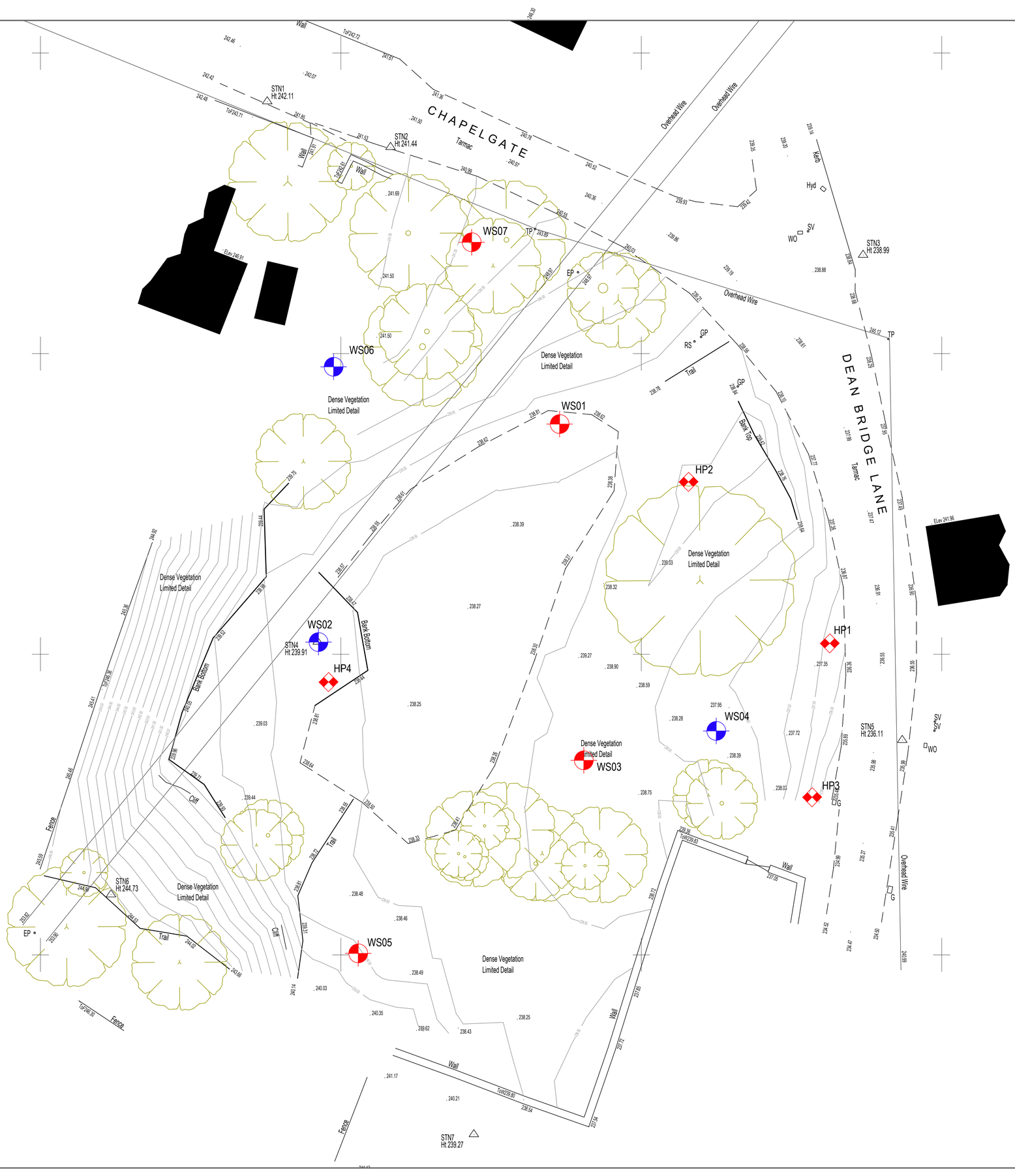
Land Adjacent 67, Chapel Gate Scholes, Holmfirth

Project No:

B24367



jnpgroup



General Notes

1. Where this drawing has been issued in electronic .dwg format, it has been done so in good faith. JNP Group do not take any responsibility for any inaccuracies in the electronic data, which should be checked against the paper (or .pdf) drawing issue. Any apparent discrepancies should be immediately reported to JNP Group. The electronic .dwg file should not be assumed to be to scale and should not be used for 'overlaying', setting out or checking of any third party information. All dimensions should be taken from the paper (or .pdf) version of the drawing. Electronic drawings may contain third party information. JNP Group take no responsibility for this information, which should be checked against the originators paper drawing(s).
2. All dimensions are millimetres (mm), and levels are in metres (m) unless noted otherwise and should be checked on site prior to construction/fabrication.
3. Do not scale from this drawing. Only figured dimensions are to be relied upon. Don't hesitate to get in touch with JNP Group if additional information is required.
4. Any discrepancies between drawings of different scales and between drawings and specifications, where appropriate, to be reported to JNP Group for decision.
5. Copyright reserved. This drawing may only be used for The Client and location specified in the title block. It may not be copied or disclosed to any third party without the prior written consent of JNP Group.
6. This drawing should only be used for construction if the drawing status is "Construction". JNP Group takes no responsibility for construction works undertaken to drawings that are not marked with this status.

Health & Safety Note

The details on this drawing have been prepared on the assumption that a competent contractor will be carrying out the works. If the contractor(s) considers that there is insufficient Health and Safety information on this drawing, this should immediately be brought to the attention of the designer.

HAZARD IDENTIFICATION BOX			
This table is provided to assist the Principal Contractor to fulfil their obligations under the CDM Regulations 2015			
Hazard Ref	Hazard Type (Construction/Maintenance/ Cleaning/Demolition/Adaptation)	Hazard Description	Mitigation Measures/ Residual Risk
1			

Key

WS -Install

WS

Hand Pit

Rev.	Date	Description	Drn / Chk'd / Appd

Suitability:

S2 - Suitable for Information

JNP GROUP
CONSULTING ENGINEERS
Chesham • Brighouse • Bristol • Glasgow • Hartlepool • Leamington Spa • Sheffield
www.jnpgroup.co.uk

Client: EcoHolmes Community Land Trust

Job: Land Adjacent to 67 Chapel Gate,

Title: Exploratory Hole Location Plan

Classification: FI_60_20

Scale @ A1: NTS

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number: B24367 - JNP - XX - ZZ - DR - Z - 0001 (Document/Drawing Number)

Revision: -

Compliant to ISO17200:2004 - JNP QA Ref: QD019 rev G

JNP Group Internal Project Number: H01234

Appendix A LIMITATIONS

INTRODUCTION

This report is confidential and has been prepared solely for the benefit of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from JNP Group; a charge may be levied against such approval. JNP Group accepts no responsibility or liability for the consequences of this document being used for any purpose or project other than for which it was commissioned, and: this document to any third party with whom and agreement has not been executed.

Any comments given within this report are based on the understanding that the proposed works to be undertaken will be as described in the introduction and the information referred to and provided by others and will be assumed to be correct and will not have been checked by JNP Group and JNP Group will not accept any liability or responsibility for any inaccuracy in such information.

Any deviation from the recommendations or conclusions contained in this report should be referred to JNP Group in writing for comment and JNP Group reserve the right to reconsider their recommendations and conclusions contained within. JNP Group will not accept any liability or responsibility for any changes or deviations from the recommendations noted in this report without prior consultation and our full approval.

The details contained within this report reflect the site conditions prevailing at the time of investigation. JNP Group warrants the accuracy of this report up to and including that date. Additional information, improved practice or changes in legislation may necessitate this report having to be reviewed in whole or in part after that date. If necessary, this report should be referred back to JNP Group for re-assessment and, if necessary, re-appraisal.

This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report. Whilst this report and the opinion made herein are correct to the best of JNP Group' belief, JNP Group cannot guarantee the accuracy or completeness of any information provided by third parties.

The report represents the finding and opinions of experience geotechnical and geo-environmental engineers. JNP Group does not provide legal advice and the advice of lawyers may also be required.

It should be noted that the following were not included as part of the agreed scope of works with the client: detailed ecological surveys.

JNP Group has provided advice and made recommendations based on the findings of the work undertaken, however this is subject to the approval / acceptance by the relevant Regulatory Authorities.

Objectives

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, JNP Group reserves the right to review such information and, if warranted, to modify the opinions

accordingly. It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Intrusive Investigations

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made.

Where intrusive investigations have been undertaken, they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature sampling, no investigation technique is capable of identifying all conditions present in all areas. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered. The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

The objectives of the investigation have been linked to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and ground water. The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to areas unoccupied by the building(s) on the site and by buried services.

Gas and groundwater levels may vary from those reported due to seasonal, or other effects.

Gas Membranes

Where JNP Group are commissioned to undertake the inspection and validation of a gas membrane, we, at the time of inspection, will ensure that the membrane is laid in accordance with the relevant arrangements and sections. At that time we will ensure that the venting media is laid correctly in preparation of the membrane and we will ensure that any tears in the membrane or bad workmanship is reported and instructions given to be rectified. Thereafter it is the duty of the Principal Contractor to ensure that tears and defects are rectified.

Remediation and Verification Reports Limitations

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

Where intrusive investigations have been undertaken, they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature sampling, no investigation technique is capable of identifying all conditions present in all areas. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

If costs have been included in relation to the site remediation these must be confirmed by a qualified quantity surveyor. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed from Third Party should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional

information become available which may affect the opinions expressed in this report, JNP Group reserves the right to review such information and, if warranted, to modify the opinions accordingly.

Whilst this report and the opinion made herein are correct to the best of JNP Group's belief, JNP Group cannot guarantee the accuracy or completeness of any information provided by third parties.

Gas and groundwater levels may vary from those reported due to seasonal, or other effects.

Appendix B THIRD PARTY DRAWINGS

Contractors must verify all dimensions at the job before commencing any work or making shop drawings. Do not scale off drawing. Do not take digital dimensions from this drawing. Written dimensions should be taken. Any discrepancies to be reported to the Architect. The design is subject to the following:

- Land Registry Confirmation
- Full Structural Review
- Planning Approval
- Topographical Information
- Review of Easements and Covenants
- Rights of lights Issues
- Building Regulations Approval / Fire Engineering

Name	(462)-GWP-01-01-DR-A-(SK)-0001		
Scale	1:500@A3	Rev / Status	WIP / S
Dr/Checked	CT / DT	Date of Issue	TBA

BIMcloud: DESKTOP-H2CIOHA - BIMcloud Basic for ARCHICAD 25/Chippings Dump Site - (462)2112-GW@P-01-DR-A-Huddersfield_EcoHomes_P02

Chippings

Site Plan Option 4

Appendix C PHOTO DOCUMENT

Photograph 1: Showing Ground Conditions at WS01

Photograph 2: Showing Ground Conditions at WS02

Photograph 3: Showing Ground Conditions at WS03

Photograph 4: Showing Ground Conditions at WS04

Photogrpah 5: Site at Time of Ground Investigation

Photograph 6: Showing Ground Conditions at WS05

Photograph 7: Showing Ground Conditions at WS06

Photograph 8: Showing Ground Conditions in WS07

Photograph 9:Site Condition Looking East

Appendix D GROUNDSURE REPORT

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

415861 , 407157

Order Details

Date: 13/01/2022

Your ref: G1380

Our Ref: GS-8445247

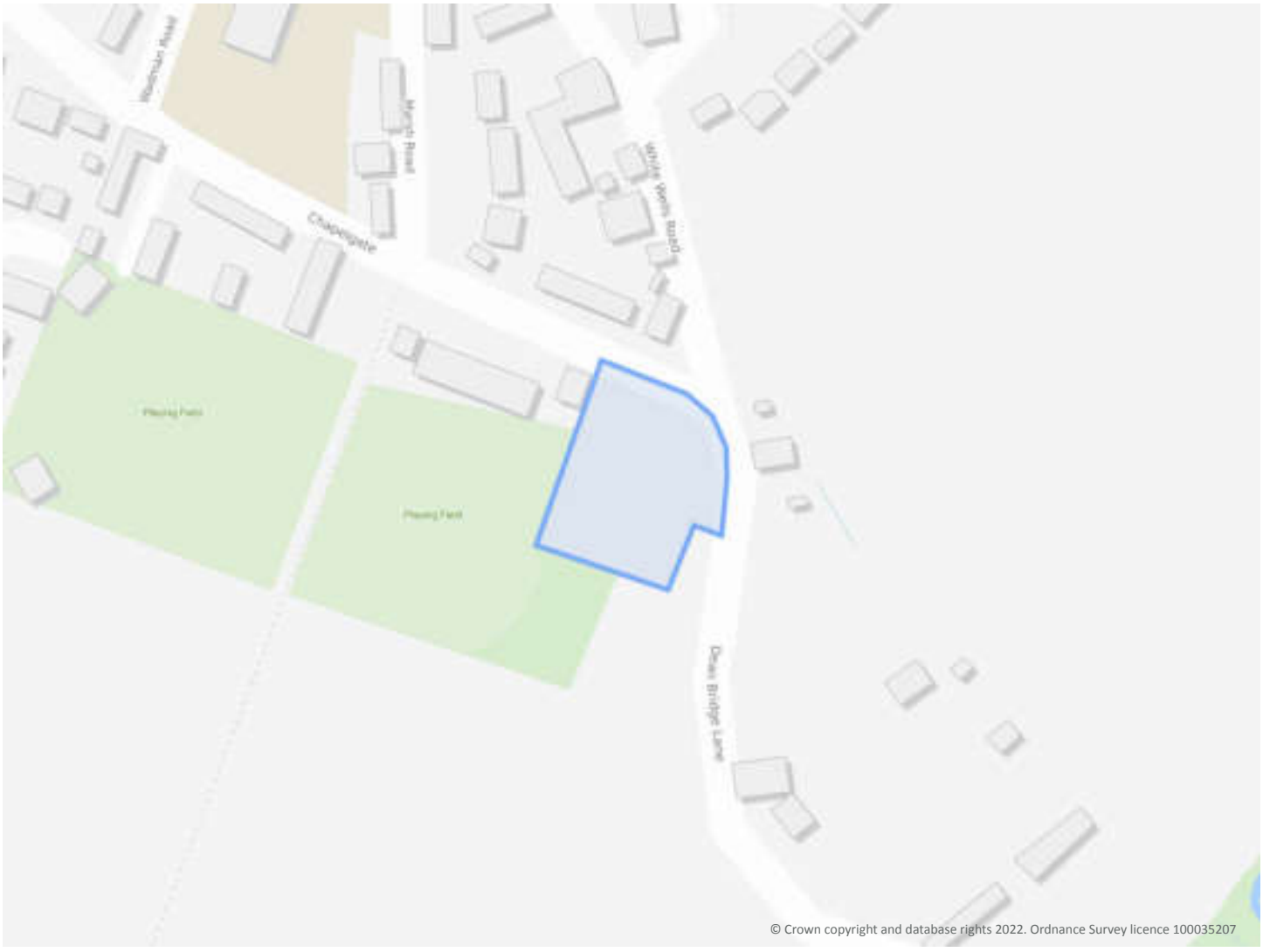
Client: JNP Group - Sheffield

Site Details

Location: 415862 407150

Area: 0.37 ha

Authority: Kirklees Council



Summary of findings p. 2

OS MasterMap site plan p.12

Aerial image p. 8

groundsure.com/insightuserguide

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

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	**1.1**	**Historical industrial land uses**	5	5	8	23	-
15	1.2	Historical tanks	0	0	0	0	-
15	**1.3**	**Historical energy features**	0	0	0	6	-
16	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	Historical garages	0	0	0	0	-
16	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
17	**2.1**	**Historical industrial land uses**	7	5	10	25	-
19	2.2	Historical tanks	0	0	0	0	-
19	**2.3**	**Historical energy features**	0	0	0	18	-
20	2.4	Historical petrol stations	0	0	0	0	-
21	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
22	3.1	Active or recent landfill	0	0	0	0	-
22	3.2	Historical landfill (BGS records)	0	0	0	0	-
23	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
23	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
23	3.5	Historical waste sites	0	0	0	0	-
23	3.6	Licensed waste sites	0	0	0	0	-
23	**3.7**	**Waste exemptions**	0	0	0	13	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
25	**4.1**	**Recent industrial land uses**	0	0	2	-	-
26	4.2	Current or recent petrol stations	0	0	0	0	-
26	4.3	Electricity cables	0	0	0	0	-
26	4.4	Gas pipelines	0	0	0	0	-
26	4.5	Sites determined as Contaminated Land	0	0	0	0	-

26	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
27	4.7	Regulated explosive sites	0	0	0	0	-
27	4.8	Hazardous substance storage/usage	0	0	0	0	-
27	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
27	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
27	**4.11**	**Licensed pollutant release (Part A(2)/B)**	0	0	0	1	-
28	4.12	Radioactive Substance Authorisations	0	0	0	0	-
28	**4.13**	**Licensed Discharges to controlled waters**	0	0	0	2	-
29	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
29	4.15	Pollutant release to public sewer	0	0	0	0	-
29	4.16	List 1 Dangerous Substances	0	0	0	0	-
29	4.17	List 2 Dangerous Substances	0	0	0	0	-
29	**4.18**	**Pollution Incidents (EA/NRW)**	0	0	0	2	-
30	4.19	Pollution inventory substances	0	0	0	0	-
30	4.20	Pollution inventory waste transfers	0	0	0	0	-
30	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
31	5.1	Superficial aquifer	None (within 500m)				
32	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
33	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
34	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
34	5.5	Groundwater vulnerability- local information	None (within 0m)				
35	**5.6**	**Groundwater abstractions**	0	0	0	0	39
44	**5.7**	**Surface water abstractions**	0	0	0	0	12
47	**5.8**	**Potable abstractions**	0	0	0	0	1
48	5.9	Source Protection Zones	0	0	0	0	-
48	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
49	**6.1**	**Water Network (OS MasterMap)**	0	1	5	-	-

50	6.2	Surface water features	0	1	5	-	-
50	6.3	WFD Surface water body catchments	1	-	-	-	-
51	6.4	WFD Surface water bodies	0	0	1	-	-
51	6.5	WFD Groundwater bodies	1	-	-	-	-

Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
52	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
52	7.2	Historical Flood Events	0	0	0	-	-
52	7.3	Flood Defences	0	0	0	-	-
53	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
53	7.5	Flood Storage Areas	0	0	0	-	-
54	7.6	Flood Zone 2	None (within 50m)				
54	7.7	Flood Zone 3	None (within 50m)				

Page	Section	Surface water flooding	
55	8.1	Surface water flooding	1 in 30 year, 0.3m - 1.0m (within 50m)

Page	Section	Groundwater flooding	
57	9.1	Groundwater flooding	Negligible (within 50m)

Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
58	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
59	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
59	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
59	10.4	Special Protection Areas (SPA)	0	0	0	0	0
59	10.5	National Nature Reserves (NNR)	0	0	0	0	0
60	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
60	10.7	Designated Ancient Woodland	0	0	0	1	2
60	10.8	Biosphere Reserves	0	0	0	0	0
61	10.9	Forest Parks	0	0	0	0	0
61	10.10	Marine Conservation Zones	0	0	0	0	0
61	10.11	Green Belt	1	0	0	0	0
61	10.12	Proposed Ramsar sites	0	0	0	0	0

62	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
62	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
62	10.15	Nitrate Sensitive Areas	0	0	0	0	0
62	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
63	**10.17**	**SSSI Impact Risk Zones**	1	-	-	-	-
64	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
65	11.1	World Heritage Sites	0	0	0	-	-
66	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
66	11.3	National Parks	0	0	0	-	-
66	**11.4**	**Listed Buildings**	0	0	3	-	-
67	11.5	Conservation Areas	0	0	0	-	-
67	11.6	Scheduled Ancient Monuments	0	0	0	-	-
67	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
68	**12.1**	**Agricultural Land Classification**	Grade 4 (within 250m)				
69	12.2	Open Access Land	0	0	0	-	-
69	12.3	Tree Felling Licences	0	0	0	-	-
69	12.4	Environmental Stewardship Schemes	0	0	0	-	-
70	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
71	**13.1**	**Priority Habitat Inventory**	0	0	8	-	-
72	13.2	Habitat Networks	0	0	0	-	-
72	**13.3**	**Open Mosaic Habitat**	1	0	0	-	-
72	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
74	**14.1**	**10k Availability**	Identified (within 500m)				
75	**14.2**	**Artificial and made ground (10k)**	1	1	1	3	-
77	**14.3**	**Superficial geology (10k)**	0	0	1	0	-

78	14.4	Landslip (10k)	0	0	0	2	-
79	14.5	Bedrock geology (10k)	1	1	4	3	-
80	14.6	Bedrock faults and other linear features (10k)	0	0	2	1	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
81	15.1	50k Availability	Identified (within 500m)				
82	15.2	Artificial and made ground (50k)	0	0	0	0	-
82	15.3	Artificial ground permeability (50k)	0	0	-	-	-
83	15.4	Superficial geology (50k)	0	0	0	0	-
83	15.5	Superficial permeability (50k)	None (within 50m)				
83	15.6	Landslip (50k)	0	0	0	0	-
83	15.7	Landslip permeability (50k)	None (within 50m)				
84	15.8	Bedrock geology (50k)	1	1	4	2	-
85	15.9	Bedrock permeability (50k)	Identified (within 50m)				
85	15.10	Bedrock faults and other linear features (50k)	0	0	2	1	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
86	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence					
87	17.1	Shrink swell clays	Very low (within 50m)				
88	17.2	Running sands	Negligible (within 50m)				
89	17.3	Compressible deposits	Negligible (within 50m)				
90	17.4	Collapsible deposits	Very low (within 50m)				
91	17.5	Landslides	Low (within 50m)				
93	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
94	18.1	Natural cavities	0	0	0	0	-
95	18.2	BritPits	1	0	1	2	-
96	18.3	Surface ground workings	7	5	23	-	-
97	18.4	Underground workings	0	0	0	0	3
98	18.5	Historical Mineral Planning Areas	0	0	0	0	-

98	**18.6**	**Non-coal mining**	1	0	0	0	1
98	18.7	Mining cavities	0	0	0	0	0
99	18.8	JPB mining areas	None (within 0m)				
99	**18.9**	**Coal mining**	Identified (within 0m)				
99	18.10	Brine areas	None (within 0m)				
99	18.11	Gypsum areas	None (within 0m)				
99	18.12	Tin mining	None (within 0m)				
100	18.13	Clay mining	None (within 0m)				

Page	Section	Radon
101	**19.1**	**Radon**	Between 1% and 3% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
103	**20.1**	**BGS Estimated Background Soil Chemistry**	1	0	-	-	-
103	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
103	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
104	21.1	Underground railways (London)	0	0	0	-	-
104	21.2	Underground railways (Non-London)	0	0	0	-	-
104	21.3	Railway tunnels	0	0	0	-	-
104	21.4	Historical railway and tunnel features	0	0	0	-	-
104	21.5	Royal Mail tunnels	0	0	0	-	-
105	21.6	Historical railways	0	0	0	-	-
105	21.7	Railways	0	0	0	-	-
105	21.8	Crossrail 1	0	0	0	0	-
105	21.9	Crossrail 2	0	0	0	0	-
105	21.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 29/06/2018

Site Area: 0.37ha

Recent site history - 2012 aerial photograph

Capture Date: 26/03/2012

Site Area: 0.37ha

Recent site history - 2011 aerial photograph

Capture Date: 28/09/2011

Site Area: 0.37ha

Recent site history - 2000 aerial photograph

Capture Date: 05/08/2000

Site Area: 0.37ha

OS MasterMap site plan

Site Area: 0.37ha

1 Past land use

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical energy features

1.1 Historical industrial land uses

Records within 500m	41

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

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

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Gravel Pit**	**1955**	**1418784**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Quarry**	**1888 - 1904**	**1461953**
A	**On site**	**Unspecified Quarry**	**1948**	**1472250**
A	**On site**	**Unspecified Quarry**	**1933**	**1491782**
A	**On site**	**Unspecified Quarry**	**1970 - 1980**	**1507911**
B	39m NW	Unspecified Pit	1970	1451832
B	46m NW	Unspecified Quarry	1933	1458708
B	46m NW	Unspecified Quarry	1955	1493047
B	47m NW	Unspecified Quarry	1948	1496404
B	47m NW	Unspecified Quarry	1904	1496625
B	52m NW	Sandstone Quarry	1854	1450979
1	74m NE	Sandstone Quarry	1854	1450980
C	201m N	Unspecified Mills	1888 - 1904	1529556
C	201m N	Unspecified Mills	1948	1534970
C	205m N	Unspecified Mills	1933	1549207
D	247m NW	Unspecified Quarry	1948	1467525
D	247m NW	Unspecified Quarry	1888 - 1904	1526344
D	248m NW	Unspecified Quarry	1933	1536908
D	252m NW	Unspecified Pit	1970	1451776
D	256m NW	Sandstone Quarry	1854	1450990
E	287m NE	Unspecified Mill	1970	1421210
E	287m NE	Unspecified Mills	1955	1537582
G	318m E	Unspecified Mill	1955	1516090
G	319m E	Unspecified Mill	1933	1549167
3	351m SW	Sandstone Quarry	1854	1450989
H	359m N	Gasometer	1904	1420665
H	359m N	Unspecified Tank	1888	1433352
E	369m N	Woollen Mill	1854	1431151
E	377m N	Gasometer	1854	1420666

ID	Location	Land use	Dates present	Group ID
5	407m E	Unspecified Mill	1970 - 1980	1513395
I	416m NE	Chimney	1970	1448224
J	448m E	Unspecified Mill	1948	1499918
K	449m S	Unspecified Quarry	1933	1523123
K	451m S	Unspecified Pit	1888	1451831
K	452m S	Unspecified Quarry	1904	1487517
K	452m S	Unspecified Quarry	1948	1514231
J	455m E	Woollen Mill	1854	1431157
K	457m S	Sandstone Quarry	1854	1450981
J	462m E	Unspecified Mill	1888 - 1904	1543765
K	479m S	Unspecified Heap	1888	1415106
K	481m S	Cuttings	1955	1409775

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	0

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

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	6

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

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

ID	Location	Land use	Dates present	Group ID
2	310m NE	Electricity Substation	1984 - 1992	145783
F	314m N	Electricity Substation	1978 - 1997	141322
F	314m N	Electricity Substation	1975	140965
4	374m W	Electricity Substation	1975 - 1997	134991
I	407m NE	Electricity Substation	1984 - 1992	144092
E	417m N	Electricity Substation	1984 - 1992	135925

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

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

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

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

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m	0

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

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

2 Past land use - un-grouped

Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical energy features

2.1 Historical industrial land uses

Records within 500m	47

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

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Quarry**	**1948**	**1472250**
A	**On site**	**Unspecified Quarry**	**1904**	**1461953**
A	**On site**	**Unspecified Quarry**	**1888**	**1461953**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Quarry**	**1980**	**1507911**
A	**On site**	**Unspecified Quarry**	**1970**	**1507911**
A	**On site**	**Gravel Pit**	**1955**	**1418784**
A	**On site**	**Unspecified Quarry**	**1933**	**1491782**
B	39m NW	Unspecified Pit	1970	1451832
B	46m NW	Unspecified Quarry	1933	1458708
B	46m NW	Unspecified Quarry	1955	1493047
B	47m NW	Unspecified Quarry	1948	1496404
B	47m NW	Unspecified Quarry	1904	1496625
B	52m NW	Sandstone Quarry	1854	1450979
1	74m NE	Sandstone Quarry	1854	1450980
C	201m N	Unspecified Mills	1948	1534970
C	201m N	Unspecified Mills	1904	1529556
C	201m N	Unspecified Mills	1888	1529556
C	205m N	Unspecified Mills	1933	1549207
D	247m NW	Unspecified Quarry	1948	1467525
D	247m NW	Unspecified Quarry	1904	1526344
D	247m NW	Unspecified Quarry	1888	1526344
D	248m NW	Unspecified Quarry	1933	1536908
D	252m NW	Unspecified Pit	1970	1451776
D	256m NW	Sandstone Quarry	1854	1450990
E	287m NE	Unspecified Mill	1970	1421210
E	287m NE	Unspecified Mills	1955	1537582
H	318m E	Unspecified Mill	1955	1516090
H	319m E	Unspecified Mill	1933	1549167
2	351m SW	Sandstone Quarry	1854	1450989
I	359m N	Gasometer	1904	1420665
I	359m N	Unspecified Tank	1888	1433352

ID	Location	Land Use	Date	Group ID
E	369m N	Woollen Mill	1854	1431151
E	377m N	Gasometer	1854	1420666
K	407m E	Unspecified Mill	1970	1513395
K	409m E	Unspecified Mill	1980	1513395
L	416m NE	Chimney	1970	1448224
K	448m E	Unspecified Mill	1948	1499918
M	449m S	Unspecified Quarry	1933	1523123
M	451m S	Unspecified Pit	1888	1451831
M	452m S	Unspecified Quarry	1948	1514231
M	452m S	Unspecified Quarry	1904	1487517
K	455m E	Woollen Mill	1854	1431157
M	457m S	Sandstone Quarry	1854	1450981
K	462m E	Unspecified Mill	1904	1543765
K	462m E	Unspecified Mill	1888	1543765
M	479m S	Unspecified Heap	1888	1415106
M	481m S	Cuttings	1955	1409775

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**0**

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

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**18**

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

Features are displayed on the Past land use - un-grouped map on **page 17**

ID	Location	Land Use	Date	Group ID
F	310m NE	Electricity Substation	1984	145783
F	311m NE	Electricity Substation	1992	145783
G	314m N	Electricity Substation	1978	141322
G	314m N	Electricity Substation	1980	141322
G	314m N	Electricity Substation	1988	141322
G	314m N	Electricity Substation	1988	141322
G	314m N	Electricity Substation	1975	140965
G	315m N	Electricity Substation	1997	141322
J	374m W	Electricity Substation	1975	134991
J	375m W	Electricity Substation	1997	134991
J	375m W	Electricity Substation	1978	134991
J	375m W	Electricity Substation	1980	134991
J	375m W	Electricity Substation	1988	134991
J	375m W	Electricity Substation	1988	134991
L	407m NE	Electricity Substation	1984	144092
L	409m NE	Electricity Substation	1992	144092
E	417m N	Electricity Substation	1984	135925
E	418m N	Electricity Substation	1992	135925

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	**0**

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

This data is sourced from Ordnance Survey / Groundsure.

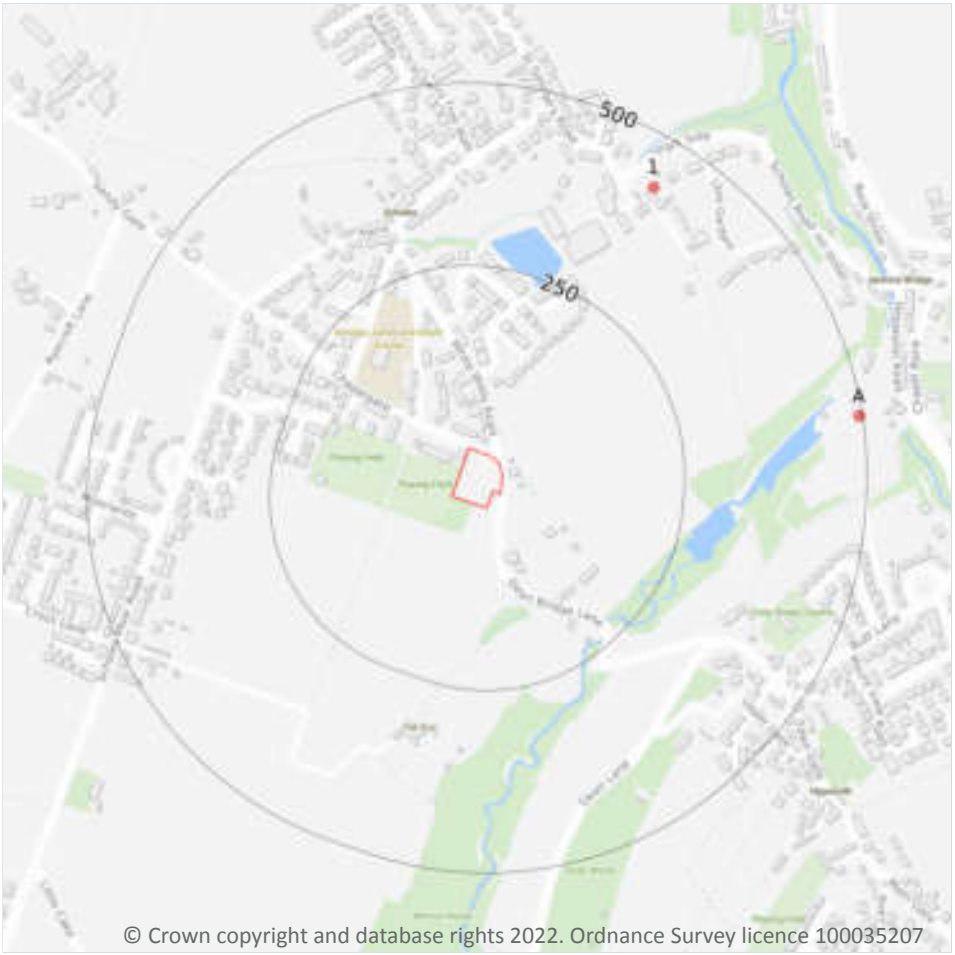
2.5 Historical garages

Records within 500m	0

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

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

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

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

3.2 Historical landfill (BGS records)

Records within 500m	0

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

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

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

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

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

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

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

3.5 Historical waste sites

Records within 500m	0

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

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

3.6 Licensed waste sites

Records within 500m	0

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

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

3.7 Waste exemptions

Records within 500m	13

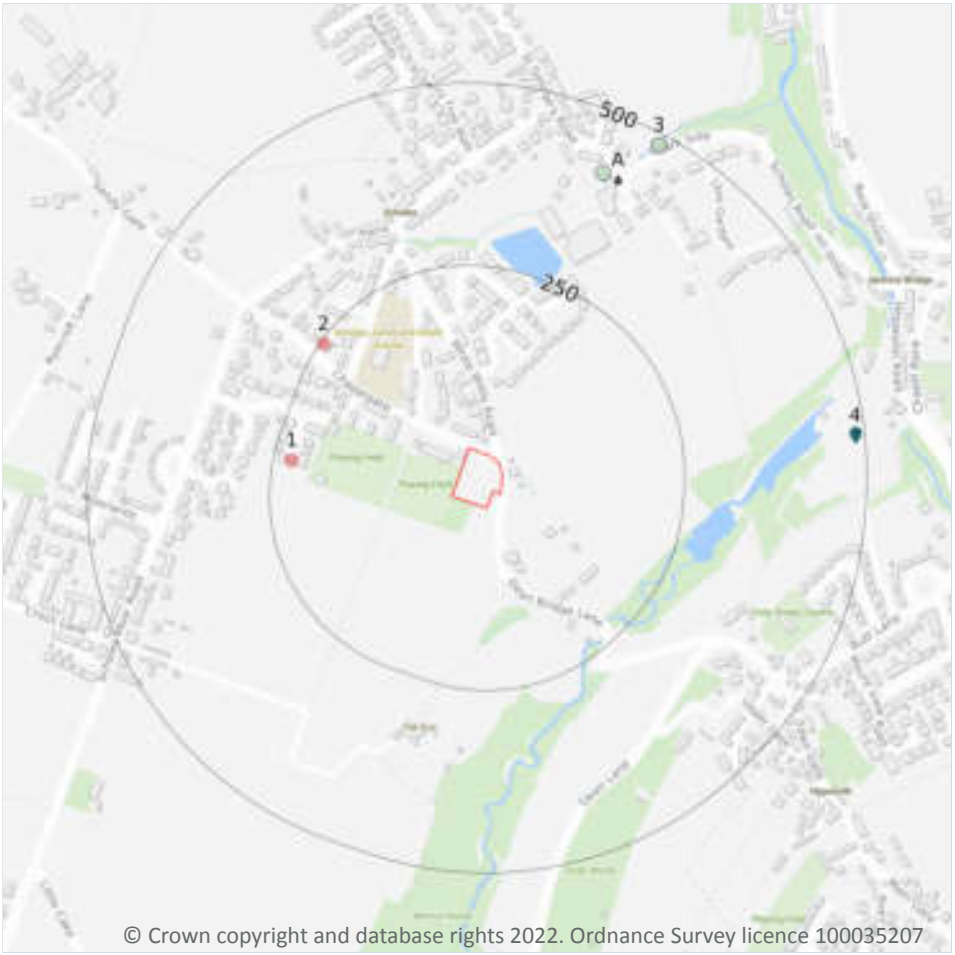
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 22**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	430m NE	Leas Farm Park Side HOLMFIRTH HD9 1UF	EPR/TE5854YT/A001	Disposing of waste exemption	Agricultural Waste Only	Burning waste in the open
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in secure containers
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting mixed waste
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Treating waste exemption	Non-Agricultural Waste Only	Manual treatment of waste
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Treating waste exemption	Non-Agricultural Waste Only	Recovery of textiles
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Treating waste exemption	Non-Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Treating waste exemption	Non-Agricultural Waste Only	Screening and blending of waste
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Treating waste exemption	Non-Agricultural Waste Only	Recovery of scrap metal
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste in construction
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste in the construction of entertainment or educational installations etc
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste for a specified purpose
A	495m E	Dobroyd Mills HOLMFIRTH HD9 1AF	EPR/QH0013RS/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste to manufacture finished goods

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

4 Current industrial land use



Site Outline

Search buffers in metres (m)

Recent industrial land uses

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

Licensed Discharges to controlled waters

Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m	**2**

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 25**

ID	Location	Company	Address	Activity	Category
1	225m W	Ran Publishing	31, Oak Tree Avenue, Scholes, Holmfirth, West Yorkshire, HD9 1SD	Published Goods	Industrial Products
2	245m NW	Able Packaging Ltd	Denecroft, Chapelgate, Scholes, Holmfirth, West Yorkshire, HD9 1SX	Rubber, Silicones and Plastics	Industrial Products

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

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

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

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

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

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

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

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

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

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

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

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

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

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

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

Records within 500m	1

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

Features are displayed on the Current industrial land use map on **page 25**

ID	Location	Address	Details	
4	486m E	R N Golden Ltd, Dabroyd Workshops, Jackson Bridge, Huddersfield, HD7 7EY	Process: Waste Oil Burner 0.4 MW Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	**0**

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

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

4.13 Licensed Discharges to controlled waters

Records within 500m	**2**

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

Features are displayed on the Current industrial land use map on **page 25**

ID	Location	Address	Details	
A	416m NE	ST GEORGE'S ROAD CSO, ST GEORGE'S ROAD, SCHOLES, NEAR HOLMFIRTH, WEST YORKSHIRE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: WRA8432 Permit Version: 1 Receiving Water: TRIB OF JACKSON BRIDGE DIKE	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 18/03/2005 Effective Date: 18/03/2005 Revocation Date: -
A	416m NE	ST GEORGE'S ROAD CSO, ST GEORGE'S ROAD, SCHOLES, NEAR HOLMFIRTH, WEST YORKSHIRE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: WADC1364 Permit Version: 1 Receiving Water: TRIB OF JACKSON BROOK DYKE	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 18/09/1989 Effective Date: 18/09/1989 Revocation Date: 17/03/2005

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

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

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

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

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

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

4.16 List 1 Dangerous Substances

Records within 500m	0

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

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

4.17 List 2 Dangerous Substances

Records within 500m	0

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

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

4.18 Pollution Incidents (EA/NRW)

Records within 500m	2

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

Features are displayed on the Current industrial land use map on **page 25**

ID	Location	Details	
A	417m N	Incident Date: 14/06/2005 Incident Identification: 320129 Pollutant: Inert Materials and Wastes Pollutant Description: Soils and Clay	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3	484m NE	Incident Date: 22/04/2002 Incident Identification: 73555 Pollutant: Oils and Fuel Pollutant Description: Gas and Fuel Oils	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

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

4.19 Pollution inventory substances

Records within 500m	0

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

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

4.20 Pollution inventory waste transfers

Records within 500m	0

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

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

4.21 Pollution inventory radioactive waste

Records within 500m	0

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

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

5 Hydrogeology - Superficial aquifer

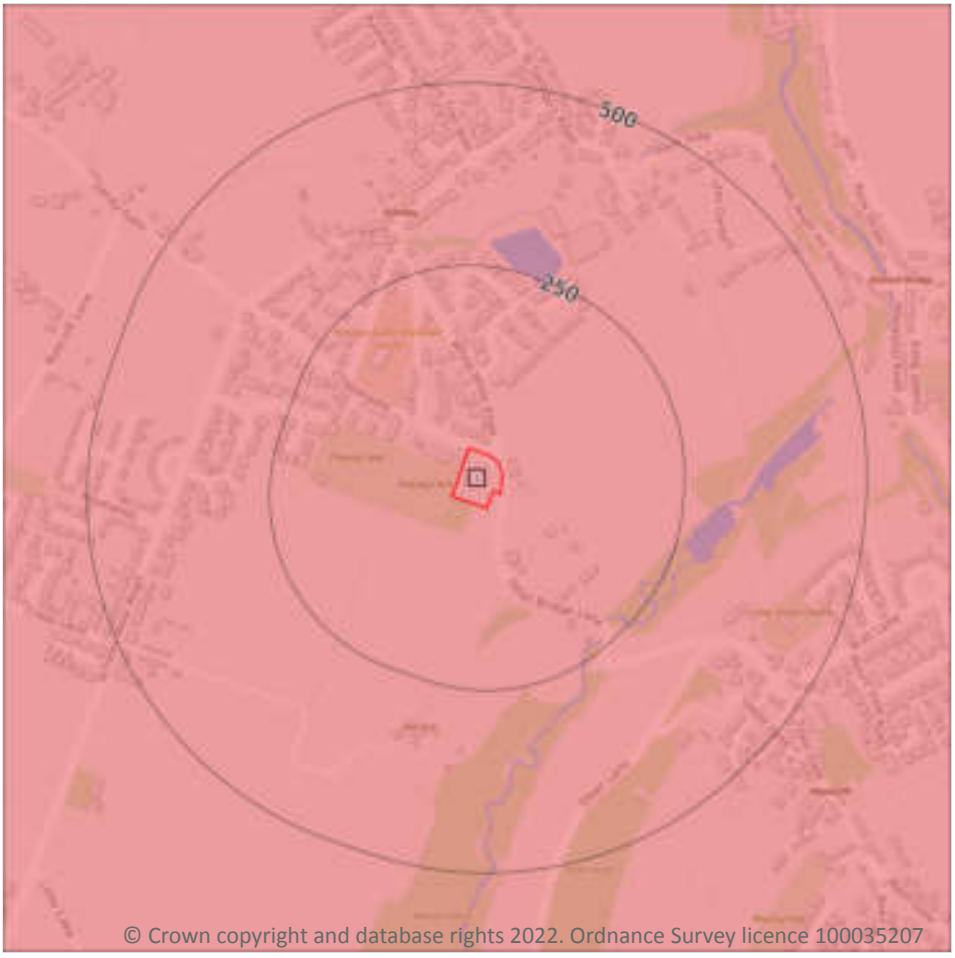
5.1 Superficial aquifer

Records within 500m	0

Aquifer status of groundwater held within superficial geology.

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

Bedrock aquifer



Site Outline

Search buffers in metres (m)

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

5.2 Bedrock aquifer

Records within 500m	1

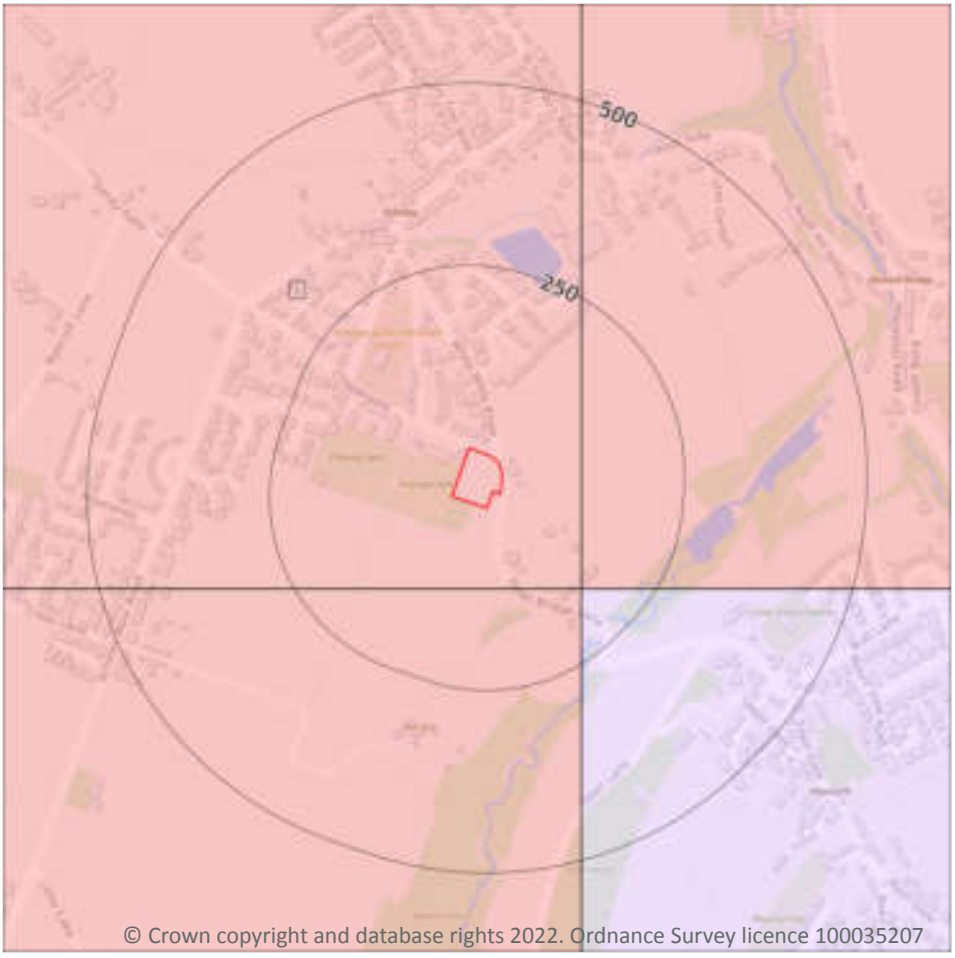
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 32**

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

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

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability

- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability

- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information

- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	1

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

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

Features are displayed on the Groundwater vulnerability map on **page 33**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: >550mm/year**	**Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: High Aquifer type: Secondary Flow mechanism: Well connected fractures**

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

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**0**

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

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

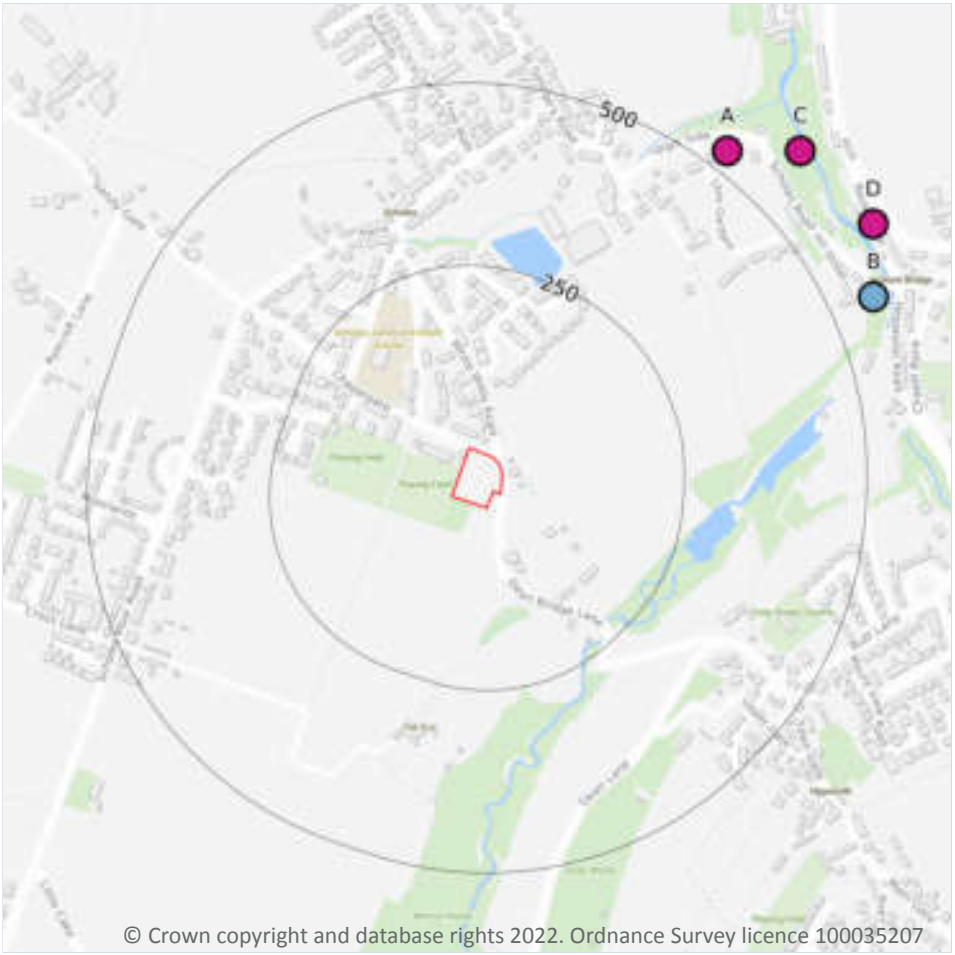
5.5 Groundwater vulnerability- local information

Records on site	**0**

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

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

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

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

5.6 Groundwater abstractions

Records within 2000m	39

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 35**

ID	Location	Details	
A	528m NE	Status: Historical Licence No: 2/27/10/050 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416200 Northing: 407600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
A	528m NE	Status: Historical Licence No: 2/27/10/050 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - NEW MILL Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416200 Northing: 407600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
C	594m NE	Status: Historical Licence No: 2/27/10/050 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416300 Northing: 407600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
C	594m NE	Status: Historical Licence No: 2/27/10/050 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - NEW MILL Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416300 Northing: 407600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -

ID	Location	Details	
D	609m NE	Status: Historical Licence No: 2/27/10/050 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416400 Northing: 407500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
D	609m NE	Status: Historical Licence No: 2/27/10/050 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - NEW MILL Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416400 Northing: 407500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	788m NE	Status: Historical Licence No: 2/27/10/051 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: SPRING Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416200 Northing: 407900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	788m NE	Status: Historical Licence No: 2/27/10/051 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: SPRING - NEW MILL Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416200 Northing: 407900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -

ID	Location	Details	
-	880m N	Status: Historical Licence No: 2/27/10/051 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: SPRING Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416200 Northing: 408000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	880m N	Status: Historical Licence No: 2/27/10/051 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: SPRING - NEW MILL Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416200 Northing: 408000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	889m NE	Status: Historical Licence No: 2/27/10/099 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING Data Type: Line Name: SHAW Easting: 416400 Northing: 407900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	889m NE	Status: Historical Licence No: 2/27/10/099 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING - NEW MILL Data Type: Line Name: SHAW Easting: 416400 Northing: 407900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	1016m SW	Status: Historical Licence No: 2/27/10/075 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: -- GRAVITY Data Type: Point Name: GARLICK Easting: 414900 Northing: 406700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/05/1966 Version End Date: -

ID	Location	Details	
-	1016m SW	Status: Historical Licence No: 2/27/10/075 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING Data Type: Point Name: GARLICK Easting: 414900 Northing: 406700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/05/1966 Version End Date: -
-	1025m S	Status: Historical Licence No: 2/27/10/100 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL X2 Data Type: Line Name: HALL Easting: 415700 Northing: 406100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/05/1966 Version End Date: -
-	1025m S	Status: Historical Licence No: 2/27/10/100 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL X2 - MILLSTONE GRIT - HEPWORTH Data Type: Line Name: HALL Easting: 415700 Northing: 406100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/05/1966 Version End Date: -
-	1263m SE	Status: Historical Licence No: 2/27/10/086 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: -- BOREHOLE Data Type: Point Name: SMITH Easting: 416370 Northing: 405950	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	1263m SE	Status: Historical Licence No: 2/27/10/086 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - HEPWORTH Data Type: Point Name: SMITH Easting: 416370 Northing: 405950	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -

ID	Location	Details	
-	1412m S	Status: Historical Licence No: 2/27/10/104 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING Data Type: Point Name: BOOTH Easting: 415800 Northing: 405700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 30/06/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1970 Version End Date: -
-	1412m S	Status: Historical Licence No: 2/27/10/104 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING - HEPWORTH Data Type: Point Name: BOOTH Easting: 415800 Northing: 405700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 30/06/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1970 Version End Date: -
-	1428m W	Status: Historical Licence No: 2/27/10/080 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELLS X3 Data Type: Point Name: BATTYE Easting: 414400 Northing: 407000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	1428m W	Status: Historical Licence No: 2/27/10/080 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELLS X3 - MILLSTONE GRIT - CARTWORTH MOOR Data Type: Point Name: BATTYE Easting: 414400 Northing: 407000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	1478m N	Status: Historical Licence No: 2/27/10/056 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: BOWER ROEBUCK & CO LTD Easting: 416300 Northing: 408600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -

ID	Location	Details	
-	1478m N	Status: Historical Licence No: 2/27/10/056 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - NEW MILL Data Type: Point Name: BOWER ROEBUCK & CO LTD Easting: 416300 Northing: 408600	Annual Volume (m^3): 19321 Max Daily Volume (m^3): 77.27 Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2008 Version End Date: -
-	1511m N	Status: Historical Licence No: 2/27/10/057 Details: Boiler Feed Direct Source: GROUNDWATERS Point: SPRINGS Data Type: Point Name: BOWER ROEBUCK & CO LTD Easting: 416400 Northing: 408600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	1511m N	Status: Historical Licence No: 2/27/10/057 Details: Boiler Feed Direct Source: GROUNDWATERS Point: SPRINGS - GLENDALE MILLS Data Type: Point Name: BOWER ROEBUCK & CO LTD Easting: 416400 Northing: 408600	Annual Volume (m^3): 3683 Max Daily Volume (m^3): 104.54 Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	1609m NW	Status: Active Licence No: 2/27/10/083 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - RIBBLEDEN DYEWORKS Data Type: Point Name: HOLMFIRTH DYERS LTD Easting: 414400 Northing: 407900	Annual Volume (m^3): 90,920 Max Daily Volume (m^3): 363.68 Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 101 Version Start Date: 13/03/2000 Version End Date: -

ID	Location	Details	
-	1645m N	Status: Historical Licence No: 2/27/10/004 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE Data Type: Point Name: MOORHOUSE & BROOK LTD Easting: 416200 Northing: 408800	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/12/1965 Version End Date: -
-	1645m N	Status: Historical Licence No: 2/27/10/004 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE - MILLSTONE GRIT - NEW MILL Data Type: Point Name: MOORHOUSE & BROOK LTD Easting: 416200 Northing: 408800	Annual Volume (m^3): 34095 Max Daily Volume (m^3): 136.38 Original Application No: - Original Start Date: 01/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/12/1965 Version End Date: -
-	1662m SW	Status: Historical Licence No: 2/27/10/084 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING Data Type: Point Name: TAYLOR Easting: 414600 Northing: 406000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	1662m SW	Status: Historical Licence No: 2/27/10/084 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING - HADE EDGE Data Type: Point Name: TAYLOR Easting: 414600 Northing: 406000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	1697m N	Status: Historical Licence No: 2/27/10/102 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL Data Type: Point Name: BROADHEAD Easting: 415330 Northing: 408810	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/05/1966 Version End Date: -

ID	Location	Details	
-	1697m N	Status: Historical Licence No: 2/27/10/102 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL - MILLSTONE GRIT - HOLMFIRTH Data Type: Point Name: BROADHEAD Easting: 415330 Northing: 408810	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/05/1966 Version End Date: -
-	1737m SW	Status: Historical Licence No: 2/27/10/085 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL Data Type: Point Name: TAYLOR Easting: 414500 Northing: 406000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	1737m SW	Status: Historical Licence No: 2/27/10/085 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL - MILLSTONE GRIT - HADE EDGE HOLMFIRTH Data Type: Point Name: TAYLOR Easting: 414500 Northing: 406000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/04/1966 Version End Date: -
-	1840m S	Status: Historical Licence No: 2/27/10/074 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING Data Type: Point Name: DENTON Easting: 416200 Northing: 405300	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 17/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/03/1966 Version End Date: -
-	1840m S	Status: Historical Licence No: 2/27/10/074 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING - HEPWORTH Data Type: Point Name: DENTON Easting: 416200 Northing: 405300	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 17/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/03/1966 Version End Date: -

ID	Location	Details	
-	1860m W	Status: Historical Licence No: 2/27/10/037 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL X3 Data Type: Point Name: MAZUREK Easting: 414000 Northing: 407500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 13/12/1966 Version End Date: -
-	1860m W	Status: Historical Licence No: 2/27/10/037 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: WELL X3 - MILLSTONE GRIT - HOLMFIRTH Data Type: Point Name: MAZUREK Easting: 414000 Northing: 407500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 13/12/1966 Version End Date: -

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

5.7 Surface water abstractions

Records within 2000m	**12**

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 35**

ID	Location	Details	
B	561m NE	Status: Historical Licence No: 2/27/10/049 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: DEAN DYKE Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416400 Northing: 407400	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -

ID	Location	Details	
B	561m NE	Status: Historical Licence No: 2/27/10/049 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: DEAN DYKE Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416400 Northing: 407400	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	834m NE	Status: Historical Licence No: 2/27/10/049 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: JACKSON BRIDGE DYKE Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416300 Northing: 407900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	834m NE	Status: Historical Licence No: 2/27/10/049 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: JACKSON BRIDGE DYKE Data Type: Point Name: COPLEY MARSHALL & CO LTD Easting: 416300 Northing: 407900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/01/1966 Version End Date: -
-	1423m SW	Status: Historical Licence No: 2/27/10/112 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: BOSHAW WHAMS RESERVOIR Data Type: Line Name: YORKSHIRE WATER SERVICES LTD Easting: 415100 Northing: 405900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 03/08/1977 Expiry Date: - Issue No: 100 Version Start Date: 03/08/1977 Version End Date: -

ID	Location	Details	
-	1423m SW	Status: Active Licence No: 2/27/10/112 Details: Transfer Between Sources (Pre Water Act 2003) Direct Source: SURFACE WATER Point: BOSHAW WHAMS RESERVOIR Data Type: Line Name: Yorkshire Water Services Ltd Easting: 415100 Northing: 405900	Annual Volume (m^3): 55,000 Max Daily Volume (m^3): 450 Original Application No: - Original Start Date: 03/08/1977 Expiry Date: - Issue No: 100 Version Start Date: 10/03/2016 Version End Date: -
-	1438m W	Status: Historical Licence No: 2/27/10/082 Details: Process water Direct Source: SURFACE WATER Point: RIVER RIBBLE - TRIBUTARY OF RIVER HOLME-RIBBLEDEN Data Type: Point Name: HOLMFIRTH DYERS LTD Easting: 414500 Northing: 407700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 102 Version Start Date: 17/04/2002 Version End Date: -
-	1438m W	Status: Active Licence No: 2/27/10/082 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER RIBBLE - TRIBUTARY OF RIVER HOLME-RIBBLEDEN Data Type: Point Name: HOLMFIRTH DYERS LTD Easting: 414500 Northing: 407700	Annual Volume (m^3): 85,000 Max Daily Volume (m^3): 355 Original Application No: - Original Start Date: 28/04/1966 Expiry Date: - Issue No: 103 Version Start Date: 07/01/2015 Version End Date: -
-	1753m W	Status: Historical Licence No: 2/27/10/053 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: SPRING Data Type: Point Name: WESTWOOD YARNS LTD Easting: 414100 Northing: 406800	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 03/05/1991 Version End Date: -

ID	Location	Details	
-	1753m W	Status: Active Licence No: 2/27/10/053 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: SPRING - HOLMFIRTH Data Type: Point Name: WESTWOOD YARNS LTD Easting: 414100 Northing: 406800	Annual Volume (m^3): 9,092 Max Daily Volume (m^3): 45.46 Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2008 Version End Date: -
-	1833m W	Status: Historical Licence No: 2/27/10/052 Details: General Use Relating To Secondary Category (Low Loss) Direct Source: SURFACE WATER Point: RIVER RIBBLE - TRIBUTARY OF RIVER HOLME - HOLMFIRTH Data Type: Point Name: WESTWOOD YARNS LTD Easting: 414100 Northing: 406500	Annual Volume (m^3): 295496 Max Daily Volume (m^3): 1130 Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 12/10/2006 Version End Date: -
-	1833m W	Status: Historical Licence No: 2/27/10/052 Details: Process Water Direct Source: SURFACE WATER Point: RIVER RIBBLE - TRIBUTARY OF RIVER HOLME - HOLMFIRTH Data Type: Point Name: WESTWOOD YARNS LTD Easting: 414100 Northing: 406500	Annual Volume (m^3): 295496 Max Daily Volume (m^3): 1130 Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 101 Version Start Date: 12/10/2006 Version End Date: -

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

5.8 Potable abstractions

Records within 2000m	**1**

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 35**

ID	Location	Details	
-	1423m SW	Status: Historical Licence No: 2/27/10/112 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: BOSHAW WHAMS RESERVOIR Data Type: Line Name: YORKSHIRE WATER SERVICES LTD Easting: 415100 Northing: 405900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 03/08/1977 Expiry Date: - Issue No: 100 Version Start Date: 03/08/1977 Version End Date: -

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

5.9 Source Protection Zones

Records within 500m	0

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

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

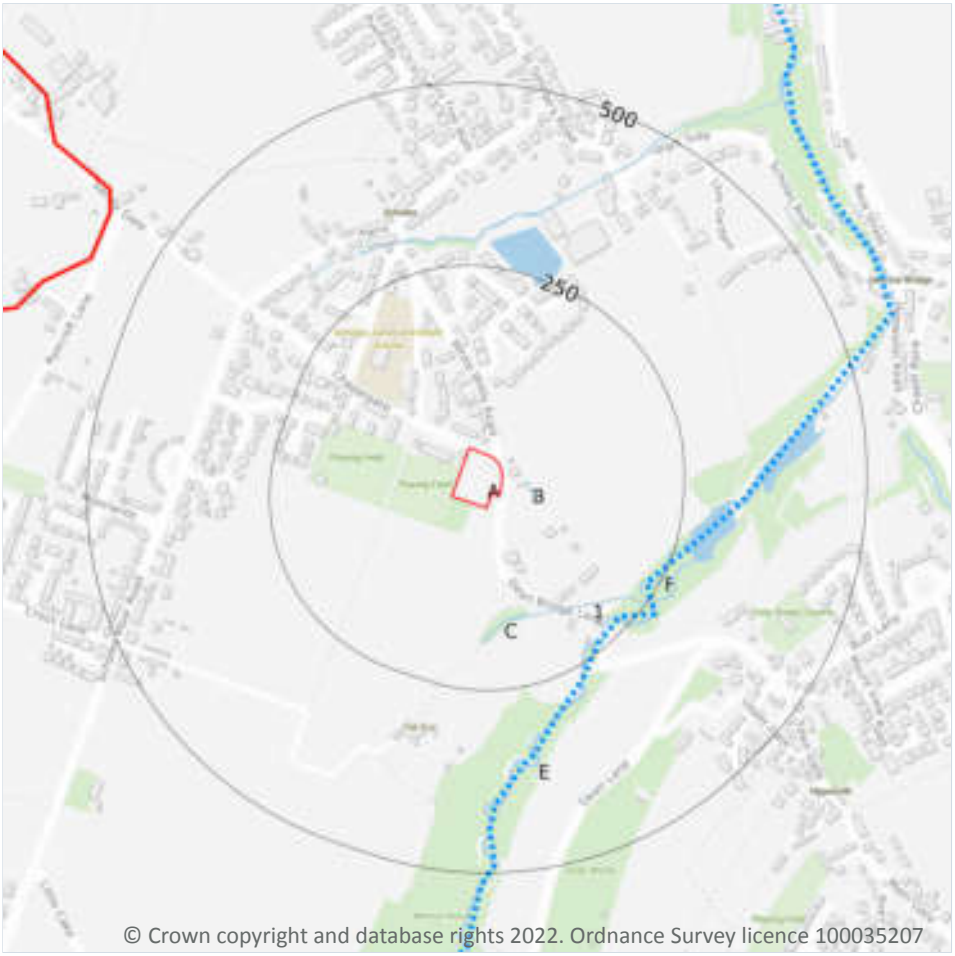
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

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

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

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	**6**

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

Features are displayed on the Hydrology map on **page 49**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	32m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
C	154m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
1	159m S	Inland river not influenced by normal tidal action.	Not provided	Watercourse contains water year round (in normal circumstances)	-
E	225m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Dean Dike
F	229m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Dean Dike
F	245m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Dean Dike

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**6**

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

Features are displayed on the Hydrology map on **page 49**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	**1**

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

Features are displayed on the Hydrology map on **page 49**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**River**	**New Mill Dike from Source to River Holme**	**GB104027057610**	**Colne and Holme**	**Aire and Calder**

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

6.4 WFD Surface water bodies

Records identified	**1**

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

Features are displayed on the Hydrology map on **page 49**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
2	235m SE	River	New Mill Dike from Source to River Holme	GB104027057610	Moderate	Fail	Moderate	2019

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

6.5 WFD Groundwater bodies

Records on site	**1**

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 49**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**Aire & Calder Carb Limestone / Millstone Grit / Coal Measures.**	**GB40402G700400**	**Poor**	**Poor**	**Good**	**2019**

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

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

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

7.2 Historical Flood Events

Records within 250m	0

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

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

7.3 Flood Defences

Records within 250m	0

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

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

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

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

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

7.5 Flood Storage Areas

Records within 250m	0

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

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

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

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

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

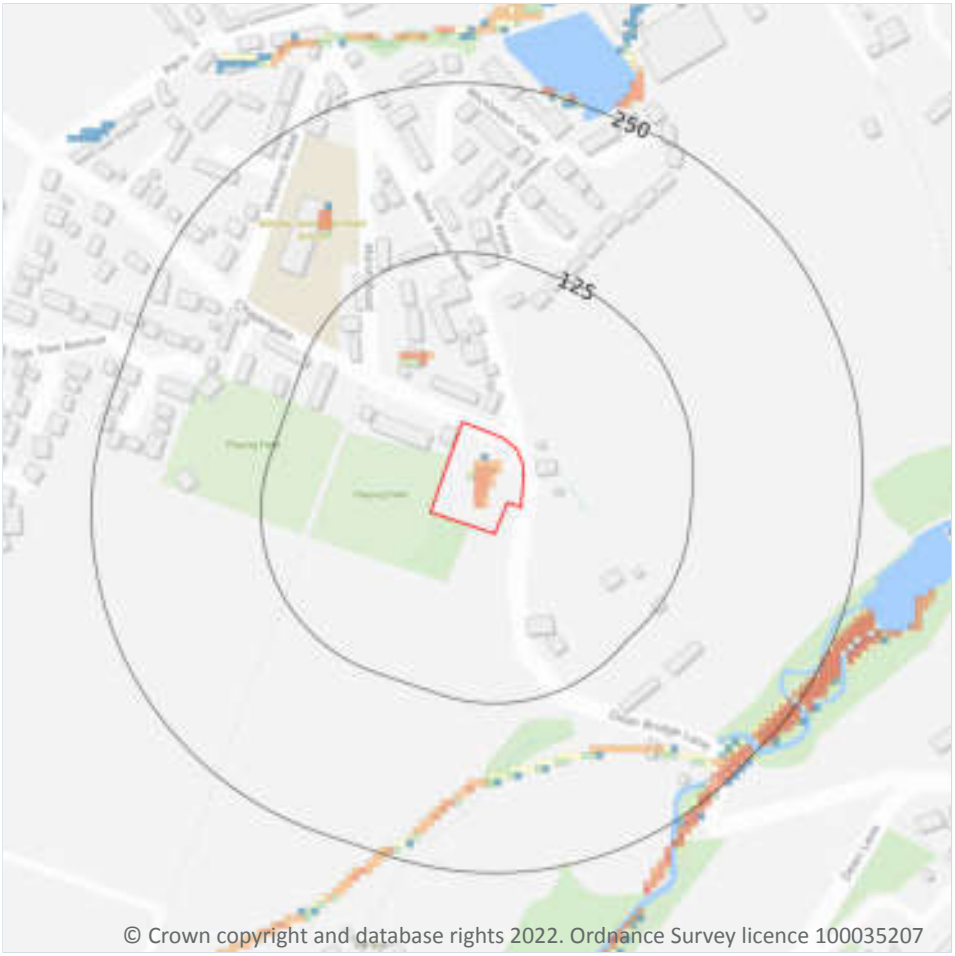
7.7 Flood Zone 3

Records within 50m	0

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

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

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

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

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

Features are displayed on the Surface water flooding map on **page 55**

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

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

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

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding

Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

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

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

Features are displayed on the Groundwater flooding map on **page 57**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

Site Outline

Search buffers in metres (m)

Designated Ancient Woodland

Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

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

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

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

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

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

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

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

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

10.4 Special Protection Areas (SPA)

Records within 2000m	0

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

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

10.5 National Nature Reserves (NNR)

Records within 2000m	0

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

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

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

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

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

10.7 Designated Ancient Woodland

Records within 2000m	3

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

Features are displayed on the Environmental designations map on **page 58**

ID	Location	Name	Woodland Type
2	274m S	Morton Wood	Ancient & Semi-Natural Woodland
3	997m SE	Rakes Wood	Ancient & Semi-Natural Woodland
-	1915m NE	Holme House Wood	Ancient & Semi-Natural Woodland

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

10.8 Biosphere Reserves

Records within 2000m	0

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

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

10.9 Forest Parks

Records within 2000m	0

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

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

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

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

10.11 Green Belt

Records within 2000m	1

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

Features are displayed on the Environmental designations map on **page 58**

ID	Location	Name	Local Authority name
1	**On site**	**South and West Yorkshire**	**Kirklees**

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

10.12 Proposed Ramsar sites

Records within 2000m	0

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

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

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

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

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

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

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

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

This data is sourced from Natural England.

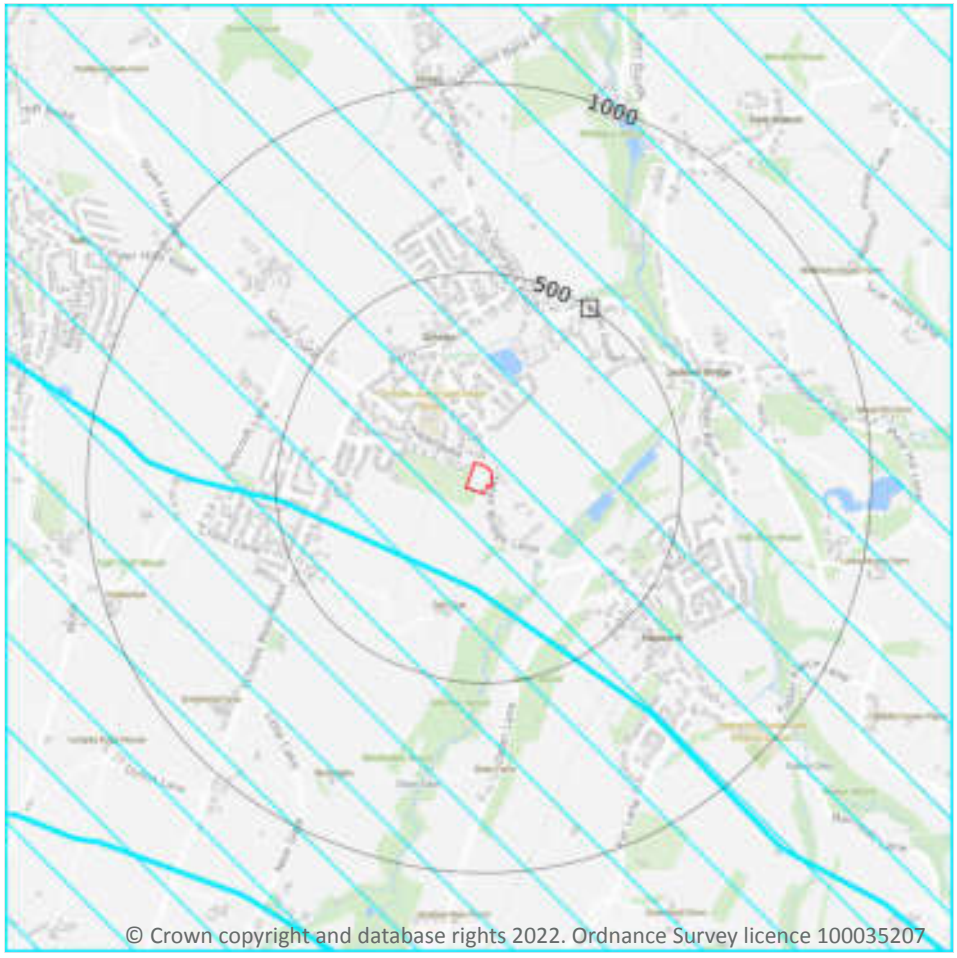
10.16 Nitrate Vulnerable Zones

Records within 2000m	0

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

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

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

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

10.17 SSSI Impact Risk Zones

Records on site	1

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

Features are displayed on the SSSI Impact Zones and Units map on **page 63**

ID	Location	Type of developments requiring consultation
1	**On site**	**Infrastructure - Airports, helipads and other aviation proposals. Minerals, Oil and Gas - Oil & gas exploration/extraction. Air pollution - Any industrial/agricultural development that could cause air pollution (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 750m², manure stores > 3500t). Combustion - General combustion processes >50mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.**

This data is sourced from Natural England.

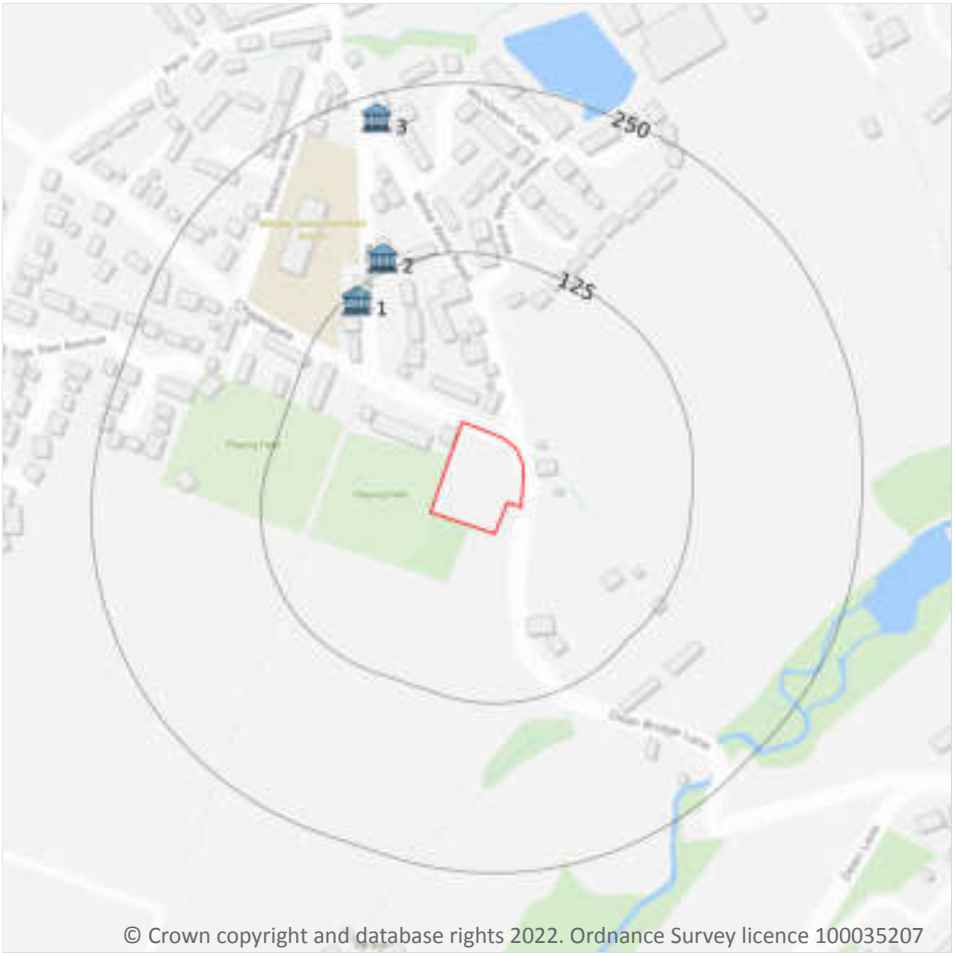
10.18 SSSI Units

Records within 2000m	**0**

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

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

11 Visual and cultural designations



Site Outline

Search buffers in metres (m)

Listed buildings

Conservation areas

Conservation areas - no data

National Parks

Areas of Outstanding Natural Beauty

Registered parks and gardens

Scheduled Monuments

World Heritage Sites

11.1 World Heritage Sites

Records within 250m	0

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

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

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

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

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

11.3 National Parks

Records within 250m	0

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

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

11.4 Listed Buildings

Records within 250m	3

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

Features are displayed on the Visual and cultural designations map on **page 65**

ID	Location	Name	Grade	Reference Number	Listed date
1	119m NW	2, 3, Marsh Road, Holme Valley, Kirklees, HD9	II	1313565	04/08/1983
2	134m NW	Scholes Methodist Chapel, Holme Valley, Kirklees, HD9	II	1313583	04/08/1983
3	233m N	Ward Boundary Stone At Junction Of Marsh Road, Holme Valley, Kirklees, HD9	II	1229403	04/08/1983

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

11.5 Conservation Areas

Records within 250m	0

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

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

11.6 Scheduled Ancient Monuments

Records within 250m	0

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

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

11.7 Registered Parks and Gardens

Records within 250m	0

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

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

12 Agricultural designations

Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	2

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

Features are displayed on the Agricultural designations map on **page 68**

ID	Location	Classification	Description
1	On site	Grade 4	**Poor quality agricultural land. Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.**

ID	Location	Classification	Description
2	**On site**	**Grade 4**	**Poor quality agricultural land. Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.**

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	**0**

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

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

12.3 Tree Felling Licences

Records within 250m	**0**

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

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	**0**

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

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

This data is sourced from Natural England.

13 Habitat designations

Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks
Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	**8**

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

Features are displayed on the Habitat designations map on **page 71**

ID	Location	Main Habitat	Other habitats
2	85m SE	Traditional orchard	Main habitat: TORCH (INV > 50%)
3	219m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	219m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
5	228m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
A	228m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	231m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	231m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
7	242m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	**0**

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

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	**1**

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

Features are displayed on the Habitat designations map on **page 71**

ID	Location	Site reference	Identification confidence	Primary source	Secondary source	Tertiary source
1	**On site**	**BRITPITS ref: 98013**	**Low**	**British Geological Survey BRITPITS database**	**UK Perspectives Aerial Photography**	**-**

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

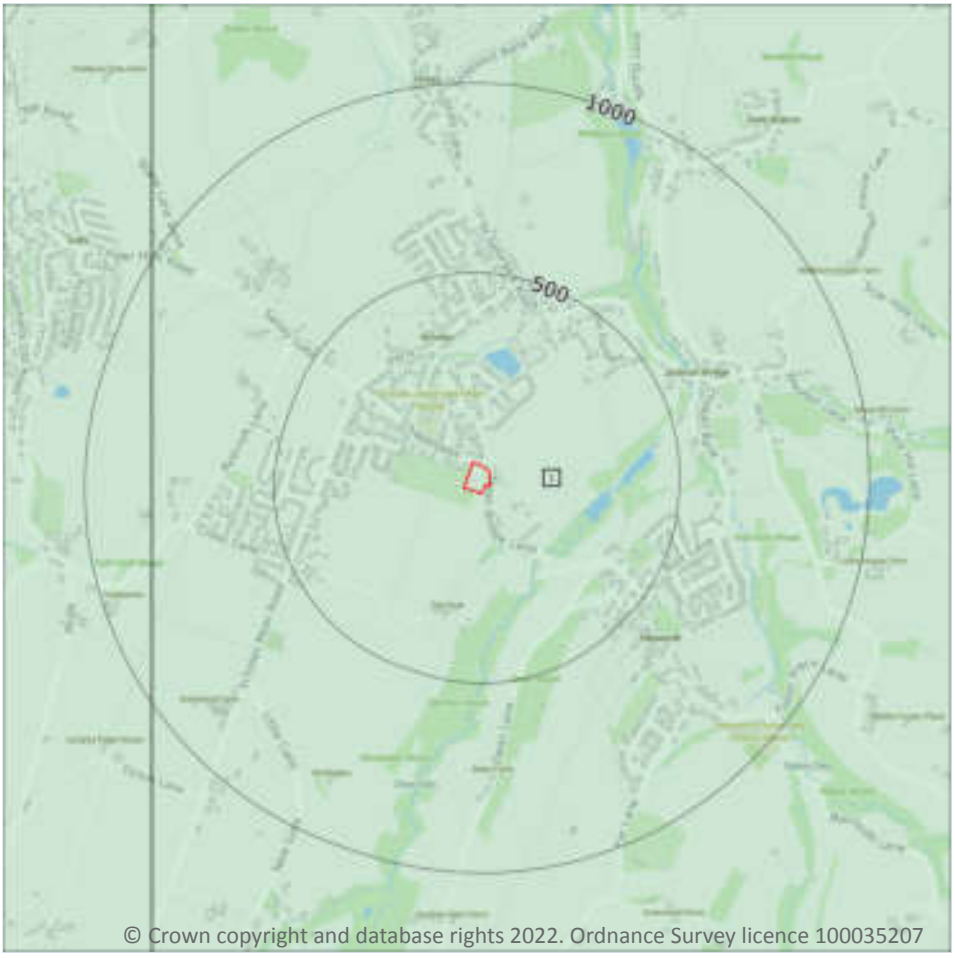
Records within 250m	**0**

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave

them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m	1

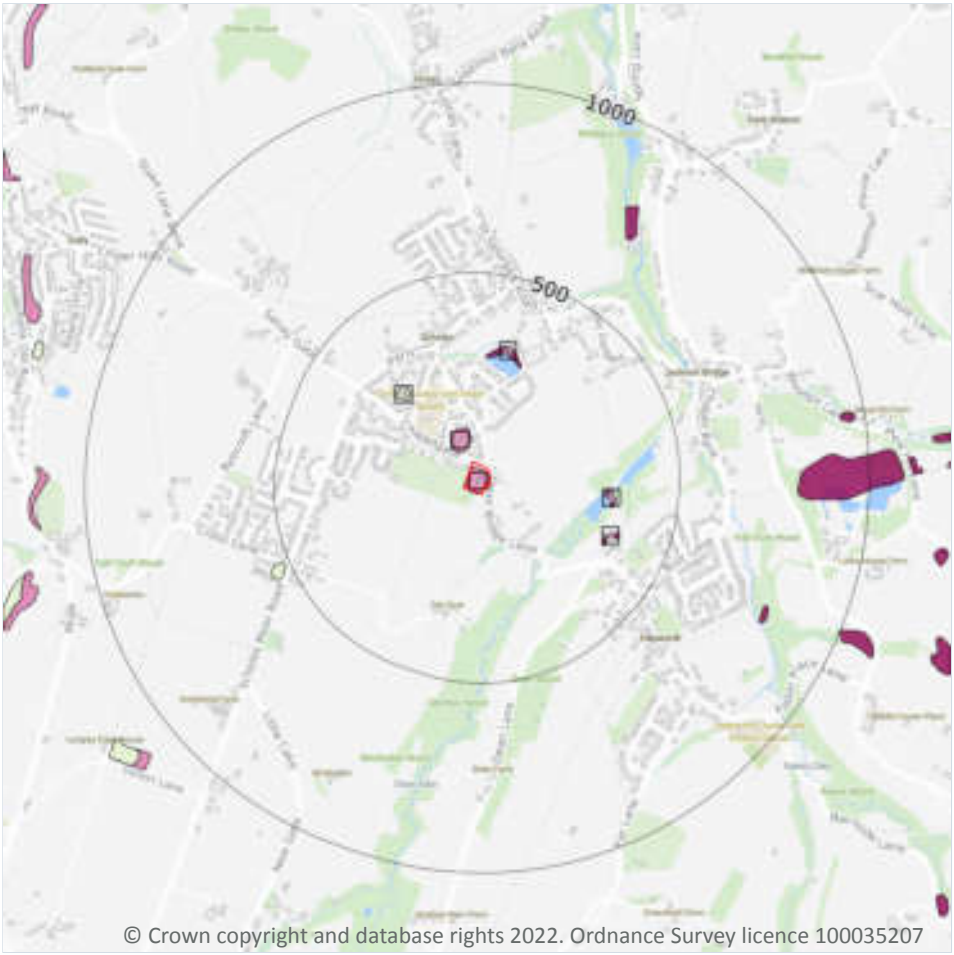
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 74**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**SE10NE**

This data is sourced from the British Geological Survey.

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



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	6

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

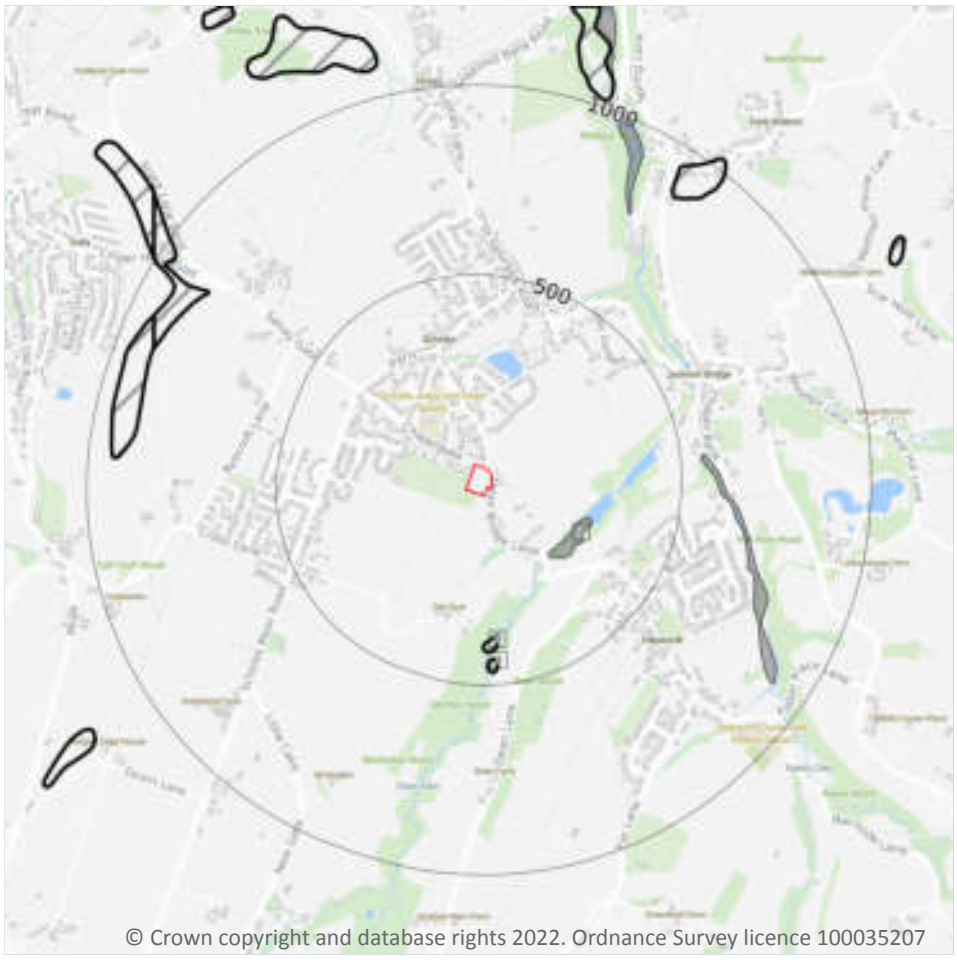
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 75**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**WGR-VOID**	**Worked Ground (Undivided)**	**Void**
2	39m NW	WGR-VOID	Worked Ground (Undivided)	Void
3	237m NW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
4	277m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

ID	Location	LEX Code	Description	Rock description
5	304m E	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
6	331m SE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

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

14.3 Superficial geology (10k)

Records within 500m	1

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

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 77**

ID	Location	LEX Code	Description	Rock description
1	229m SE	ALV-CZ	Alluvium - Silty Clay	Clay, Silty

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m	2

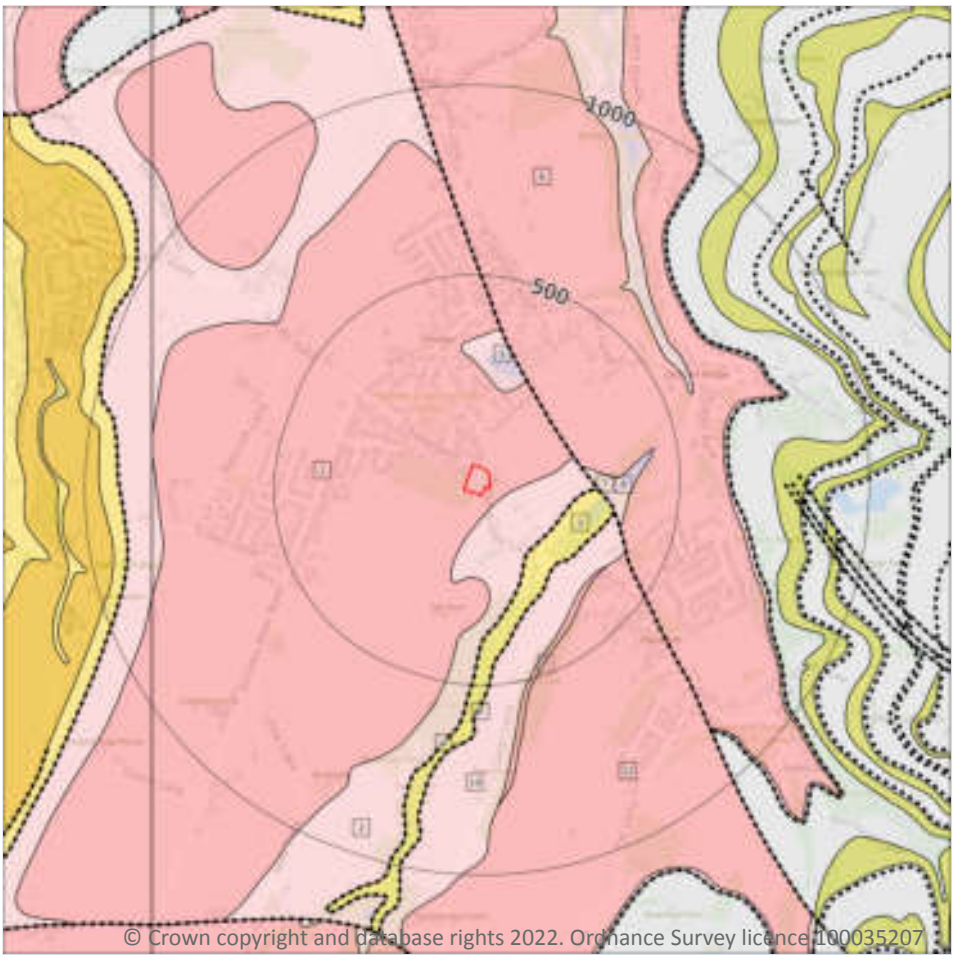
Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 77**

ID	Location	LEX Code	Description	Rock description
2	370m S	SLIP-UKNOWN	Landslide Deposits	Unknown/unclassified Entry
3	433m S	SLIP-UKNOWN	Landslide Deposits	Unknown/unclassified Entry

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

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

14.5 Bedrock geology (10k)

Records within 500m	9

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

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**RR-SDST**	**Rough Rock - Sandstone**	**Yeadonian Sub-age**
2	39m SE	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian Sub-age
3	191m SE	MARSD-MDSI	Marsden Formation - Mudstone And Siltstone	Marsdenian Sub-age

ID	Location	LEX Code	Description	Rock age
5	208m N	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian Sub-age
6	211m NE	RR-SDST	Rough Rock - Sandstone	Yeadonian Sub-age
8	240m E	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian Sub-age
10	267m SE	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian Sub-age
11	356m SE	RF-SDST	Rough Rock Flags - Sandstone	Yeadonian Sub-age
12	366m SE	RR-SDST	Rough Rock - Sandstone	Yeadonian Sub-age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	**3**

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

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79**

ID	Location	Category	Description
4	191m SE	FOSSIL_HORIZON	Fossil horizon, marine band ()
7	211m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
9	267m SE	FOSSIL_HORIZON	Fossil horizon, marine band ()

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability

Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 81**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW086_glossop_v4**

This data is sourced from the British Geological Survey.

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

15.2 Artificial and made ground (50k)

Records within 500m	0

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

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m	0

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

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial

15.4 Superficial geology (50k)

Records within 500m	0

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

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	0

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

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

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

This data is sourced from the British Geological Survey.

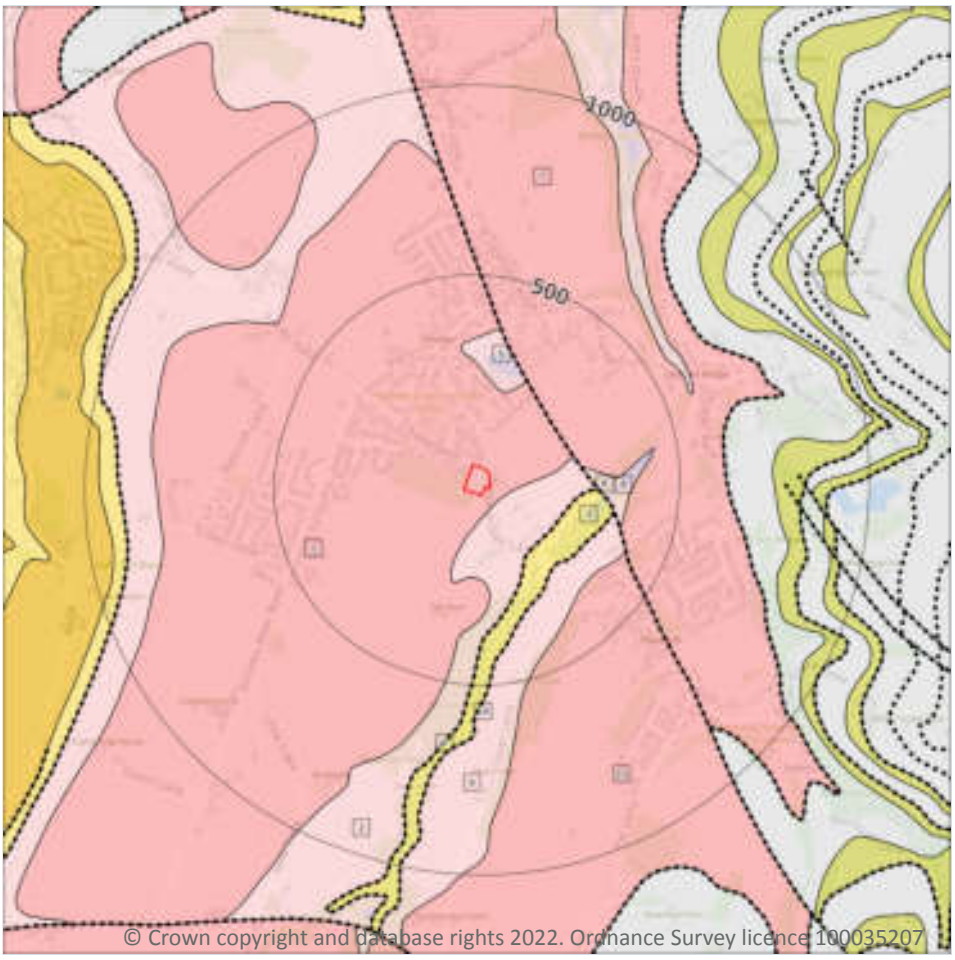
15.7 Landslip permeability (50k)

Records within 50m	0

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

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

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

15.8 Bedrock geology (50k)

Records within 500m	8

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

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 84**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**RR-SDST**	**ROUGH ROCK - SANDSTONE**	**NAMURIAN**
2	39m SE	ROSSE-MDSI	ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
3	192m SE	MARSD-MDSI	MARSDEN FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN

ID	Location	LEX Code	Description	Rock age
5	208m N	ROSSE-MDSI	ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
7	210m NE	RR-SDST	ROUGH ROCK - SANDSTONE	NAMURIAN
8	240m E	ROSSE-MDSI	ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
9	267m SE	ROSSE-MDSI	ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE	NAMURIAN
11	356m SE	RR-SDST	ROUGH ROCK - SANDSTONE	NAMURIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	**2**

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

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**High**	**Moderate**
39m S	Fracture	Low	Low

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	**3**

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

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 84**

ID	Location	Category	Description
4	192m SE	FOSSIL_HORIZON	Marine band
6	210m NE	FAULT	Fault, inferred
10	267m SE	FOSSIL_HORIZON	Marine band

This data is sourced from the British Geological Survey.

16 Boreholes

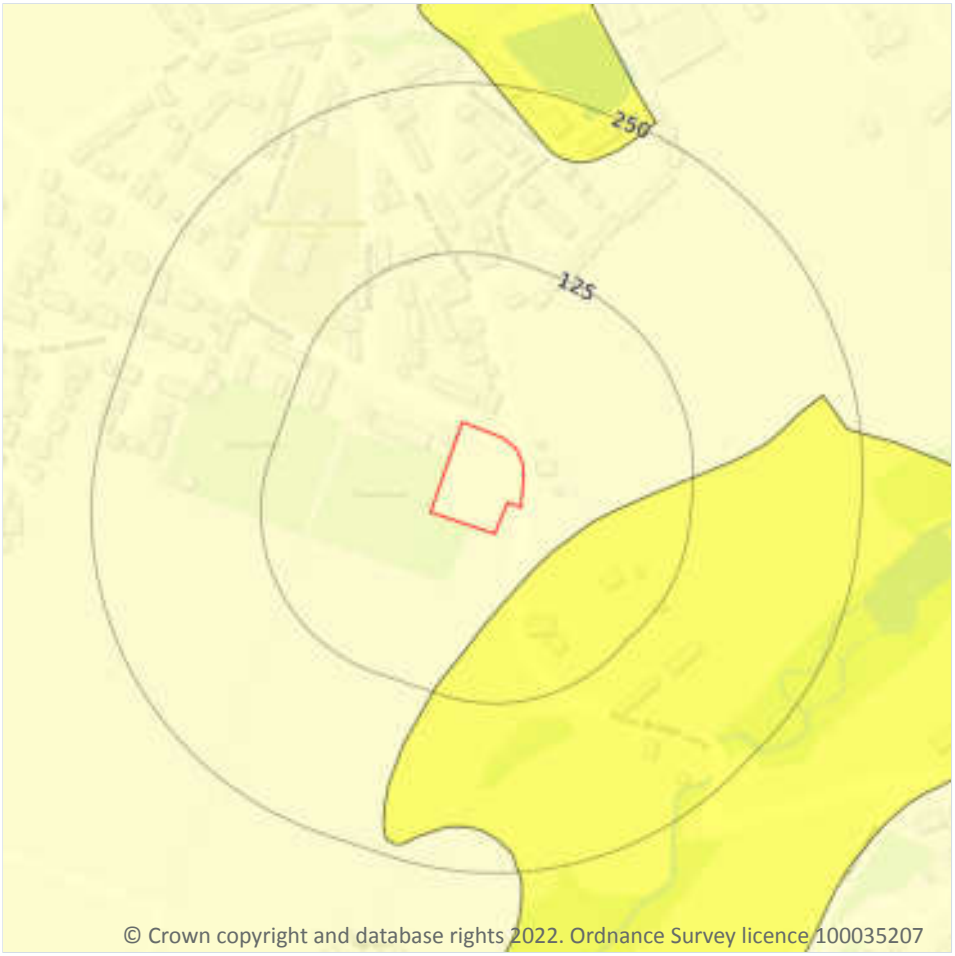
16.1 BGS Boreholes

Records within 250m	0

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

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

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

17.1 Shrink swell clays

Records within 50m	2

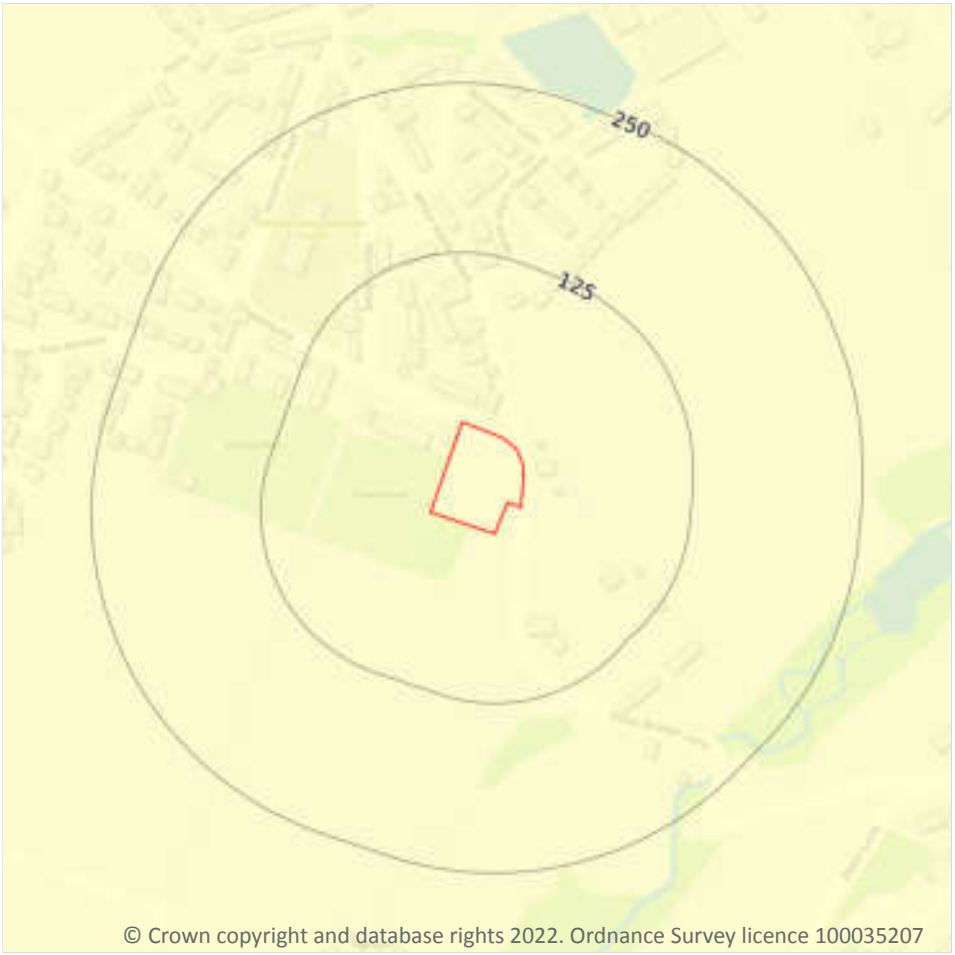
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and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

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 87**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
39m SE	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

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

17.2 Running sands

Records within 50m	1

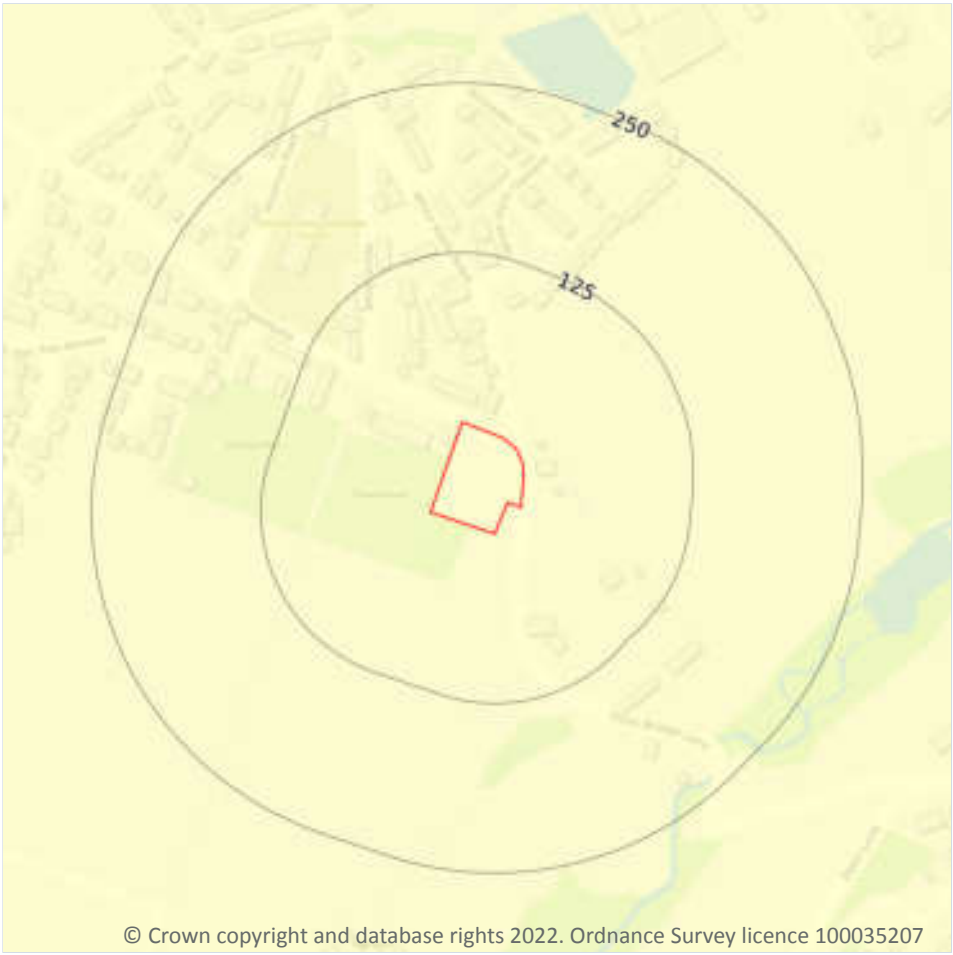
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 88**

Location	Hazard rating	Details
On site	**Negligible**	**Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

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

17.3 Compressible deposits

Records within 50m	1

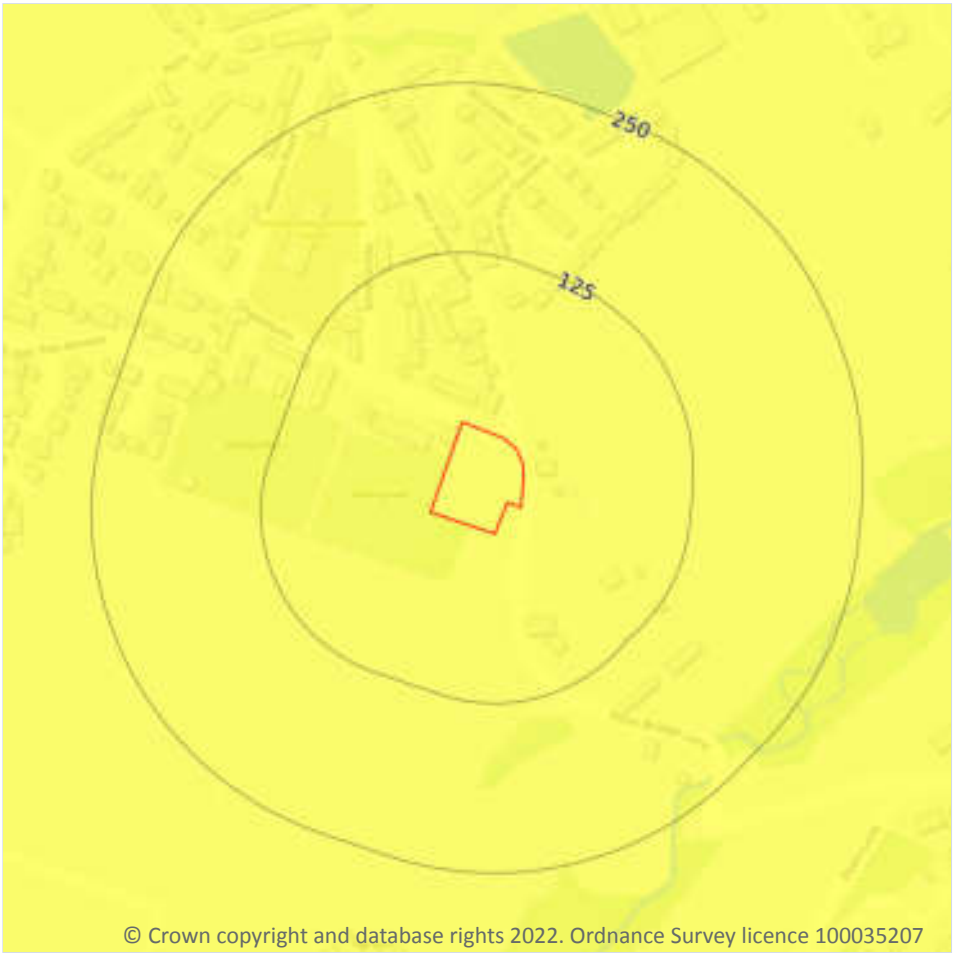
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 89**

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

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

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

17.4 Collapsible deposits

Records within 50m	**1**

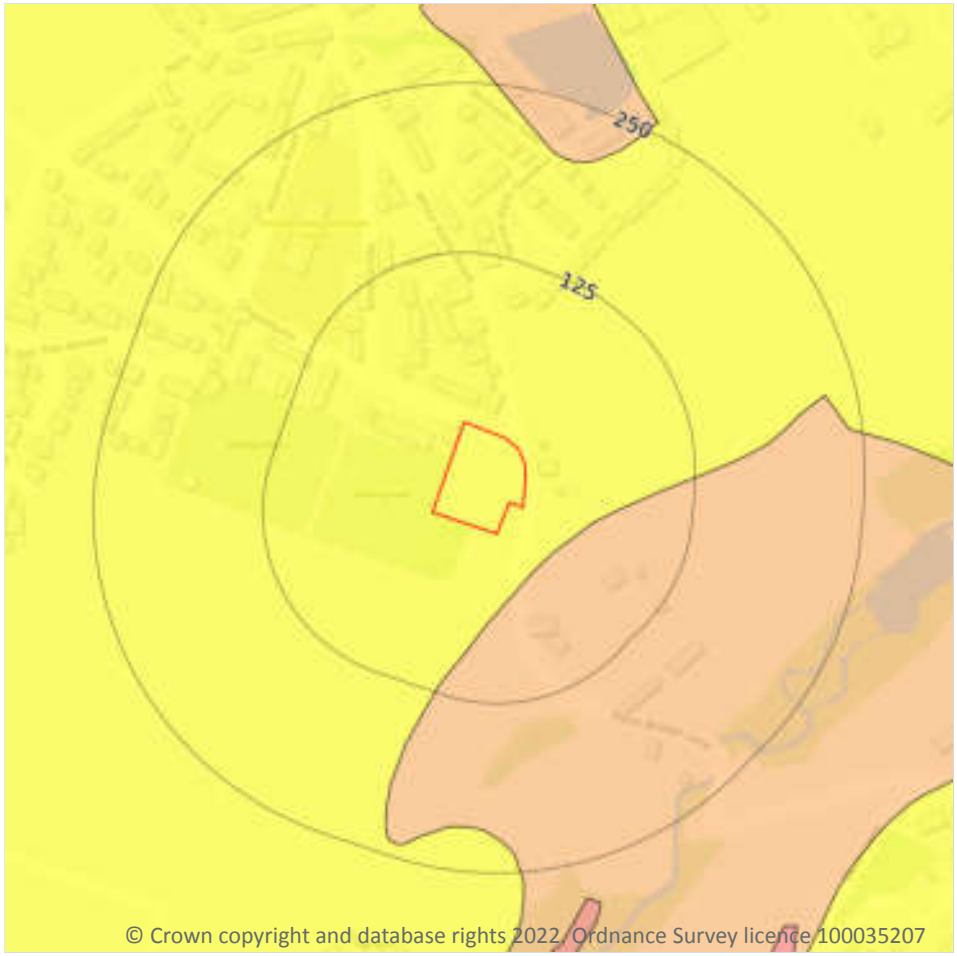
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 90**

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

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

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

17.5 Landslides

Records within 50m	2

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

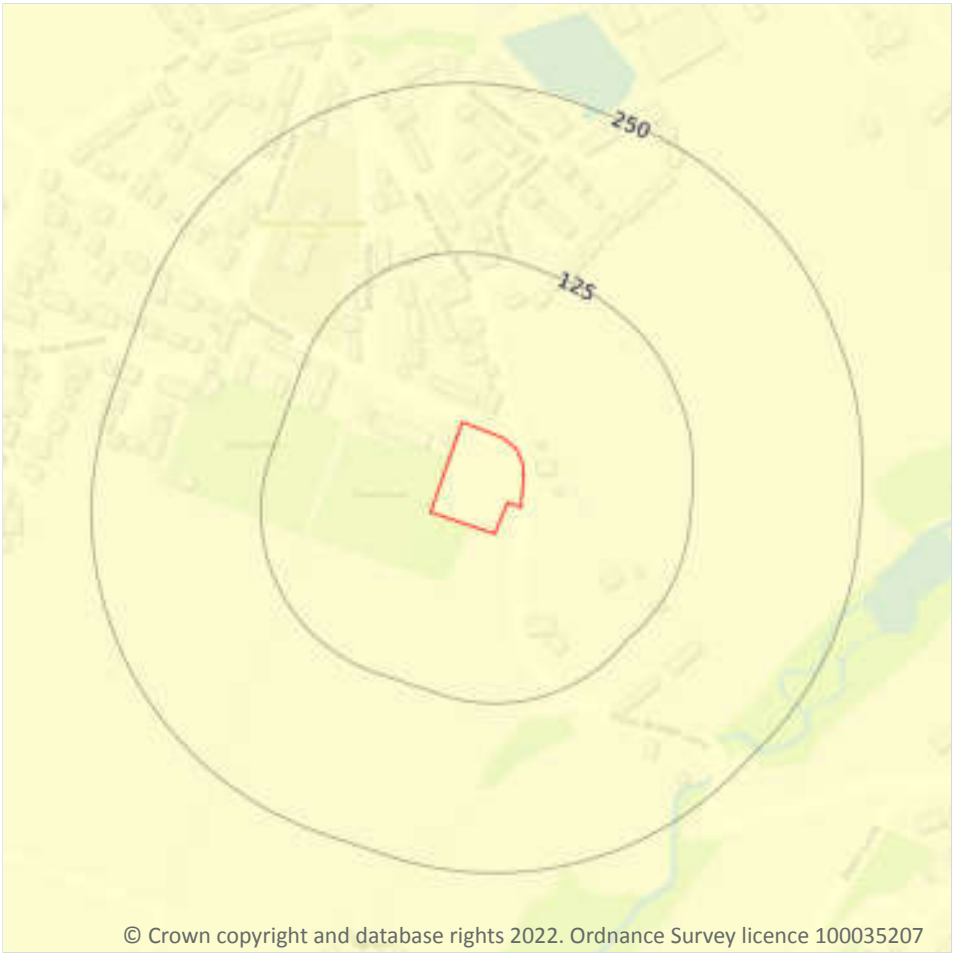
Features are displayed on the Natural ground subsidence - Landslides map on **page 91**

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

Location	Hazard rating	Details
39m SE	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

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

17.6 Ground dissolution of soluble rocks

Records within 50m	1

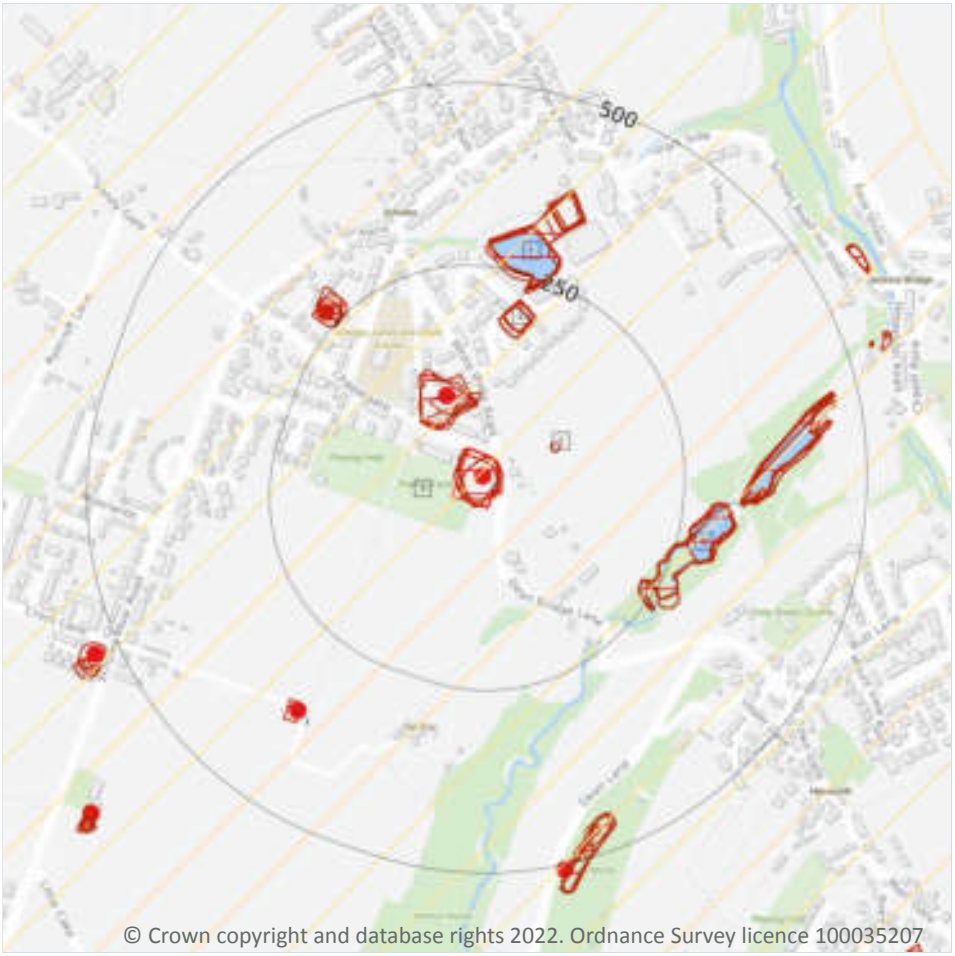
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 93**

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

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

Natural cavities (Area)

Natural cavities (Point)

BritPits

Surface ground workings

Underground workings

Historical Mineral Planning Areas

Mining Cavities

Non Coal Mining

Sporadic underground mining of restricted extent possible

Localised small scale underground mining possible

Small scale mining possible

Underground mining known or likely within or in close proximity

Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

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

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	**4**

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 94**

ID	Location	Details	Description
A	**On site**	**Name: Town Quarry** **Address: Scholes, HOLMFIRTH, West Yorkshire** **Commodity: Sandstone** **Status: Ceased**	**Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site** **Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority**
B	78m NW	Name: Chapel Gate Address: Scholes, HOLMFIRTH, West Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
F	270m NW	Name: Paris Address: Scholes, LEEDS, West Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
I	361m SW	Name: Morton Wood Quarry Address: Scholes, HOLMFIRTH, West Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	**35**

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 94**

ID	Location	Land Use	Year of mapping	Mapping scale
A	**On site**	**Unspecified Quarry**	**1980**	**1:10000**
A	**On site**	**Unspecified Quarry**	**1970**	**1:10560**
A	**On site**	**Gravel Pit**	**1955**	**1:10560**
A	**On site**	**Unspecified Quarry**	**1948**	**1:10560**
A	**On site**	**Unspecified Quarry**	**1904**	**1:10560**
A	**On site**	**Unspecified Quarry**	**1888**	**1:10560**
A	**On site**	**Unspecified Quarry**	**1933**	**1:10560**
B	39m NW	Unspecified Pit	1970	1:10560
B	46m NW	Unspecified Quarry	1933	1:10560
B	46m NW	Unspecified Quarry	1955	1:10560
B	47m NW	Unspecified Quarry	1948	1:10560
B	47m NW	Unspecified Quarry	1904	1:10560
B	52m NW	Sandstone Quarry	1854	1:10560
2	74m NE	Sandstone Quarry	1854	1:10560
C	163m N	Water Body	1948	1:10560
C	163m N	Water Body	1904	1:10560
C	163m N	Pond	1888	1:10560
C	173m N	Pond	1970	1:10560
C	173m N	Water Body	1955	1:10560
C	174m N	Water Body	1933	1:10560
D	226m SE	Water Body	1933	1:10560
E	226m N	Ponds	1888	1:10560
D	228m SE	Water Body	1948	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
D	228m SE	Water Body	1904	1:10560
E	231m N	Water Body	1980	1:10000
E	231m N	Water Body	1970	1:10560
E	231m N	Water Body	1955	1:10560
E	232m N	Water Body	1948	1:10560
E	232m N	Water Body	1904	1:10560
D	232m SE	Water Body	1955	1:10560
E	235m N	Water Body	1933	1:10560
F	247m NW	Unspecified Quarry	1948	1:10560
F	247m NW	Unspecified Quarry	1904	1:10560
F	247m NW	Unspecified Quarry	1888	1:10560
F	248m NW	Unspecified Quarry	1933	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	**3**

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 94**

ID	Location	Land Use	Year of mapping	Mapping scale
-	846m E	Disused Colliery	1951	1:10560
-	933m E	Disused Colliery	1948	1:10560
-	933m E	Colliery	1904	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

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

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	2

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 94**

ID	Location	Name	Commodity	Class	Likelihood
1	**On site**	**Not available**	**Vein Mineral**	**A**	**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**
-	823m W	Not available	Vein Mineral	A	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

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

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

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	0

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

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	1

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

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

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

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

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

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

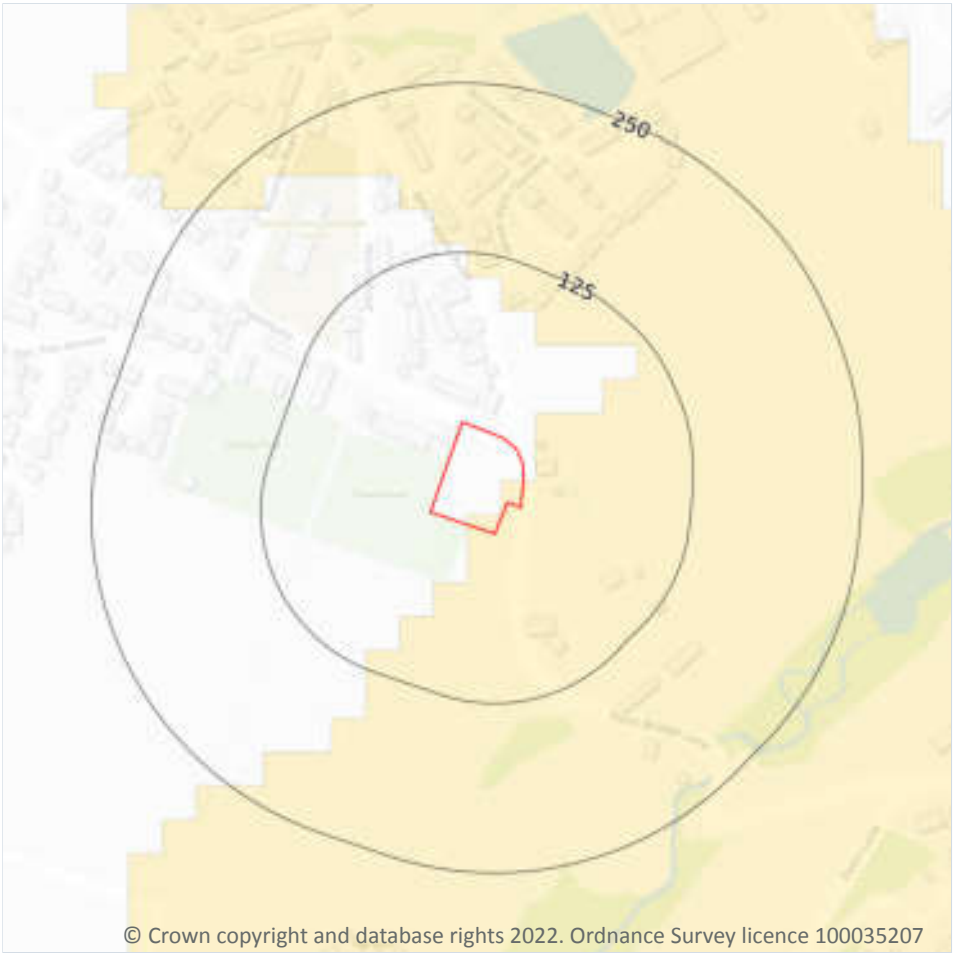
18.13 Clay mining

Records on site	0

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

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

19 Radon



Site Outline

Search buffers in metres (m)

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

19.1 Radon

Records on site	2

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

Features are displayed on the Radon map on **page 101**

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

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

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	1

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

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

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

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

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

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

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

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

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

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

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

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

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

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

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

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

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

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

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

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

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

This data is sourced from HS2 ltd.

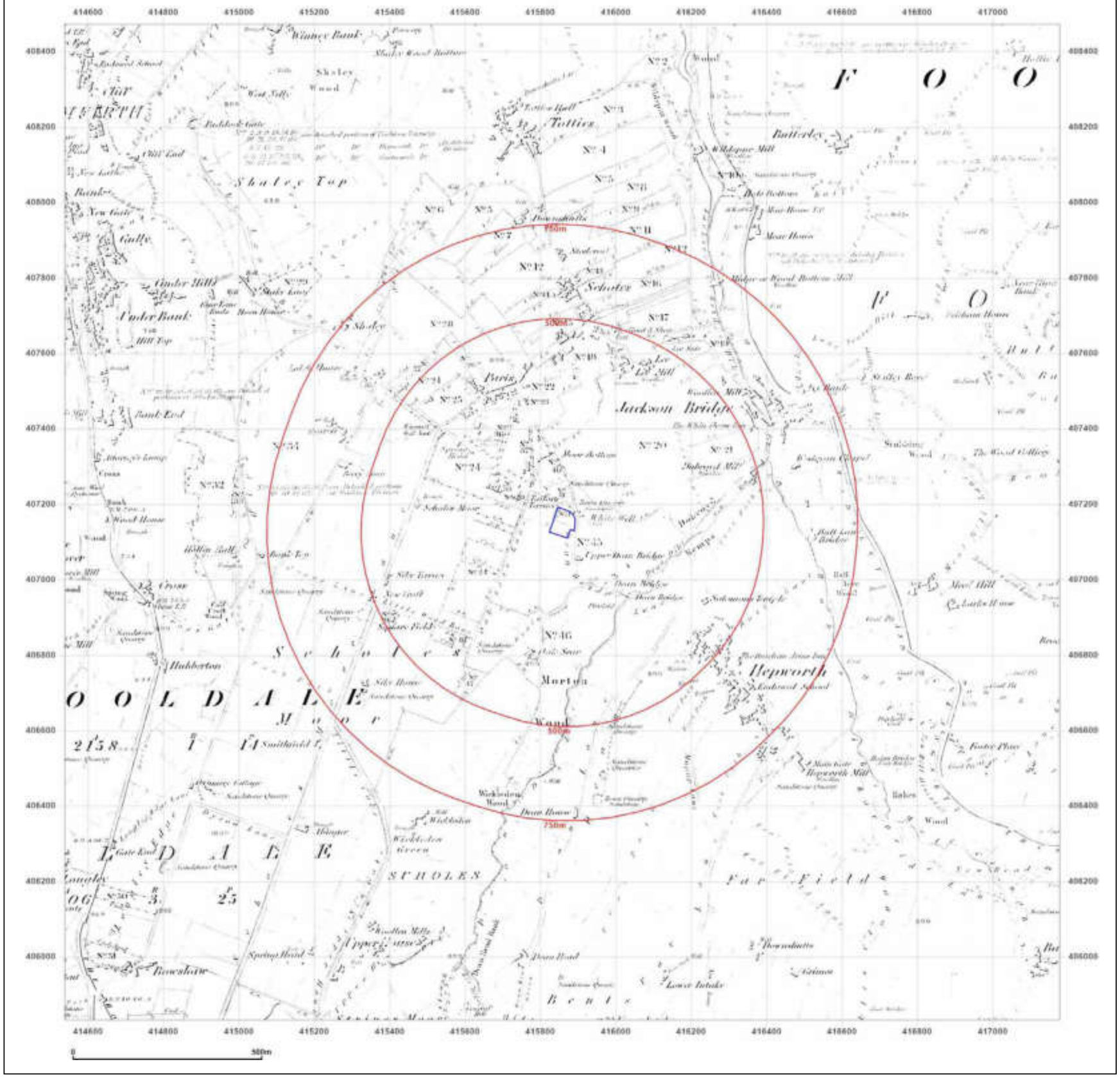
Data providers

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

Terms and conditions

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

Appendix E HISTORICAL MAPS



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: County Series

Map date: **1854**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

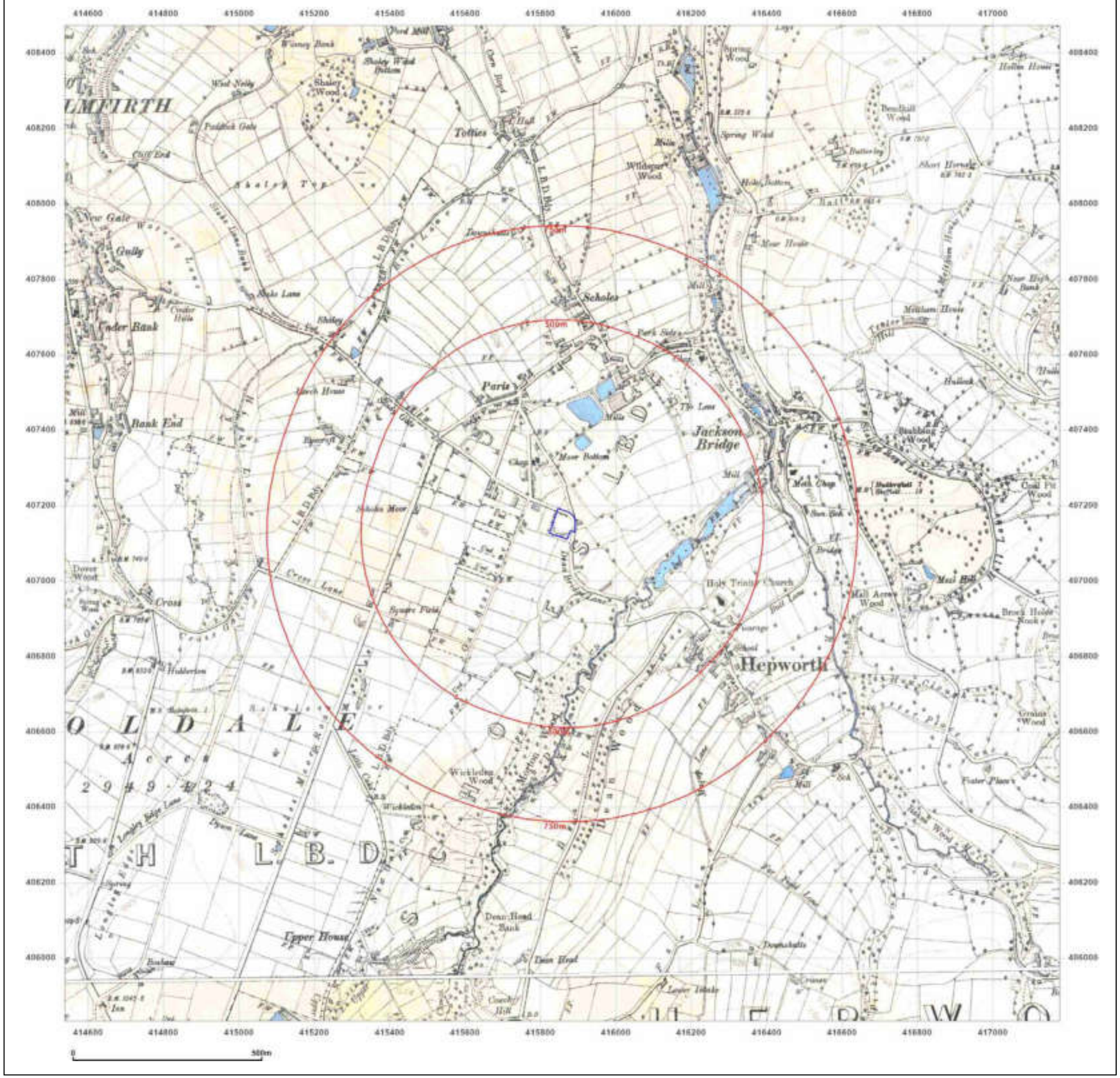
Surveyed 1854
Revised N/A
Edition 1854
Copyright N/A
Levelled N/A

Powered by

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

Production date: 13 January 2022

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



Groundsure
INSIGHTS

Site Details:

415861 , 407157

Client Ref:	G1380
Report Ref:	GS-8445246
Grid Ref:	415857, 407152

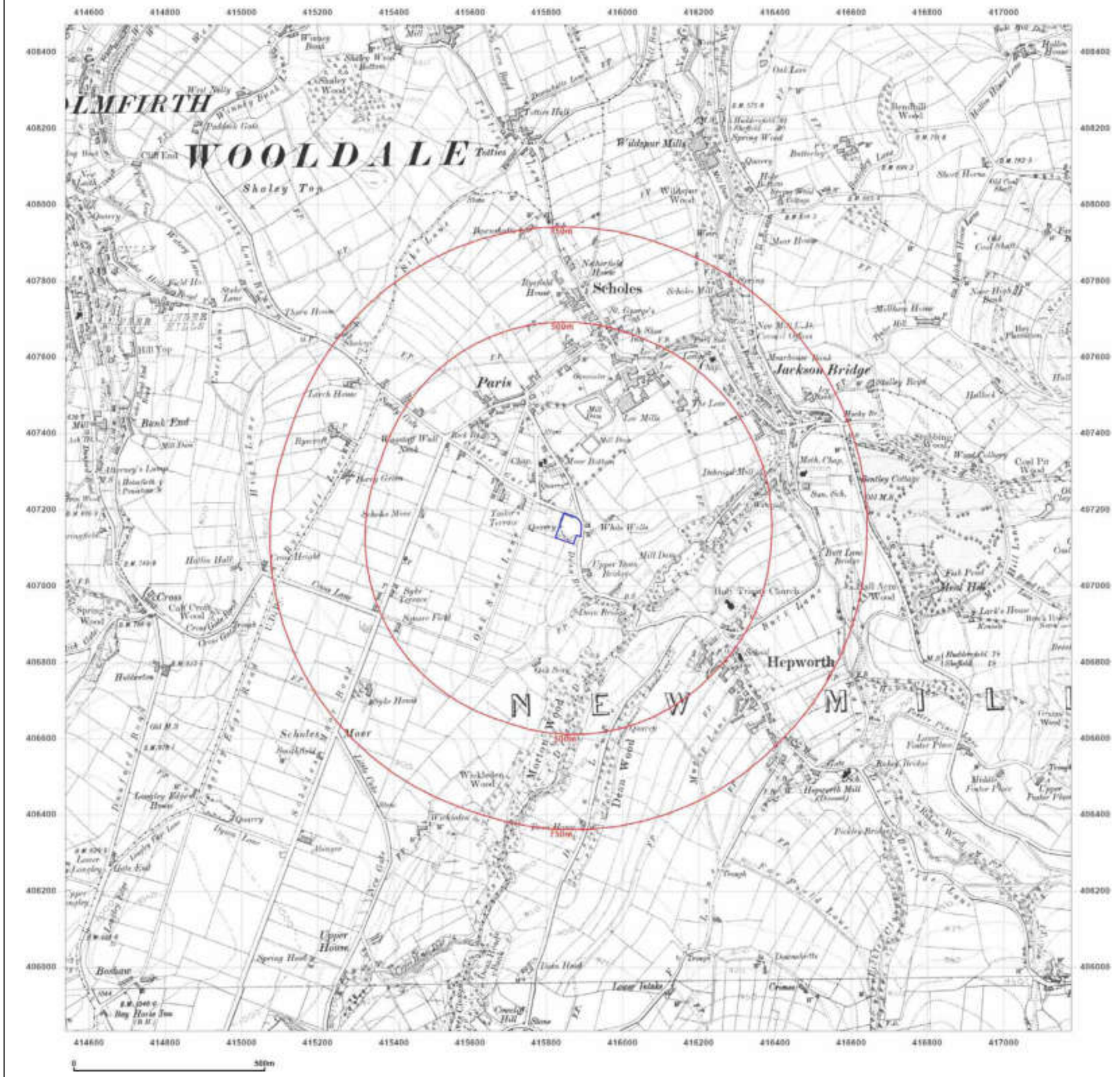
Map Name:	County Series
Map date:	**1888**
Scale:	1:10,560
Printed at:	1:10,560

Powered by

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: County Series

Map date: **1904-1906**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1888
Revised 1904
Edition N/A
Copyright N/A
Levelled N/A

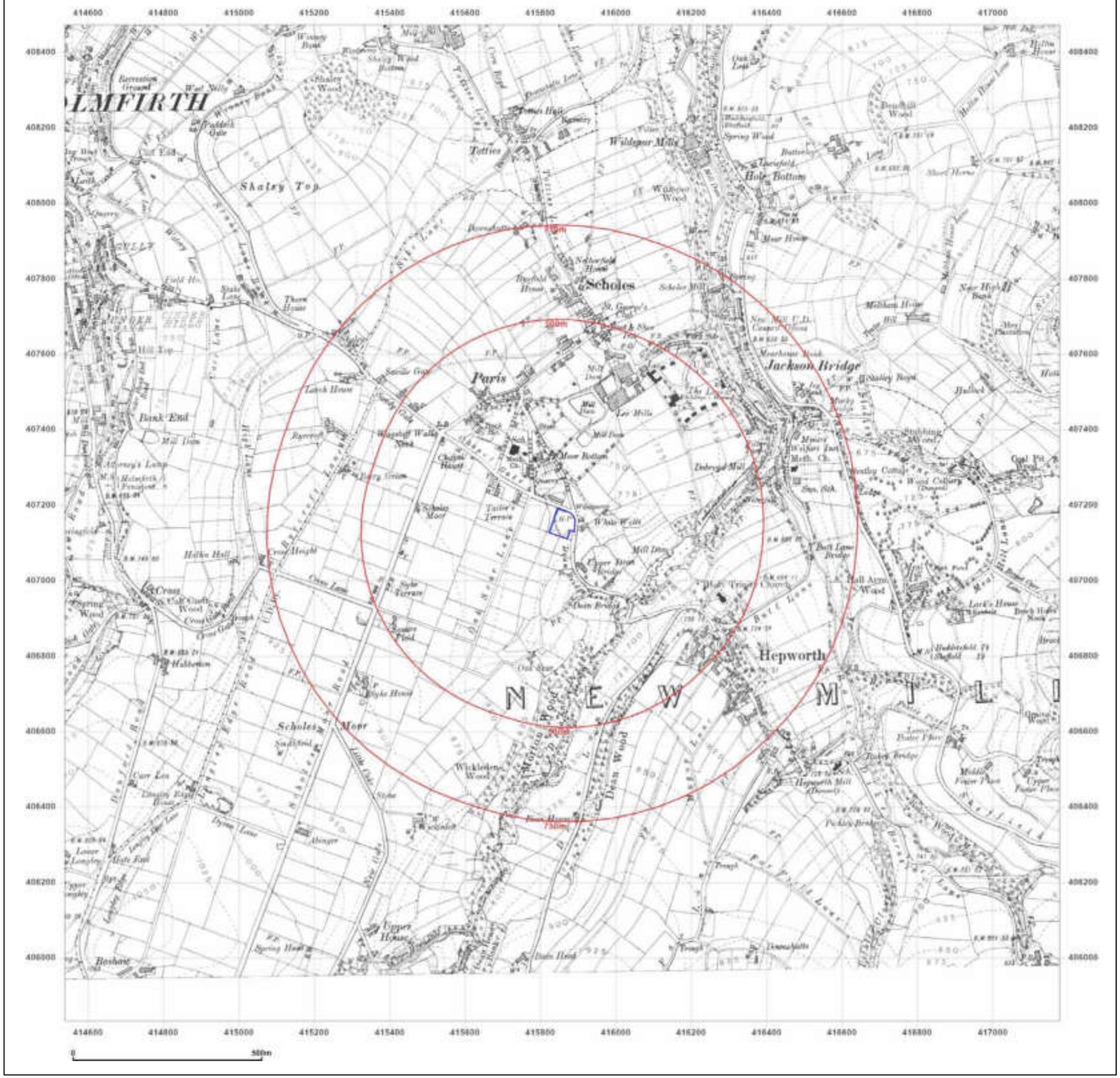
Surveyed 1888
Revised 1906
Edition 1906
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: County Series

Map date: **1933**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

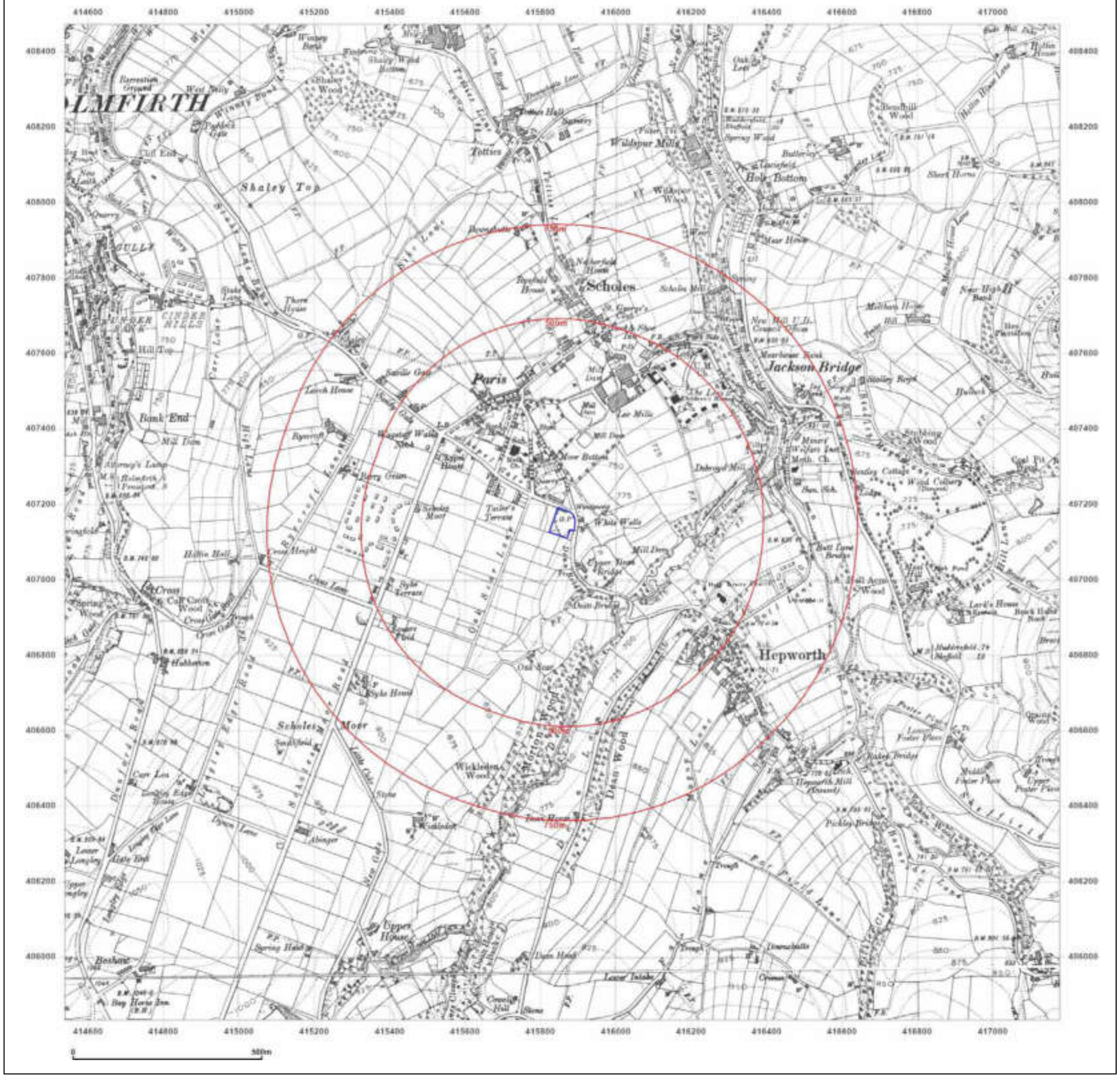
Surveyed 1851
Revised 1933
Edition 1933
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: County Series

Map date: **1948**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1851
Revised 1948
Edition N/A
Copyright N/A
Levelled N/A

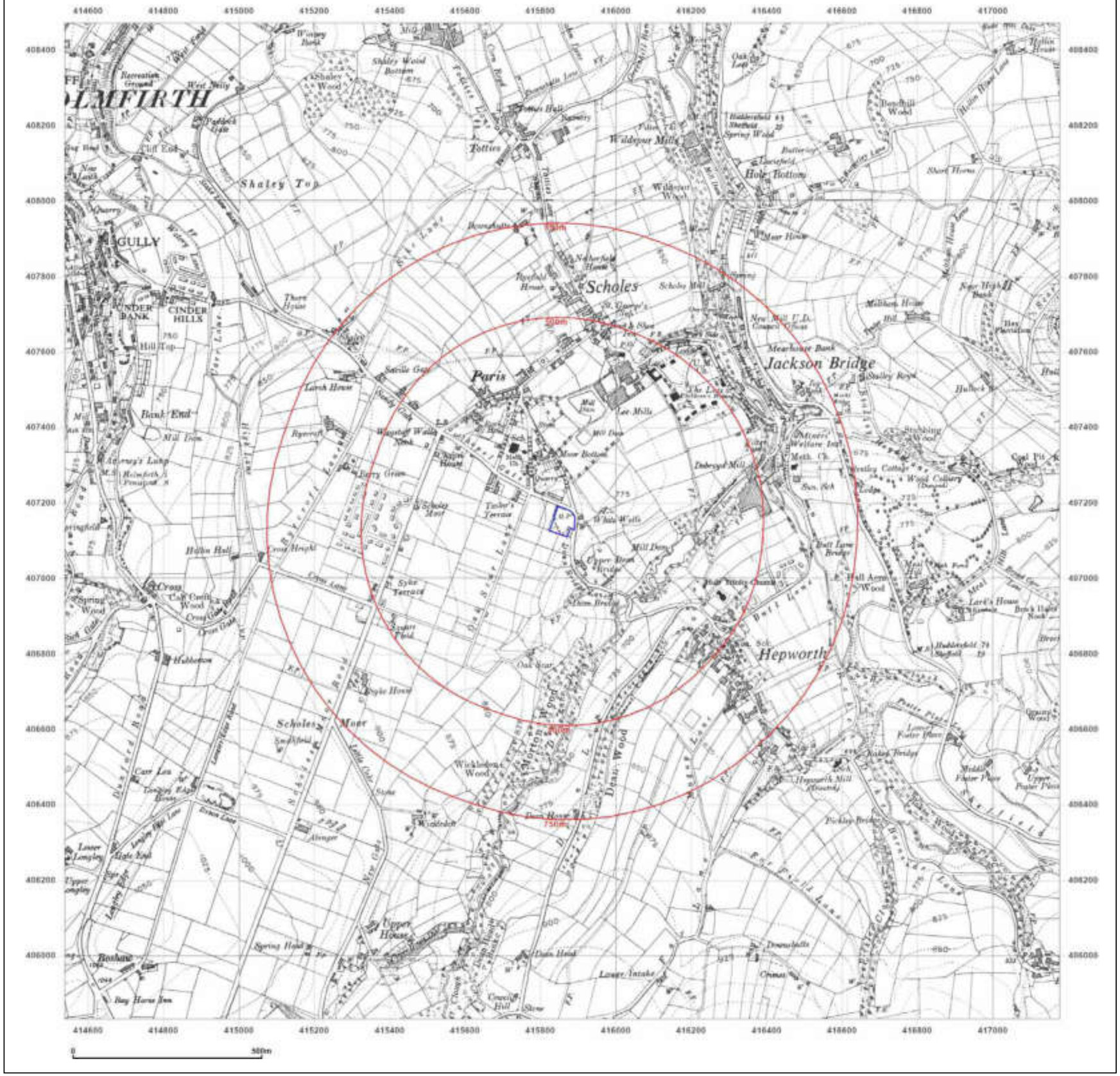
Surveyed 1851
Revised 1948
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: Provisional

Map date: **1955**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed N/A
Revised 1955
Edition N/A
Copyright N/A
Levelled N/A

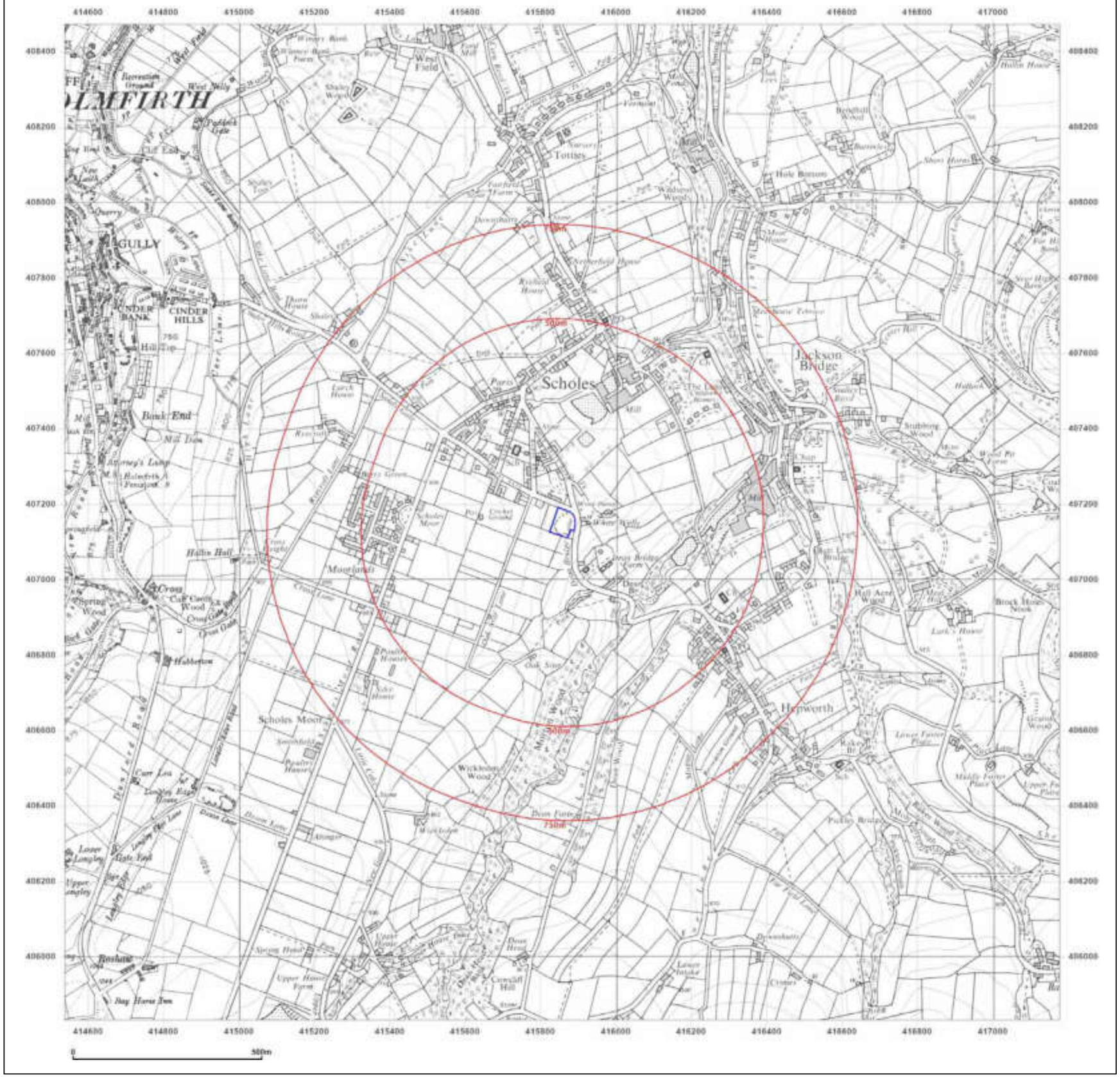
Surveyed N/A
Revised 1955
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: Provisional

Map date: **1965-1970**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed N/A
Revised 1965
Edition N/A
Copyright N/A
Levelled N/A

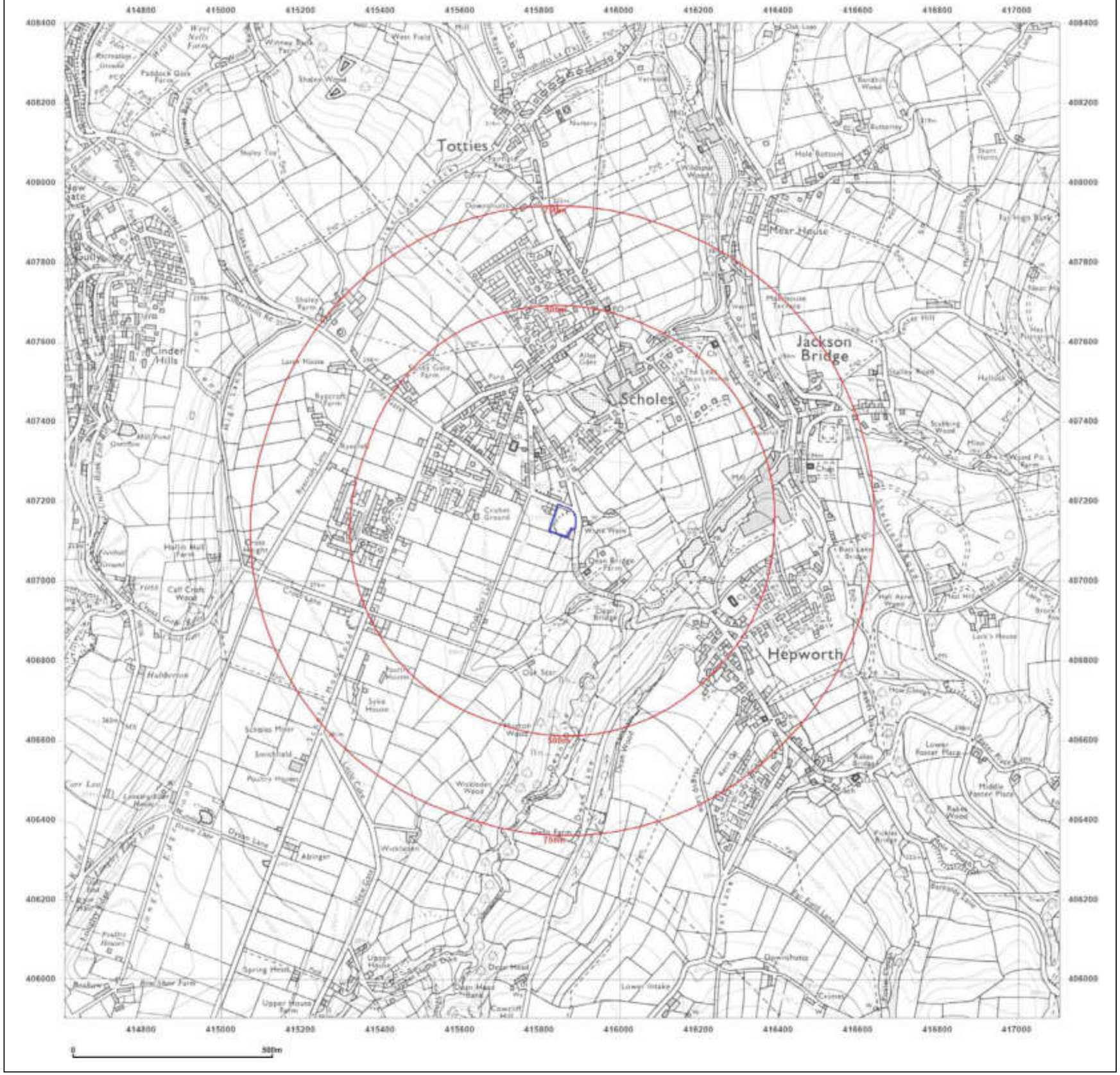
Surveyed 1968
Revised 1970
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **1980**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1978
Revised 1980
Edition N/A
Copyright N/A
Levelled N/A

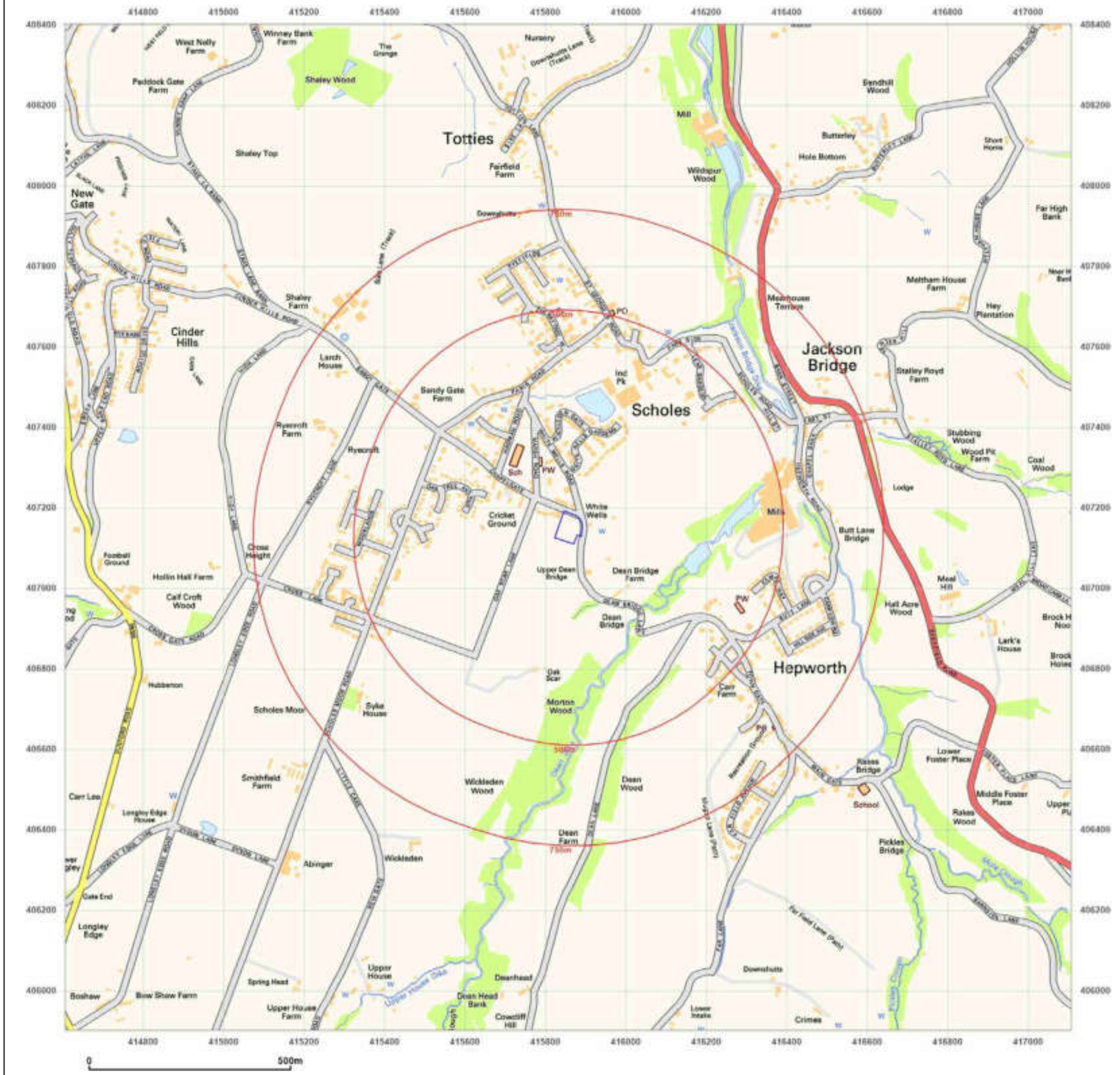
Surveyed 1976
Revised 1980
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

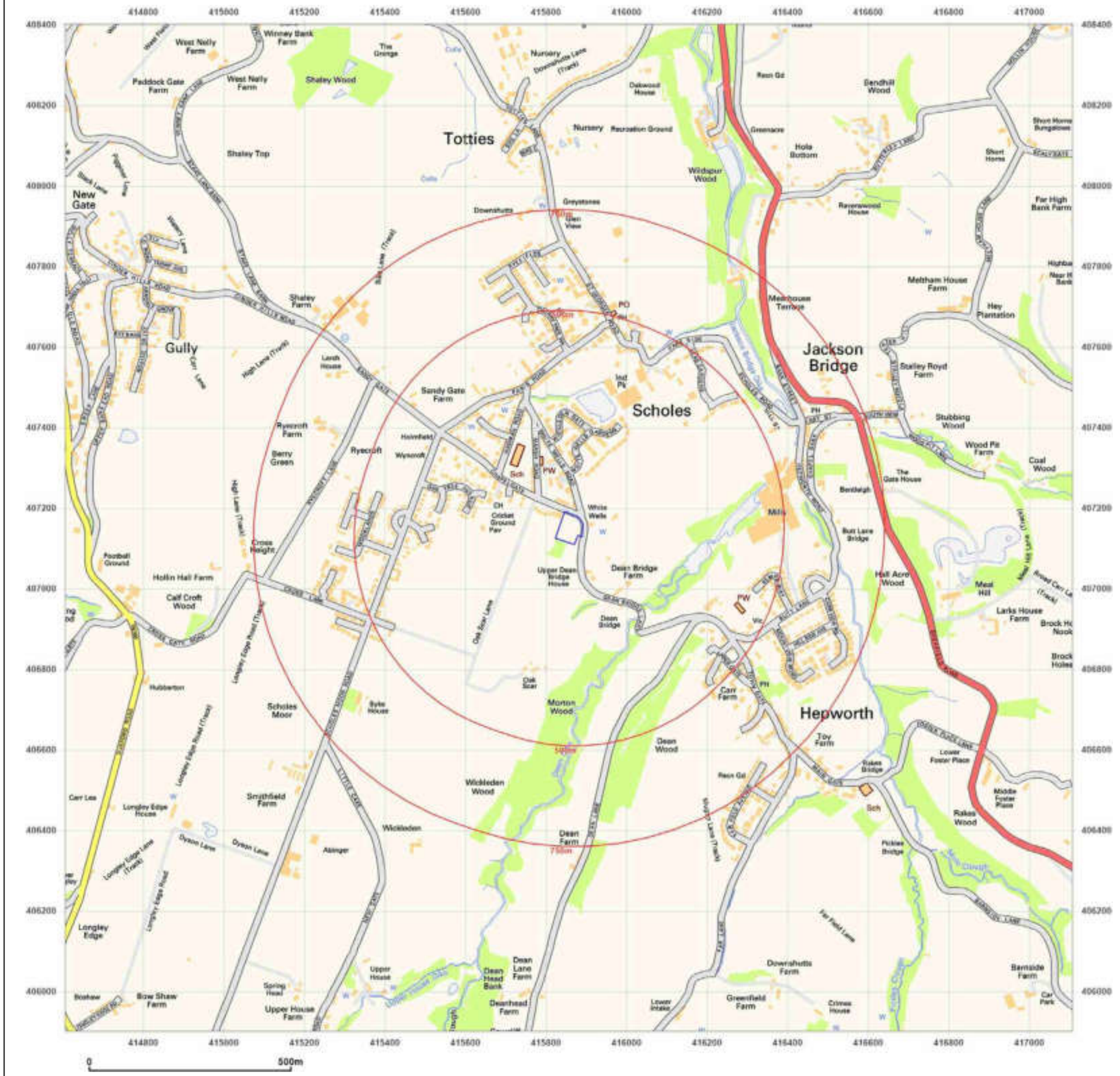
N
W E
S

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

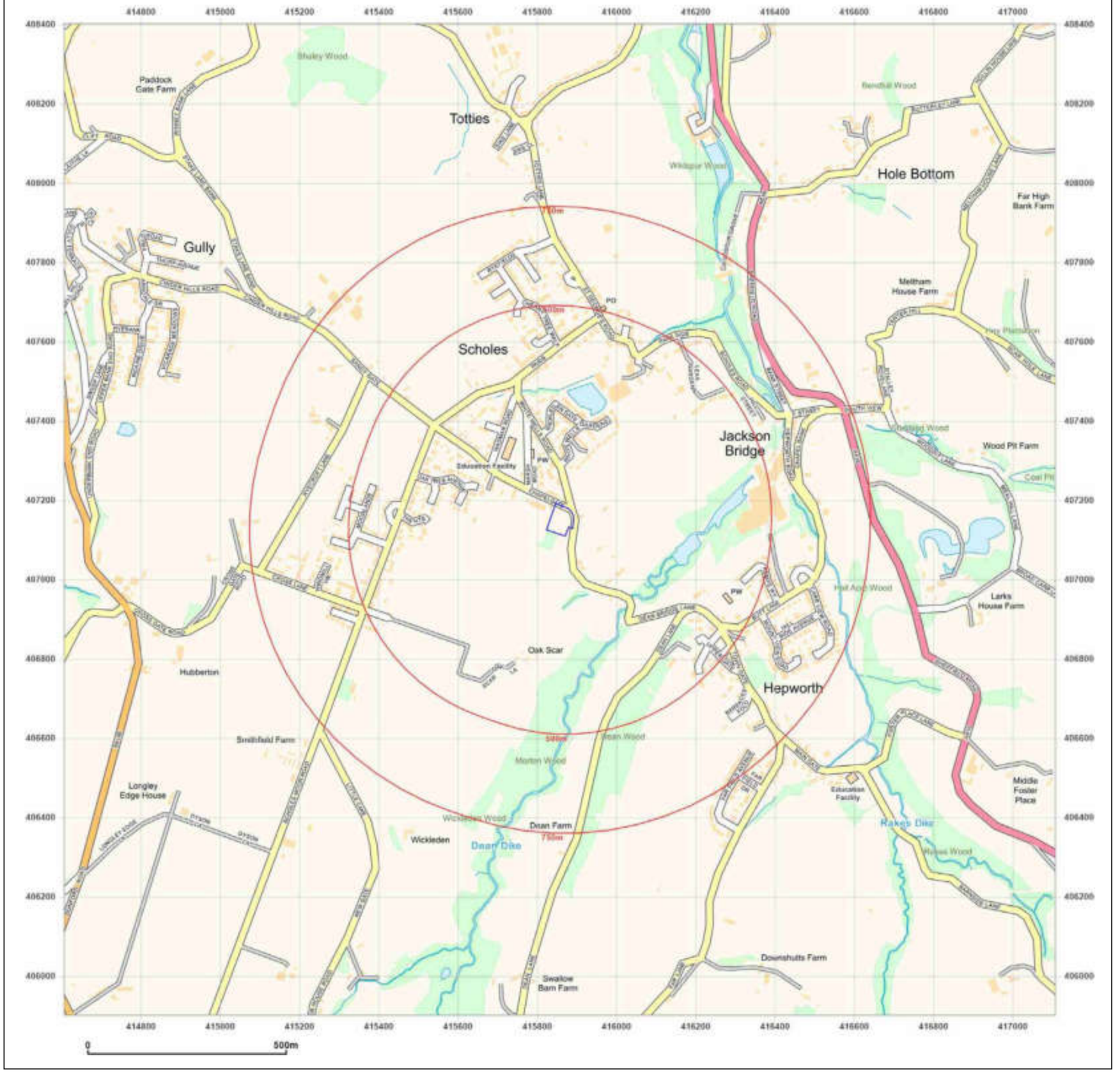
2010

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **2022**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

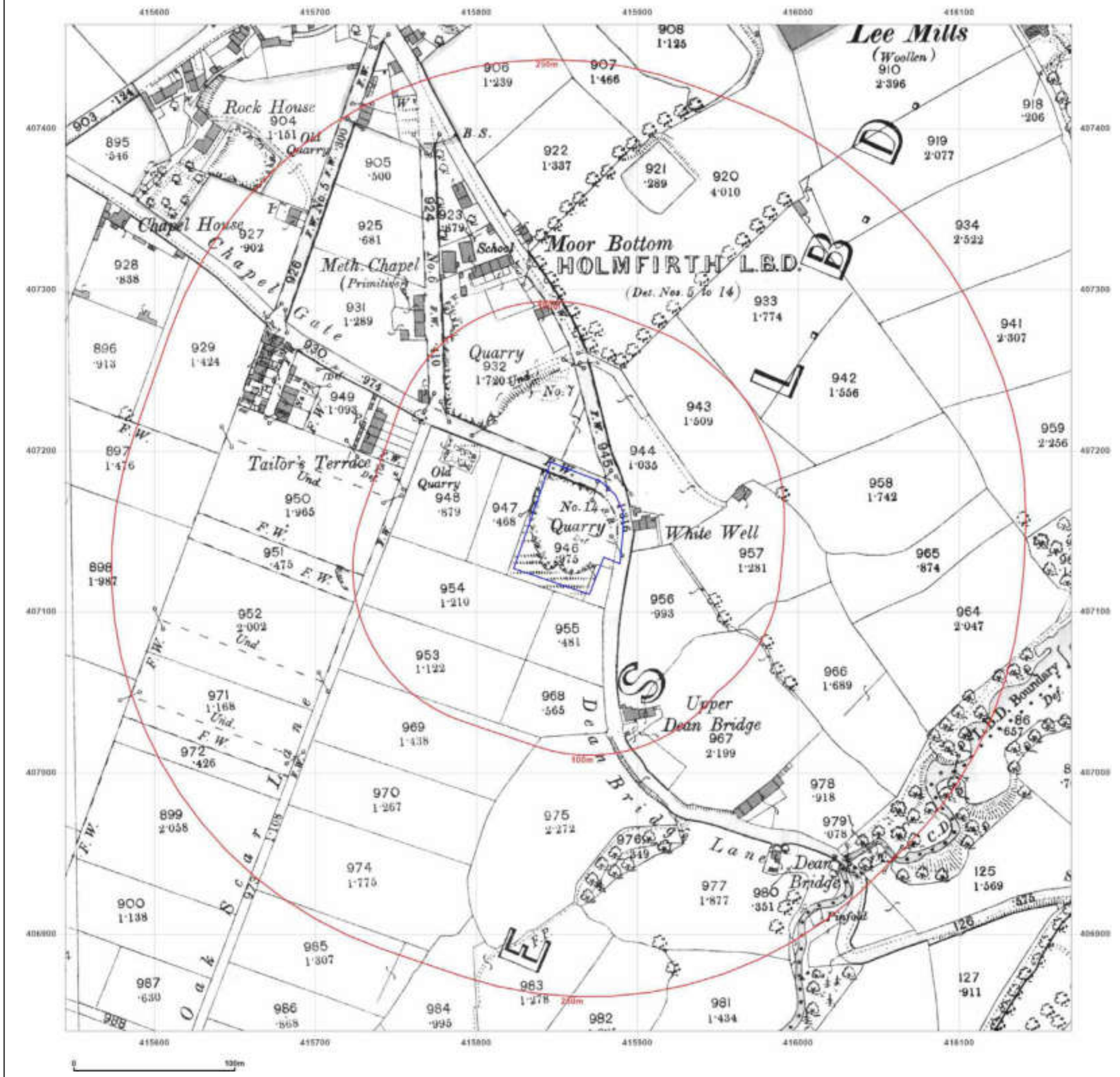
2022

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: County Series

Map date: **1893**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1893
Revised 1893
Edition N/A
Copyright N/A
Levelled N/A

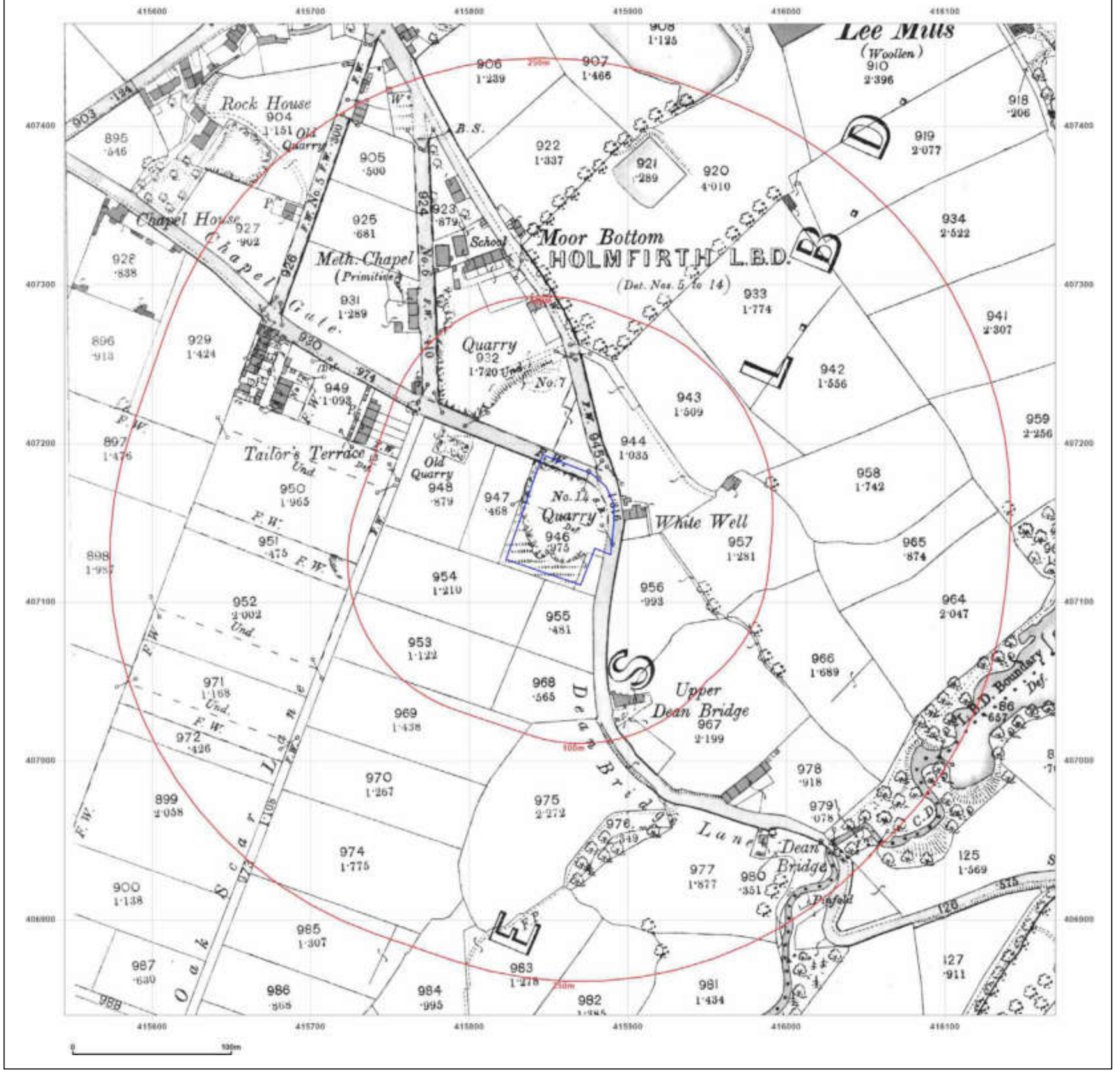
Surveyed 1893
Revised 1893
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: County Series
Map date: **1893**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

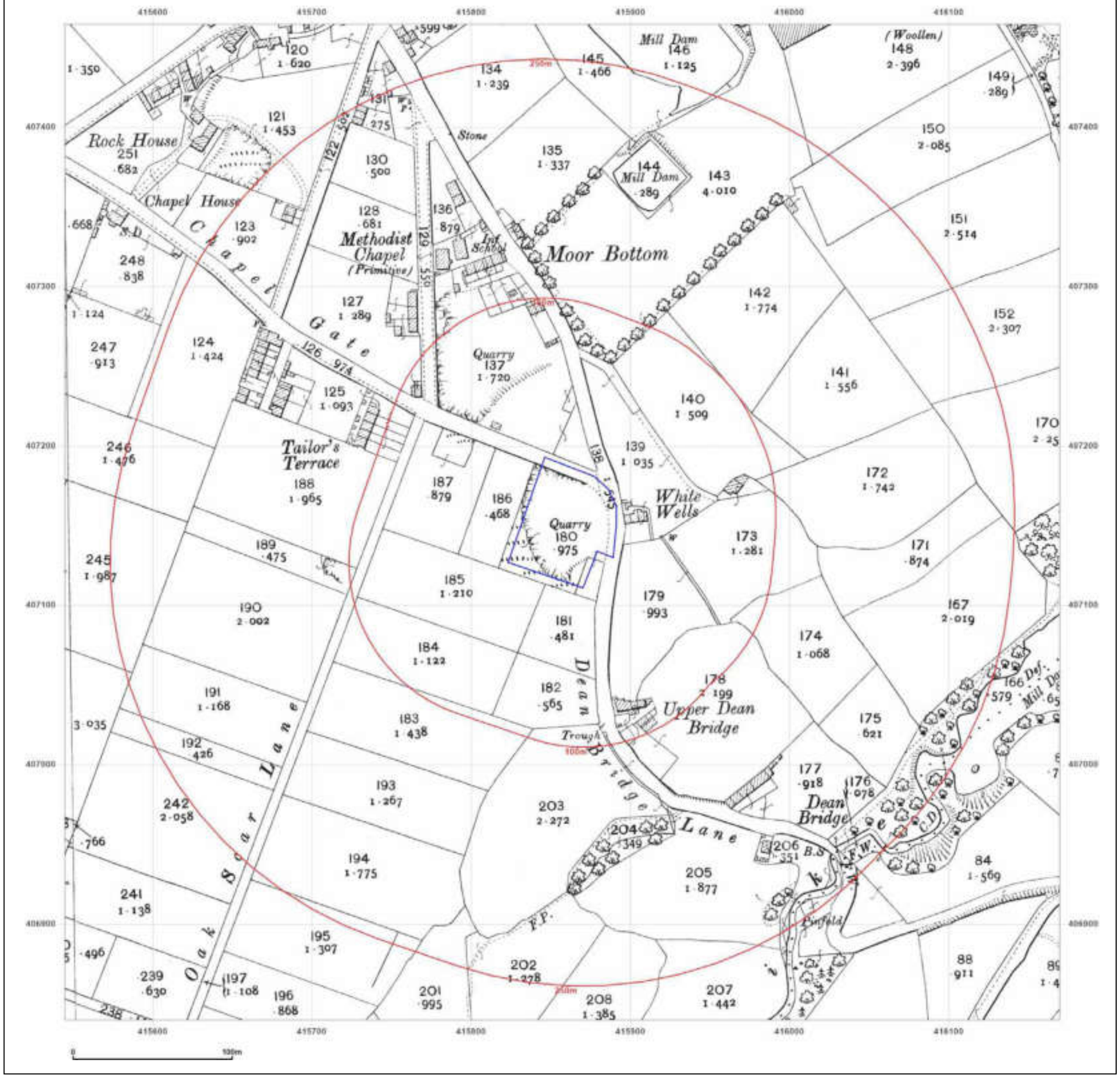
Surveyed 1893
Revised 1893
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

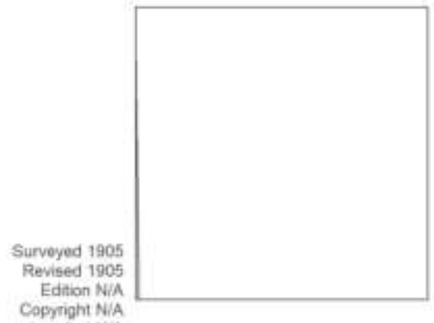
Map Name: County Series

Map date: **1905**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

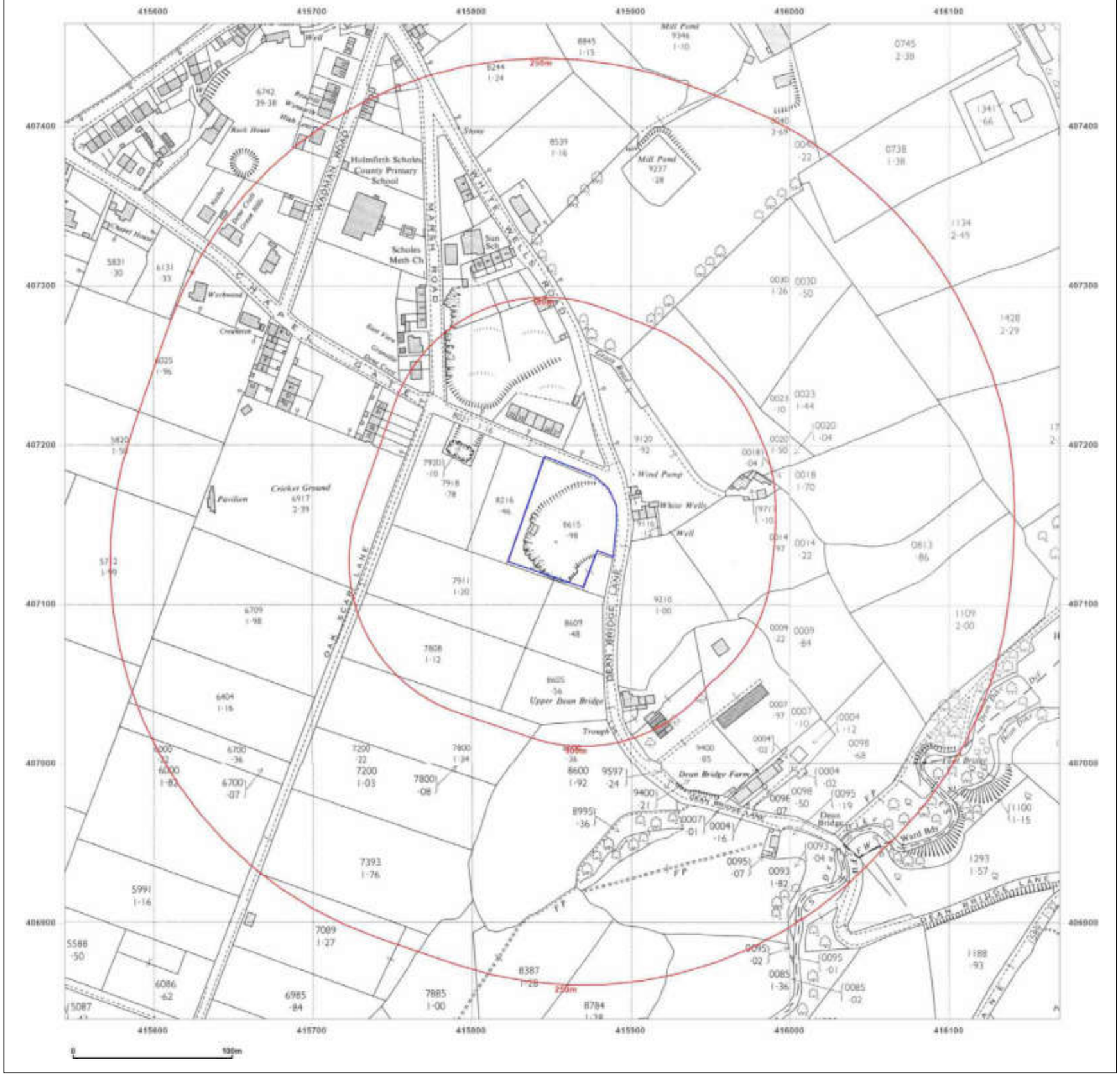


Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **1964**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1959

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1958

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1959

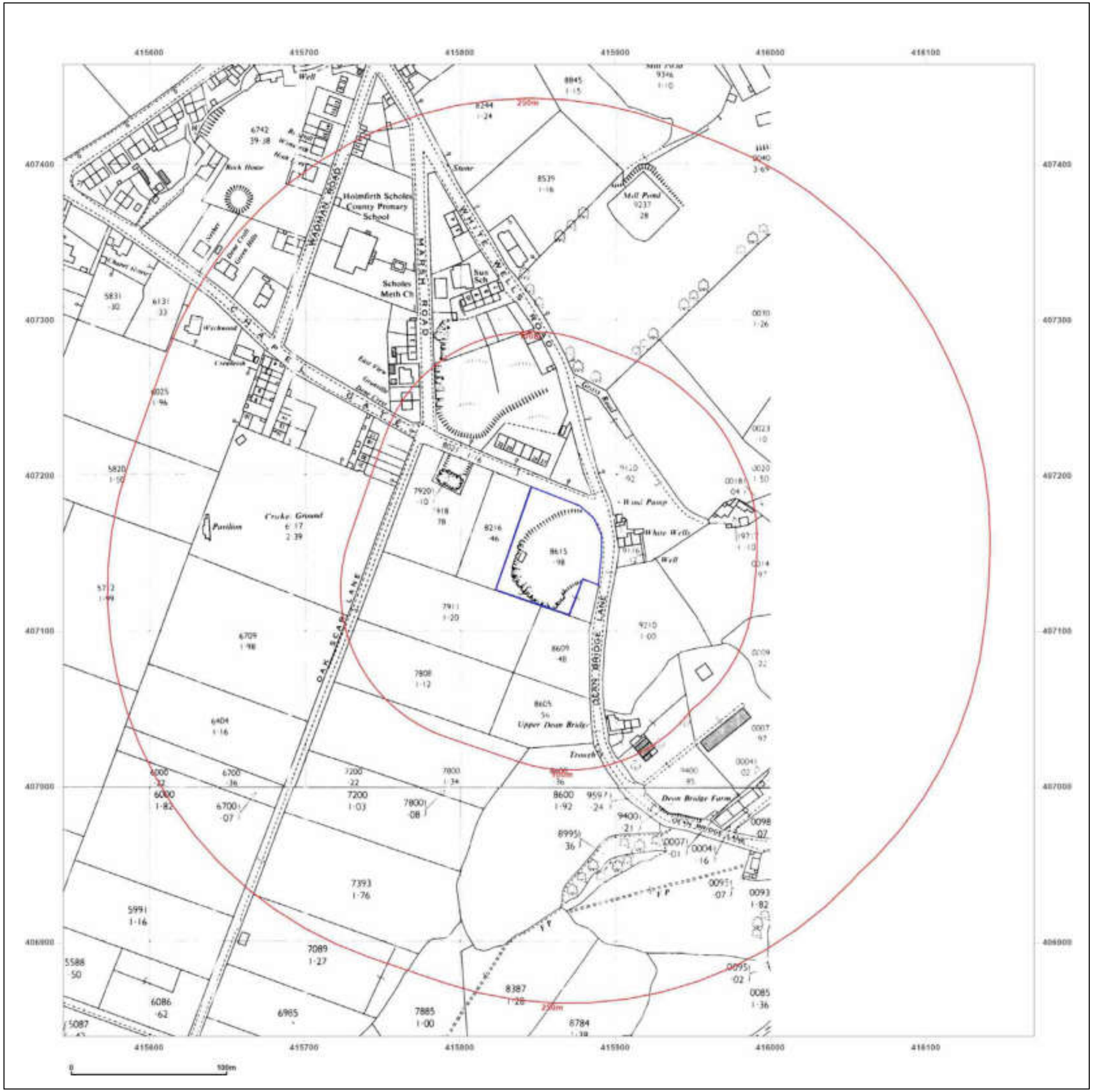
Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1958

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref:	G1380
Report Ref:	GS-8445246
Grid Ref:	415857, 407152

Map Name:	National Grid
Map date:	**1964**
Scale:	1:2,500
Printed at:	1:2,500

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

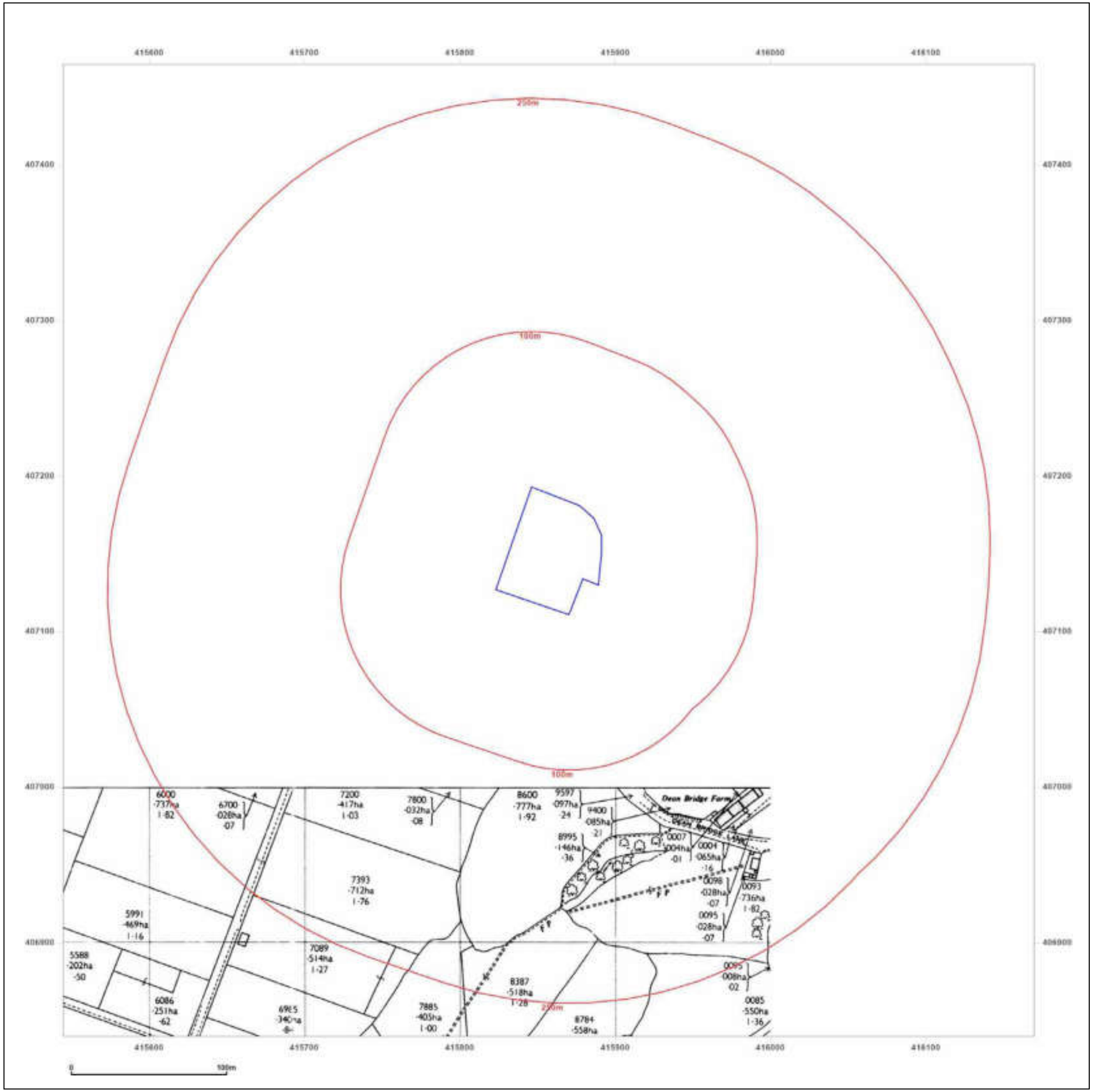
Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Powered by

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

Production date: 13 January 2022

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



Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **1964**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

Powered by

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

Production date: 13 January 2022

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

Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **1976-1977**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1975
Revised 1975
Edition N/A
Copyright 1976
Levelled 1958

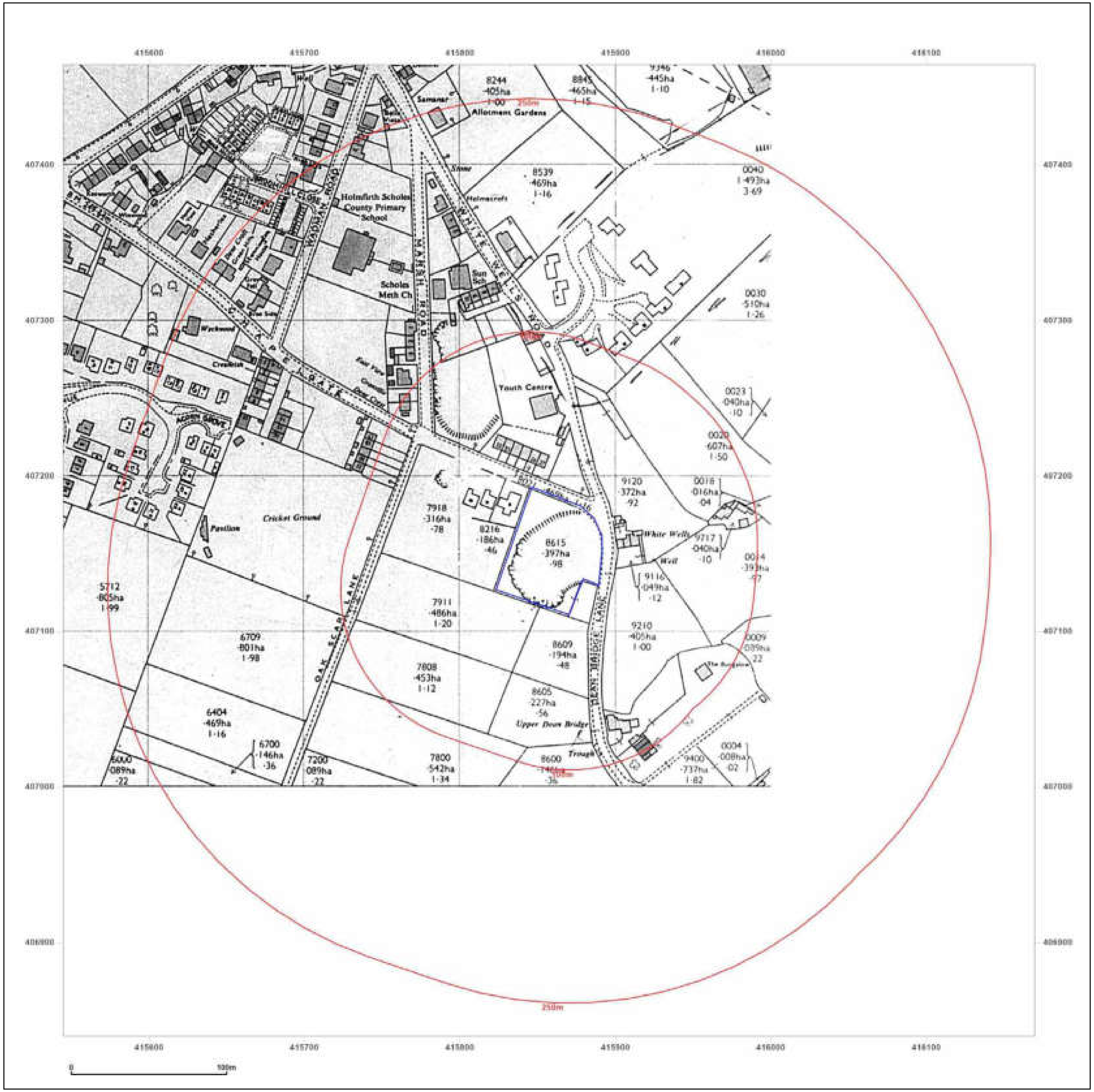
Surveyed 1976
Revised 1976
Edition N/A
Copyright 1977
Levelled 1958

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **1978**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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

Powered by OS

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

Production date: 13 January 2022

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

Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **1980-1985**

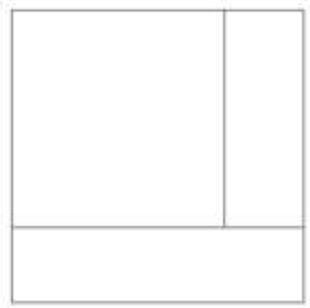
Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1958
Revised 1980
Edition N/A
Copyright 1980
Levelled 1958

Surveyed 1984
Revised 1984
Edition N/A
Copyright 1985
Levelled 1958



Powered by OS

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

Production date: 13 January 2022

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

Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **1988-1992**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1958
Revised 1988
Edition N/A
Copyright 1988
Levelled 1958

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

Surveyed 1958
Revised 1988
Edition N/A
Copyright 1988
Levelled 1958

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

Powered by OS

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

Production date: 13 January 2022

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

Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

Map date: **1988-1992**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1958
Revised 1988
Edition N/A
Copyright 1988
Levelled 1958

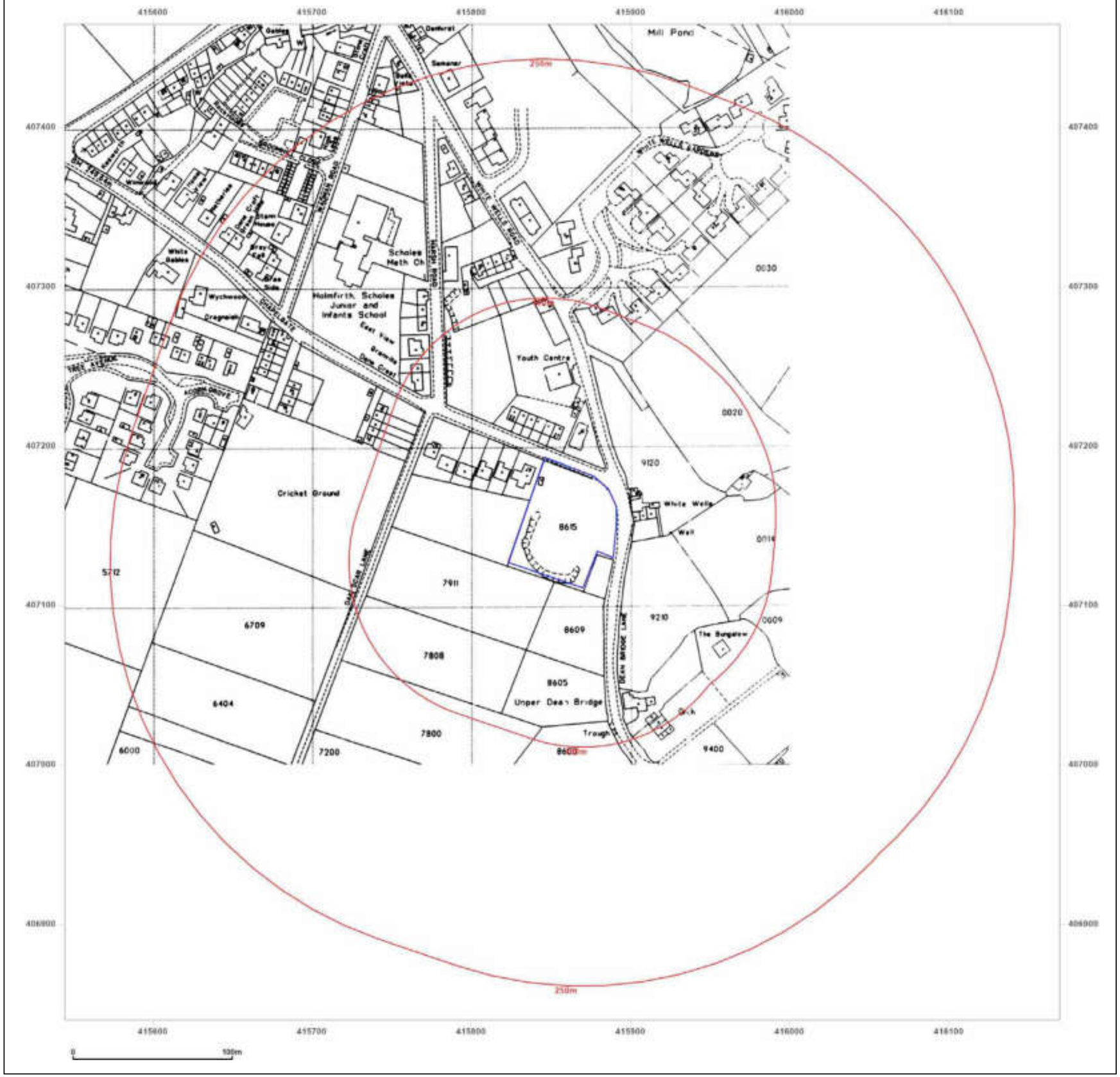
Surveyed 1992
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

Powered by OS

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

Production date: 13 January 2022

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



Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: National Grid

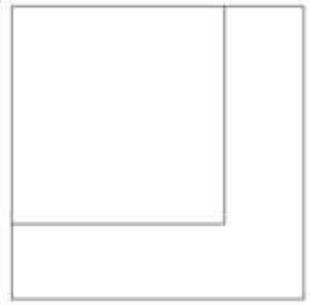
Map date: **1992**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

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



Powered by OS

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

Production date: 13 January 2022

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

Groundsure INSIGHTS

Site Details:

415861 , 407157

Client Ref: G1380
Report Ref: GS-8445246
Grid Ref: 415857, 407152

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

N
W E
S

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

Production date: 13 January 2022

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

Appendix F EXPLORATORY HOLE RECORDS

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415865.00 - 407167.00	Hole Type WS
Location:	Holmfirth		Level: 238.81	Scale 1:25
Client:	EcoHolmes Community Land Trust		Dates: 16/02/2022 - 16/02/2022	Logged By SP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.05	ES					Grass and moss over black clayey GRAVEL. Gravel is fine to medium, angular to rounded of tarmac and mudstone shale. MADE GROUND
					0.40	238.41		
		0.50	ES					Dense dark brown to black very clayey GRAVEL. Gravel is fine to medium, angular to rounded of glass, coal, ash, and sandstone. MADE GROUND
		0.60	D					
					0.75	238.06		
		0.80	ES					Light brown clayey gravelly SAND. Gravel is fine to course, angular to rounded of Sandstone. ROUGH ROCK
		1.00	D					
		1.00		N=8 (1,0/0,1,1,6)				
					1.40	237.41		Dense yellowish brown Sandstone. ROUGH ROCK
					1.50	237.31		End of borehole at 1.50 m
		1.60		50 (25 for 50mm/50 for 20mm)				

Remarks
Terminated early due to refusal, hole Dry

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415847.00 - 407154.00	Hole Type WS
Location:	Holmfirth		Level: 239.91	Scale 1:25
Client:	EcoHolmes Community Land Trust		Dates: 16/02/2022 - 16/02/2022	Logged By SP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES					Moss over dark brown to black slightly sandy GRAVEL. Gravel is fine to medium, angular to subangular of tarmac sandstone and mudstone shale. MADE GROUND
		1.00	D					
		1.00		N=4 (1,0/1,1,1,1)				
					1.50	238.41		
		1.60	ES					Stiff Dark brown to black very gravelly sandy CLAY. Gravel is fine to course, angular of sandstone, brick, tarmac, white material, and pottery. MADE GROUND
					1.80	238.11		
		1.90	D					Strong light brown Sandstone. ROUGH ROCK
		2.00		50 (1,2/50 for 125mm)	2.00	237.91		End of borehole at 2.00 m

Remarks
Terminated early due to refusal, hole Dry

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415867.00 - 407139.00	Hole Type WS
Location:	Holmfirth		Level: 238.75	Scale 1:25
Client:	EcoHolmes Community Land Trust		Dates: 16/02/2022 - 16/02/2022	Logged By SP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	ES					Dark brown to black slightly clayey sandy GRAVEL. Gravel is fine to medium, angular to subangular of tarmac, glass, sandstone, mudstone and pottery. MADE GROUND
		0.80	D					
		1.00		N=8 (2,2/2,2,2,2)	1.00	237.75		
		1.30	ES					Light brown very sandy gravelly CLAY. Gravel is fine to medium, angular to subangular of Sandstone. ROUGH ROCK
		1.50	D					
		1.50		50 (25 for 70mm/50 for 40mm)	1.55 1.60	237.20 237.15		Strong light brown Sandstone. ROUGH ROCK End of borehole at 1.60 m

Remarks
Terminated early due to refusal, hole Dry

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415884.00 - 407147.00	Hole Type WS
Location:	Holmfirth		Level: 238.39	Scale 1:25
Client:	EcoHolmes Community Land Trust		Dates: 16/02/2022 - 16/02/2022	Logged By SP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.05	ES		0.10	238.29		Dark black to brown clayey TOPSOIL with rootlets and high organic content. TOPSOIL
		0.50	ES					Light brown clayey very sandy GRAVEL. Gravel is fine to course, angular to subangular of Sandstone (with frequent pockets of dark brown sandy CLAY) ROUGH ROCK
		0.60	D					
		1.00		N=4 (1,1/1,1,1,1)				
					1.80	236.59		Weathered yellowish brown Sandstone. ROUGH ROCK
					1.90	236.49		End of borehole at 1.90 m
		2.00		68 (2,2/68 for 190mm)				

Remarks
Terminated early due to refusal, hole Dry

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords:	415848.00 - 407129.00	Hole Type WS
Location:	Holmfirth		Level:	240.00	Scale 1:25
Client:	EcoHolmes Community Land Trust		Dates:	16/02/2022 - 16/02/2022	Logged By SP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.30	239.70		Brown very gravelly TOPSOIL. Gravel is fine to medium of sandstone. MADE GROUND
		0.60	ES					Brown very sandy gravelly CLAY. Gravel is medium to course, angular to subangular of Sandstone. MADE GROUND
		0.80	D					
	▼	1.00		N=7 (1,0/1,2,2,2)				
					1.80	238.20		Grey weathered Sandstone. ROUGH ROCK
		2.00		50 (25 for 10mm/50 for 10mm)	2.00	238.00		End of borehole at 2.00 m

Remarks

Terminated early due to refusal, groundwater at 1.20m bgl.

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415847.00 - 407180.00	Hole Type WS
Location:	Holmfirth		Level: 241.50	Scale 1:25
Client:	EcoHolmes Community Land Trust		Dates: 16/02/2022 - 16/02/2022	Logged By SP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.20	241.30		Brown gravelly TOPSOIL. Gravel is fine, angular of brick, glass and sandstone. MADE GROUND
		0.80	D					Dark brown to black clayey sandy GRAVEL. Gravel is fine to medium, angular of mudstone, sandstone, clinker, tarmac, roots and coal. MADE GROUND
		1.00	ES					
		1.00		N=4 (1,1/1,1,1,1)				
		2.00		N=5 (2,2/2,1,1,1)	2.60	238.90		
		2.80	ES					Light brown very clayey sandy GRAVEL. Gravel is fine to medium, angular of Sandstone MADE GROUND
		3.00	D					
		3.00		N=4 (2,2/1,1,1,1)	3.50	238.00		
		3.70	ES					Reddish brown gravelly CLAY. Gravel is of coal, glass, mudstone, tarmac, and sandstone. MADE GROUND
					3.80	237.70		Strong yellowish brown sandstone. ROUGH ROCK
		4.00		50 (9,7/50 for 160mm)	4.00	237.50		End of borehole at 4.00 m

Remarks
Terminated early due to refusal, hole Dry

Borehole Log

Borehole No. **WS07**

Sheet 1 of 2

Project Name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415857.00 - 407189.00	Hole Type WS
Location:	Holmfirth		Level: 241.00	Scale 1:25
Client:	EcoHolmes Community Land Trust		Dates: 16/02/2022 - 16/02/2022	Logged By SP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30	240.70		Brown clayey TOPSOIL with rootlets. MADE GROUND
		1.00		N=4 (1,1/1,1,1,1)				Dark brown clayey gravelly SAND. Gravel is fine to medium angular of Sandstone. MADE GROUND
		2.00		N=8 (2,2/2,2,2,2)				
		3.00		N=7 (1,2/2,1,2,2)				
					3.60	237.40		Reddish brown very gravelly CLAY. Gravel is fine, angular of coal. MADE GROUND
		4.00		N=11 (3,4/3,2,3,3)	4.00	237.00		Yellowish brown clayey sandy GRAVEL. Gravel is fine to medium, angular of Sandstone. ROUGH ROCK
		5.00		N=11 (3,4/3,2,3,3)				

Continued on next sheet

Remarks
Target depth achieved, hole dry

Borehole Log

Borehole No. **WS07**
Sheet 2 of 2

Project Name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415857.00 - 407189.00	Hole Type WS
Location:	Holmfirth		Level: 241.00	Scale 1:25
Client:	EcoHolmes Community Land Trust		Dates: 16/02/2022 - 16/02/2022	Logged By SP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					5.50	235.50		Strong yellowish brown sandstone. ROUGH ROCK
					5.60	235.40		End of borehole at 5.60 m

Remarks
Target depth achieved, hole dry

Trial Pit Log

Trialpit No **HP1**

Sheet 1 of 1

Project Name: Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415889.00 - 407150.00 Level: 237.00	Date 16/02/2022
Location: Holmfirth		Dimensions (m): 0.6 × 0.4, Depth 0.60	Scale 1:20
Client: EcoHolmes Community Land Trust			Logged SP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40	236.60		Brown loamy sandy TOPSOIL with rootlets. TOPSOIL
				0.60	236.40		Yellowish brown very sandy very clayey GRAVEL. Gravel is fine to course, angular of Sandstone. ROUGH ROCK End of pit at 0.60 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **HP2**

Sheet 1 of 1

Project Name: Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415878.00 - 407164.00 Level: 239.00	Date 16/02/2022
Location: Holmfirth		Dimensions (m): 0.6 × 0.4, Depth 0.60	Scale 1:20
Client: EcoHolmes Community Land Trust			Logged SP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.40	ES		0.60	238.40		Brown to black sandy slightly clayey GRAVEL. Gravel is fine to medium, angular of coal, glass, tarmac, ceramic pottery, and brick. MADE GROUND End of pit at 0.60 m

1
2
3
4

Remarks:

Stability:

Trial Pit Log

Trialpit No **HP3**

Sheet 1 of 1

Project Name: Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415888.00 - 407138.00 Level: 236.00	Date 16/02/2022
Location: Holmfirth		Dimensions (m): 0.6 × 0.4, Depth 0.70	Scale 1:20
Client: EcoHolmes Community Land Trust			Logged SP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.00			Brown loamy sandy TOPSOIL with rootlets. TOPSOIL
	0.50	ES		0.40	235.60		Yellowish brown very sandy very clayey GRAVEL. Gravel is fine to course, angular of Sandstone. ROUGH ROCK
				0.70	235.30		End of pit at 0.70 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **HP4**

Sheet 1 of 1

Project Name: Land adj 67, Chapel Gate, Scholes, Holmfirth	Project No. B24367	Co-ords: 415848.00 - 407147.00 Level: 239.00	Date 16/02/2022
Location: Holmfirth		Dimensions (m): 0.6 x 0.4 Depth 0.50	Scale 1:20
Client: EcoHolmes Community Land Trust			Logged SP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.50	ES		0.50	238.50		Brown to black slightly clayey GRAVEL. Gravel is fine to medium, angular of coal, glass, tarmac, ceramic pottery, and brick. MADE GROUND End of pit at 0.50 m

1
2
3
4

Remarks:

Stability:

Appendix G MONITORING RESULTS

GAS MONITORING DATA

Site:	**Land adj 67, Chapel Gate, Scholes, Holmfirth**		**MET Office Pressure 1014**
Project:	**B24367**	**Date:**	**03/03/2022**

Operator:	**SP**
Weather:	Drizzle/Mist

JNP GROUP
CONSULTING ENGINEERS

Monitoring Location	Standpipe diameter (mm)	Standpipe Depth (m bgl)	Water Level (m bgl)	Atmos. Pressure (mb)	Initial Flow Rate (litres/hr)	Average Flow Rate (litres/hr)	Temp (°C)	Reading Duration (s)	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Notes
WS02	55	2.05	1.41	993	0.02	0.0	6	15	0.0	0.4	-0.3	
								30	0.0	0.4	-0.3	
								60	0.0	0.4	-0.3	
								90	0.0	0.4	-0.3	
								120	0.0	0.4	-0.3	
								180	0.0	0.5	-0.3	
								240	0.0	0.4	-0.3	
								300	0.0	0.4	-0.3	
WS04	55	1.94	DRY	991	0.2	0.0	6	15	0.0	0.6	-0.3	
								30	0.0	0.6	-0.3	
								60	0.0	0.6	-0.3	
								30	0.0	0.6	-0.3	
								120	0.0	0.7	-0.3	
								180	0.0	0.7	-0.3	
								240	0.0	0.7	-0.3	
								300	0.0	0.8	-0.3	
WS06	55	4.05	3.74	990	0.13	0.0	6	15	0.0	0.9	-0.3	
								30	0.0	1.0	-0.3	
								60	0.0	1.0	-0.3	
								90	0.0	1.0	-0.3	
								120	0.0	1.0	-0.3	
								180	0.0	0.9	-0.3	
								240	0.0	1.0	-0.3	
								300	0.0	1.0	-0.3	
Air Readings	N/A	N/A	N/A	992	0.0	0.0	6	15	0.0	0.0	-0.3	
								30				
								60				
								90				
								120				
								180				
								240				
								300				
								15				
								30				
								60				
								90				
								120				
								180				
								240				
								300				
								15				
								30				
								60				
								90				
								120				
								180				
								240				
								300				
								12				
								30				
								60				
								90				
								120				
								180				
								240				
								300				

Appendix H GEOTECHNICAL RESULTS

Samuel Pyott
JNP Midlands LLP
No.1 Meadowhall
Riverside
Sheffield

e: Samuel.Pyott@jnpgroup.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 22-40413

Project / Site name:	B24367 Land adj 67 Chapel Gate Scholes Holmfirth	**Samples received on:**	17/02/2022
Your job number:	B24367	**Samples instructed on/ Analysis started on:**	17/02/2022
Your order number:	G1442	**Analysis completed by:**	28/02/2022
Report Issue Number:	1	**Report issued on:**	28/02/2022
Samples Analysed:	4 soil samples		

Signed:

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-40413
Project / Site name: B24367 Land adj 67 Chapel Gate Scholes Holmfirth
Your Order No: G1442

Lab Sample Number				2176665	2176666	2176667	2176668
Sample Reference				WS1	WS2	WS2	WS6
Sample Number				2	3	4	9
Depth (m)				1.00	1.00	1.90	0.80
Date Sampled				16/02/2022	16/02/2022	16/02/2022	16/02/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	31	26
Moisture Content	%	0.01	NONE	15	7.3	11	14
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	7.8	8.7	7.2	7.1
Total Sulphate as SO4	%	0.005	MCERTS	0.016	0.071	0.012	0.061
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.022	0.054	0.018	0.015
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	21.6	53.6	18.2	14.9
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	2.0	2.5	3.0	2.2
Total Sulphur	%	0.005	MCERTS	0.017	0.421	0.011	0.046
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0	< 2.0
Heavy Metals / Metalloids							
Magnesium (water soluble)	mg/kg	5	NONE	< 5.0	< 5.0	< 5.0	5.8
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5	< 2.5	< 2.5	2.9

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-40413
Project / Site name: B24367 Land adj 67 Chapel Gate Scholes Holmfirth

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2176665	WS1	2	1	Brown sandy clay with gravel.
2176666	WS2	3	1	Brown sandy gravel with vegetation.**
2176667	WS2	4	1.9	Brown sandy gravel with stones.**
2176668	WS6	9	0.8	Brown sandy gravel with stones.**

** Non MCERTS matrix

Analytical Report Number : 22-40413
Project / Site name: B24367 Land adj 67 Chapel Gate Scholes Holmfirth

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

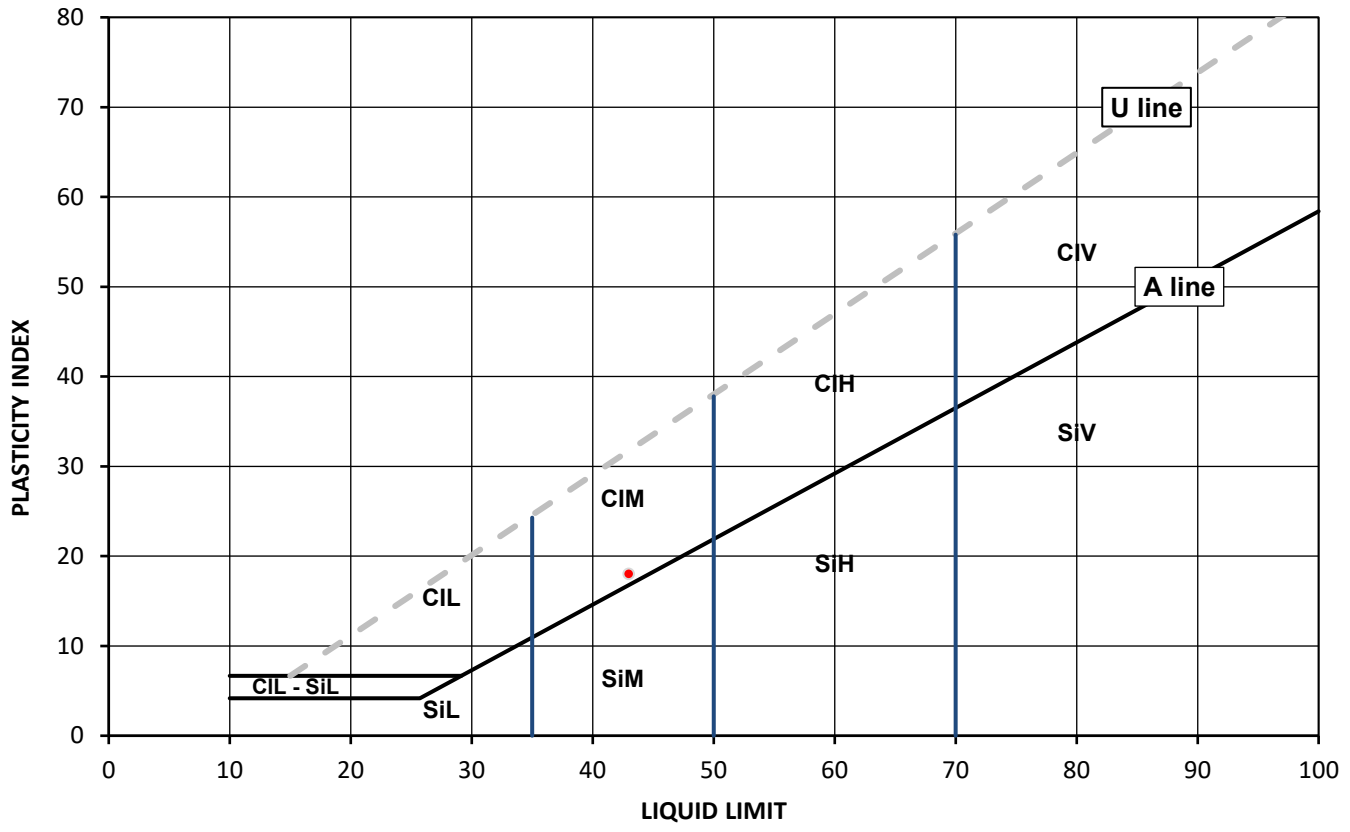
Client:	JNP Midlands LLP	Client Reference:	B24367
Client Address:	No.1 Meadowhall, Riverside, Sheffield	Job Number:	22-40410
		Date Sampled:	16/02/2022
		Date Received:	17/02/2022
Contact:	Samuel Pyott	Date Tested:	04/03/2022
Site Address:	B24367 Land adj 67 Chapel Gate Scholes Holmfirth	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2176659	Depth Top [m]:	1.50
Hole No.:	WS3	Depth Base [m]:	Not Given
Sample Reference:	6	Sample Type:	D
Sample Description:	Brown slightly sandy very gravelly CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
12	43	25	18	28



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Anna Dudzinska
Deputy Head of Geo Office Section
for and on behalf of i2 Analytical Ltd

Date Reported: 08/03/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

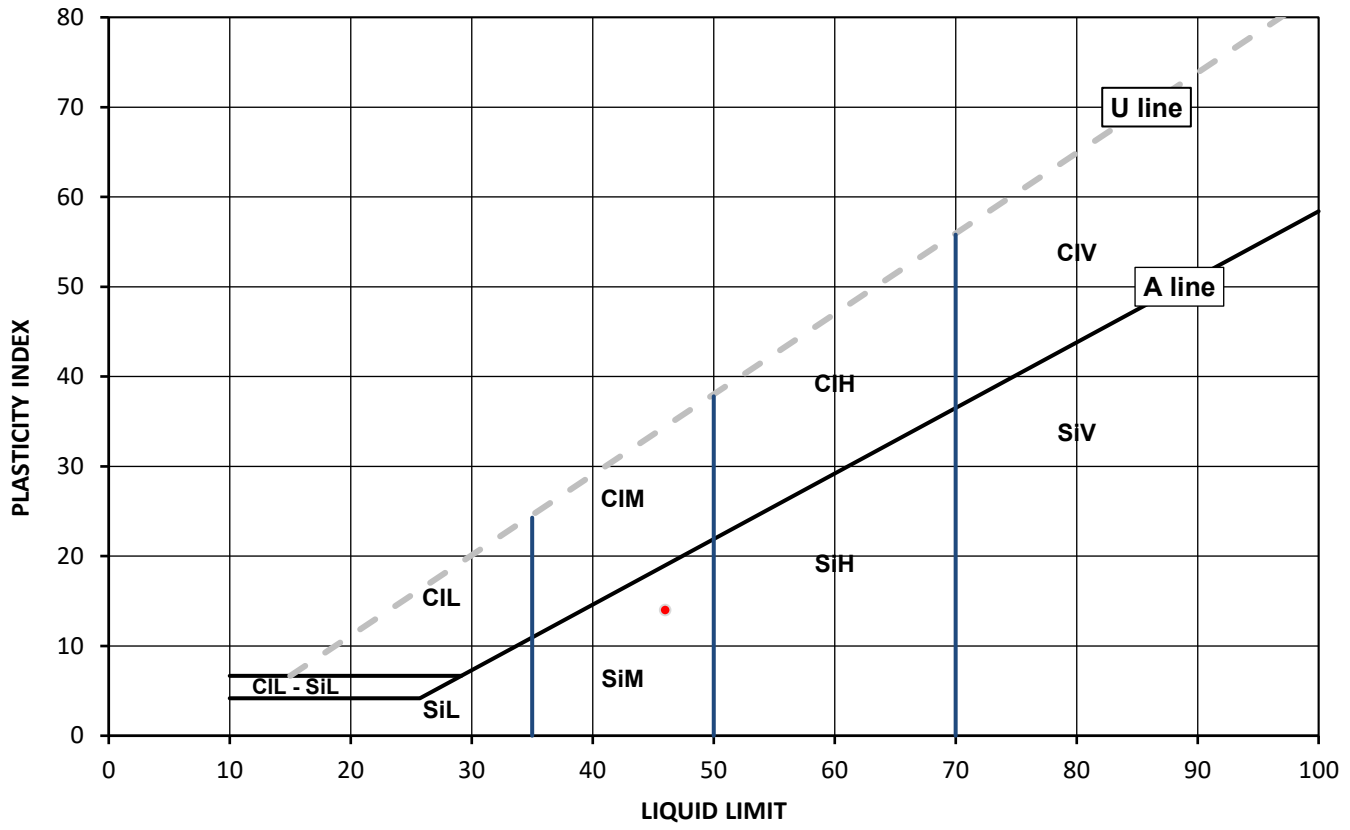
Client:	JNP Midlands LLP	Client Reference:	B24367
Client Address:	No.1 Meadowhall, Riverside, Sheffield	Job Number:	22-40410
		Date Sampled:	16/02/2022
		Date Received:	17/02/2022
Contact:	Samuel Pyott	Date Tested:	04/03/2022
Site Address:	B24367 Land adj 67 Chapel Gate Scholes Holmfirth	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2176660	Depth Top [m]:	0.60
Hole No.:	WS4	Depth Base [m]:	Not Given
Sample Reference:	7	Sample Type:	D
Sample Description:	Brown slightly sandy very gravelly CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	46	32	14	35



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Anna Dudzinska
Deputy Head of Geo Office Section
for and on behalf of i2 Analytical Ltd

Date Reported: 08/03/2022

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

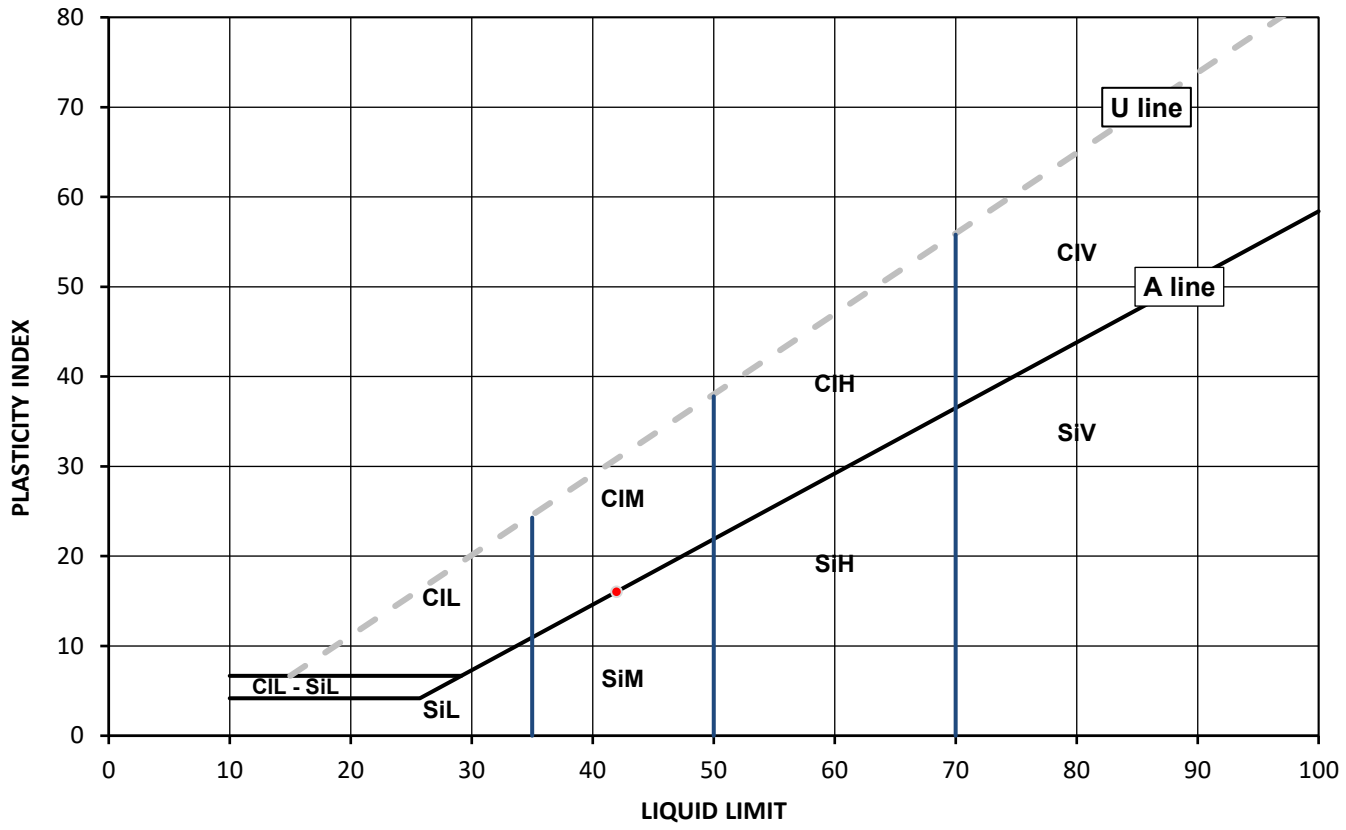
Client:	JNP Midlands LLP	Client Reference:	B24367
Client Address:	No.1 Meadowhall, Riverside, Sheffield	Job Number:	22-40410
		Date Sampled:	16/02/2022
		Date Received:	17/02/2022
Contact:	Samuel Pyott	Date Tested:	04/03/2022
Site Address:	B24367 Land adj 67 Chapel Gate Scholes Holmfirth	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2176661	Depth Top [m]:	0.80
Hole No.:	WS5	Depth Base [m]:	Not Given
Sample Reference:	8	Sample Type:	D
Sample Description:	Dark brown slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
32	42	26	16	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Anna Dudzinska
Deputy Head of Geo Office Section
for and on behalf of i2 Analytical Ltd

Date Reported: 08/03/2022

GF 236.12

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: JNP Midlands LLP

Client Address: No.1 Meadowhall, Riverside, Sheffield

Contact: Samuel Pyott

Site Address: B24367 Land adj 67 Chapel Gate Scholes Holmfirth

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: B24367
Job Number: 22-40410
Date Sampled: 16/02/2022
Date Received: 17/02/2022
Date Tested: 04/03/2022
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-1 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2176659	WS3	6	1.50	Not Given	D	Brown slightly sandy very gravelly CLAY	Atterberg 4 Point	12		28	43	25	18						
2176660	WS4	7	0.60	Not Given	D	Brown slightly sandy very gravelly CLAY	Atterberg 4 Point	16		35	46	32	14						
2176661	WS5	8	0.80	Not Given	D	Dark brown slightly sandy CLAY	Atterberg 4 Point	32		100	42	26	16						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Anna Dudzinska
Deputy Head of Geo Office Section
for and on behalf of i2 Analytical Ltd

Date Reported: 08/03/2022

GF 234.14

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: JNP Midlands LLP

Client Address: No.1 Meadowhall, Riverside, Sheffield

Contact: Samuel Pyott

Site Address: B24367 Land adj 67 Chapel Gate Scholes Holmfirth

Client Reference: B24367
Job Number: 22-40410
Date Sampled: 16/02/2022
Date Received: 17/02/2022
Date Tested: 04/03/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2176659	WS3	6	1.50	Not Given	D	Brown slightly sandy very gravelly CLAY		12	Sample was quartered, oven dried at 109 °C			
2176660	WS4	7	0.60	Not Given	D	Brown slightly sandy very gravelly CLAY		16	Sample was quartered, oven dried at 109 °C			
2176661	WS5	8	0.80	Not Given	D	Dark brown slightly sandy CLAY		32	Sample was quartered, oven dried at 109 °C			

Comments:

Signed:

Anna Dudzinska
Deputy Head of Geo Office Section
for and on behalf of i2 Analytical Ltd

Date Reported: 08/03/2022

GF 099.16

Appendix I CHEMICAL TEST RESULTS

Samuel Pyott
JNP Midlands LLP
No.1 Meadowhall
Riverside
Sheffield

e: Samuel.Pyott@jnpgroup.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 22-40619

Project / Site name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	**Samples received on:**	17/02/2022
Your job number:	B24367	**Samples instructed on/ Analysis started on:**	17/02/2022
Your order number:	G1441	**Analysis completed by:**	28/02/2022
Report Issue Number:	1	**Report issued on:**	28/02/2022
Samples Analysed:	13 soil samples		

Izabela Wójcik

Signed:

Izabela Wójcik
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth
Your Order No: G1441

Lab Sample Number				2177974	2177975	2177976	2177977	2177978
Sample Reference				WS1 ES1 MG	WS1 ES2 MG	WS1 ES3 N	WS2 ES4 MG	WS2 ES5 MG
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.05	0.50	0.80	0.20	1.60
Date Sampled				16/02/2022	16/02/2022	16/02/2022	16/02/2022	16/02/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	17	13	8.8	18
Total mass of sample received	kg	0.001	NONE	0.30	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	-	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	ASE	ASE		ASE	ASE
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.8	-	6.6	-	8.3
Organic Matter (automated)	%	0.1	MCERTS	-	4.1	1.3	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.99	-	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	0.31	-
Acenaphthene	mg/kg	0.05	MCERTS	15	-	< 0.05	0.21	-
Fluorene	mg/kg	0.05	MCERTS	8.5	-	< 0.05	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	95	-	< 0.05	1.4	-
Anthracene	mg/kg	0.05	MCERTS	25	-	< 0.05	0.50	-
Fluoranthene	mg/kg	0.05	MCERTS	160	-	< 0.05	3.5	-
Pyrene	mg/kg	0.05	MCERTS	140	-	< 0.05	3.3	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	90	-	< 0.05	1.9	-
Chrysene	mg/kg	0.05	MCERTS	75	-	< 0.05	1.6	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	87	-	< 0.05	2.6	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	35	-	< 0.05	0.94	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	79	-	< 0.05	2.7	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	31	-	< 0.05	1.6	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	10	-	< 0.05	0.44	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	33	-	< 0.05	1.8	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	878	-	< 0.80	22.7	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	-	2.2	-	14
Barium (aqua regia extractable)	mg/kg	1	MCERTS	470	-	16	-	220
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	4.4	-	0.29	-	0.96
Boron (water soluble)	mg/kg	0.2	MCERTS	1.4	-	0.3	-	1.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	-	< 0.2	-	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	340	-	7.7	-	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110	-	4.6	-	48
Lead (aqua regia extractable)	mg/kg	1	MCERTS	190	-	15	-	1400
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	-	5.9	-	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	-	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	94	-	8.4	-	24
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	900	-	32	-	120

Analytical Report Number: 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth
Your Order No: G1441

Lab Sample Number				2177974	2177975	2177976	2177977	2177978
Sample Reference				WS1 ES1 MG	WS1 ES2 MG	WS1 ES3 N	WS2 ES4 MG	WS2 ES5 MG
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.05	0.50	0.80	0.20	1.60
Date Sampled				16/02/2022	16/02/2022	16/02/2022	16/02/2022	16/02/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
o-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	7.8	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	19	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	81	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	200	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	MCERTS	300	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	220	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	980	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	1600	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	MCERTS	2800	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth
Your Order No: G1441

Lab Sample Number				2177979	2177980	2177981	2177982	2177983
Sample Reference				WS3 ES6 MG	WS3 ES7 N	WS4 ES8 MG T	WS5 ES10 MG T	WS5 ES11 MG
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.30	0.05	0.20	0.60
Date Sampled				16/02/2022	16/02/2022	16/02/2022	16/02/2022	16/02/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	33	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	5.5	9.9	35	34	22
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	ASE				ASE
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	11.0	7.9	7.2	-	5.9
Organic Matter (automated)	%	0.1	MCERTS	-	-	11	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.43	< 0.05	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	0.79	< 0.05	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	0.52	< 0.05	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	0.49	< 0.05	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	4.0	< 0.05	1.2	-	-
Anthracene	mg/kg	0.05	MCERTS	1.7	< 0.05	0.29	-	-
Fluoranthene	mg/kg	0.05	MCERTS	8.9	< 0.05	4.5	-	-
Pyrene	mg/kg	0.05	MCERTS	9.1	< 0.05	4.4	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4.9	< 0.05	2.3	-	-
Chrysene	mg/kg	0.05	MCERTS	3.9	< 0.05	2.0	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	5.9	< 0.05	2.5	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.4	< 0.05	1.8	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	7.2	< 0.05	2.8	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3.1	< 0.05	1.4	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	1.0	< 0.05	0.36	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.9	< 0.05	1.5	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	59.2	< 0.80	24.7	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.7	3.4	10	-	14
Barium (aqua regia extractable)	mg/kg	1	MCERTS	170	20	48	-	43
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.81	0.39	0.41	-	0.88
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.2	2.2	-	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	< 0.2	-	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	670	9.3	28	-	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	7.2	21	-	48
Lead (aqua regia extractable)	mg/kg	1	MCERTS	45	31	92	-	86
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	8.1	5.3	-	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	120	11	13	-	29
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	47	36	32	-	73

Analytical Report Number: 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth
Your Order No: G1441

Lab Sample Number				2177979	2177980	2177981	2177982	2177983
Sample Reference				WS3 ES6 MG	WS3 ES7 N	WS4 ES8 MG T	WS5 ES10 MG T	WS5 ES11 MG
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.30	0.05	0.20	0.60
Date Sampled				16/02/2022	16/02/2022	16/02/2022	16/02/2022	16/02/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth
Your Order No: G1441

Lab Sample Number				2177984	2177985	2177986
Sample Reference				WS6 ES12 MG T	WS6 ES13 MG	WS6 ES15 MG
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.10	1.00	3.70
Date Sampled				16/02/2022	16/02/2022	16/02/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	-	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	-	15	28
Total mass of sample received	kg	0.001	NONE	-	0.30	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	ASE	ASE	
General Inorganics						
pH - Automated	pH Units	N/A	MCERTS	-	7.8	-
Organic Matter (automated)	%	0.1	MCERTS	-	-	-
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	-	0.24	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	0.73	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	0.23	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	0.62	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	7.0	0.51
Anthracene	mg/kg	0.05	MCERTS	-	1.4	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	11	0.86
Pyrene	mg/kg	0.05	MCERTS	-	9.1	0.77
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	5.0	0.46
Chrysene	mg/kg	0.05	MCERTS	-	4.5	0.50
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	4.1	0.42
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	3.0	0.20
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	4.2	0.39
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	1.8	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	0.61	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	1.9	< 0.05
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	55.6	4.11
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	19	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	98	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	1.3	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.4	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	24	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	44	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	180	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	24	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	36	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	91	-

Analytical Report Number: 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth
Your Order No: G1441

Lab Sample Number				2177984	2177985	2177986
Sample Reference				WS6 ES12 MG T	WS6 ES13 MG	WS6 ES15 MG
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.10	1.00	3.70
Date Sampled				16/02/2022	16/02/2022	16/02/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Monoaromatics & Oxygenates						
Benzene	µg/kg	1	MCERTS	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-
Petroleum Hydrocarbons						
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	-	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	-	4.0	-
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	26	-
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	MCERTS	-	33	-
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	MCERTS	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	-	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	-	5.8	-
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	32	-
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	49	-
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	MCERTS	-	86	-

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2177974	WS1 ES1 MG	None Supplied	0.05	Brown gravelly loam with vegetation.
2177975	WS1 ES2 MG	None Supplied	0.5	Brown loam and sand with gravel and vegetation.
2177976	WS1 ES3 N	None Supplied	0.8	Brown sand with gravel.
2177977	WS2 ES4 MG	None Supplied	0.2	Brown loam and gravel with vegetation.
2177978	WS2 ES5 MG	None Supplied	1.6	Brown loam and gravel with brick.
2177979	WS3 ES6 MG	None Supplied	0.4	Brown loam with gravel.
2177980	WS3 ES7 N	None Supplied	1.3	Brown sand with stones.
2177981	WS4 ES8 MG T	None Supplied	0.05	Brown loam with gravel and vegetation.
2177982	WS5 ES10 MG T	None Supplied	0.2	Brown loam and clay with gravel and vegetation.
2177983	WS5 ES11 MG	None Supplied	0.6	Brown loam and clay with gravel and vegetation.
2177985	WS6 ES13 MG	None Supplied	1	Brown loam and clay with gravel.
2177986	WS6 ES15 MG	None Supplied	3.7	Brown loam and clay with gravel.

Analytical Report Number : 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics

Analytical Report Number : 22-40619
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
AR	Aromatics				
#1	EH_2D_Total but with humics mathematically subtracted				
#2	EH_2D_Total but with fatty acids mathematically subtracted				
_	Operator - understore to separate acronyms (exception for +)				
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total				

Samuel Pyott
JNP Midlands LLP
No.1 Meadowhall
Riverside
Sheffield

e: Samuel.Pyott@jnpgroup.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 22-40777

Project / Site name:	Land adj 67, Chapel Gate, Scholes, Holmfirth	**Samples received on:**	17/02/2022
Your job number:	B24367	**Samples instructed on/ Analysis started on:**	21/02/2022
Your order number:	G1441	**Analysis completed by:**	03/03/2022
Report Issue Number:	1	**Report issued on:**	03/03/2022
Samples Analysed:	3 wac multi samples		

Signed:

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**22-40777**						
					Client: JNP GROUP		
Location	**Land adj 67, Chapel Gate, Scholes, Holmfirth**						
Lab Reference (Sample Number)	2179097				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	16/02/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP2 WAC1						
Depth (m)	0.40						
Solid Waste Analysis							
TOC (%)**	2.9				3%	5%	6%
Loss on Ignition (%) **	6.9				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) $_{EH\_1D\_CU\_AL}$ #	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	266				100	--	--
pH (units)**	7.7				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	3.6				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.027	0.015		0.16	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0040	0.0037		0.038	0.5	10	70
Copper *	0.013	0.020		0.19	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.016	0.0052		0.062	0.5	10	30
Nickel *	0.0048	0.0035		0.036	0.4	10	40
Lead *	0.016	0.018		0.17	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.0095	0.0111		0.11	4	50	200
Chloride *	< 4.0	< 4.0		< 15	800	15000	25000
Fluoride	1.4	0.58		6.5	10	150	500
Sulphate *	6.5	1.9		23	1000	20000	50000
TDS*	140	52		600	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	10	10		100	500	800	1000
Leach Test Information							
Stone Content (%)	18						
Sample Mass (kg)	1.3						
Dry Matter (%)	83						
Moisture (%)	17						
Stage 1							
Volume Eluate L2 (litres)	0.30						
Filtered Eluate VE1 (litres)	0.16						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**22-40777**						
					Client: JNP GROUP		
Location	**Land adj 67, Chapel Gate, Scholes, Holmfirth**						
Lab Reference (Sample Number)	2179098				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	16/02/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP3 WAC2						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.1				3%	5%	6%
Loss on Ignition (%) **	3.2				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) $_{EH\_1D\_CU\_AL}$ #	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	5.6				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	-7.7				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.012	< 0.0050		0.032	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0017	0.0011		0.011	0.5	10	70
Copper *	0.014	0.017		0.17	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0045	0.0027		0.029	0.4	10	40
Lead *	0.0097	< 0.0050		0.034	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.019	0.0071		0.084	4	50	200
Chloride *	< 4.0	< 4.0		< 15	800	15000	25000
Fluoride	< 0.050	< 0.050		0.37	10	150	500
Sulphate *	4.3	1.5		18	1000	20000	50000
TDS*	100	8.8		190	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	15	11		110	500	800	1000
Leach Test Information							
Stone Content (%)	12						
Sample Mass (kg)	1.3						
Dry Matter (%)	88						
Moisture (%)	12						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.20						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**22-40777**						
					Client: JNP GROUP		
Location	**Land adj 67, Chapel Gate, Scholes, Holmfirth**						
Lab Reference (Sample Number)	2179099				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	16/02/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	HP4 WAC3						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.6				3%	5%	6%
Loss on Ignition (%) **	4.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) $_{EH\_1D\_CU\_AL}$ #	51				500	--	--
Total PAH (WAC-17) (mg/kg)	20.1				100	--	--
pH (units)**	8.2				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	5.2				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.064	0.039		0.42	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0091	0.0063		0.067	0.5	10	70
Copper *	0.015	0.018		0.18	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.0064	0.0035		0.038	0.5	10	30
Nickel *	0.0052	0.0041		0.043	0.4	10	40
Lead *	0.013	0.013		0.13	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.013	0.0161		0.16	4	50	200
Chloride *	< 4.0	< 4.0		< 15	800	15000	25000
Fluoride	0.34	0.18		1.9	10	150	500
Sulphate *	11	4.2		50	1000	20000	50000
TDS*	18	61		560	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	7.9	9.9		97	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.3						
Dry Matter (%)	87						
Moisture (%)	13						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.20						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 22-40777
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2179097	HP2 WAC1	None Supplied	0.4	Brown loam and clay with vegetation and stones.
2179098	HP3 WAC2	None Supplied	0.5	Brown loam and sand with vegetation and stones.
2179099	HP4 WAC3	None Supplied	0.5	Brown loam and sand with gravel and vegetation.

Analytical Report Number : 22-40777
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Preparation WAC leachate		In-house method	L043-PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	ISO 17025
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L031-PL	W	NONE
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil in Soil C10 - C40	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L076-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS

Analytical Report Number : 22-40777
Project / Site name: Land adj 67, Chapel Gate, Scholes, Holmfirth

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

JNP GROUP

CONSULTING ENGINEERS

Brighouse
Woodvale House
Woodvale Road
Brighouse
West Yorkshire
HD6 4AB

telephone
01484 400691

email
brighouse@jnpgroup.co.uk

Chesham (HQ)
Link House
St Mary's Way
Chesham
Buckinghamshire
HP5 1HR

telephone
01494 771221

email
chesham@jnpgroup.co.uk

Glasgow
Orient Building
16 McPhater Street
Glasgow
G4 0HW

telephone
0141 378 0808

email
glasgow@jnpgroup.co.uk

Hartlepool
The Innovation Centre
Venture Court
Queens Meadow Business Park
Hartlepool
TS25 5TG

telephone
01429 239539

email
hartlepool@jnpgroup.co.uk

Leamington Spa
Marlborough House
48 Holly Walk
Leamington Spa
Warwickshire
CV32 4XP

telephone
01926 889955

email
leamingtonspa@jnpgroup.co.uk

Sheffield
MBP2 Meadowhall Business Park
Carbrook Hall Road
Sheffield
South Yorkshire
S9 2EQ

telephone
0114 244 3500

email
sheffield@jnpgroup.co.uk