

**Phase 1 Geoenvironmental Risk Assessment and
Phase 2 Ground Investigation**

**DUNFORD ROAD
HADE EDGE, HOLMFIRTH**

for

Jones Homes (Yorkshire) Limited

Report Number 3624

May 2016

Michael D Joyce Associates LLP
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DUNFORD ROAD, HADE EDGE, HOLMFIRTH

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1 INTRODUCTION

- 1.1 At the request of Jones Homes (Yorkshire) Limited, a Phase I Geoenvironmental and Geotechnical Assessment (Desk Study) and a Phase II Intrusive Investigation have been carried out at Dunford Road in Hade Edge. It is proposed to develop the site with residential properties.
- 1.2 The purpose of the desk study was to review and assess published information on the site including geological, mining and hydrogeological data. It was also to review the past history of the site and its environmental setting.
- 1.3 The intrusive investigation has comprised trial pitting and window sampling with associated in-situ and laboratory testing. Recommendations are made for the safe and economic development of the site.
- 1.4 The study has not included checks on services on or adjacent to the site, and no structural or asbestos surveys have been carried out.

2 THE SITE

- 2.1 The site covers an area of approximately 2.9 hectares and is located to the east side of Dunford Road, approximately 3 km south of the centre of Holmfirth. The Ordnance Survey National Grid Reference is 414690, 405360 and it lies at approximately 330 m AOD. Figure 1 shows the general site location, whilst figure 2 shows the site in more detail. It consists of a grassland/pasture, which is enclosed by dry stone walling.

3 SITE HISTORY

- 3.1 The following archival Ordnance Survey maps have been examined to trace the past development of the site. These are reproduced in Appendix 5 with the current site boundary superimposed on them. The apparent displacement on the older maps is due to a change in Ordnance Survey co-ordinates.

Scale and Year of Publication			
6" to 1 mile	1854	1:2500	1892
	1888		1906
	1906		1962
	1919		1975
	1933		1995
	1948		
	1955		
	1970		
1:10,000	1980	1:1250	
	2002		
	2010		
	2014		

- 3.2 The maps show that the site has always been undeveloped agricultural land to the east side of Dunford Road.
- 3.3 Between 1888 and 1948 a 'spring' is shown midway along the western boundary of the site, whilst the map of 1854 shows a 'pump' just beyond the western boundary.

- 3.4 There are a number of quarries shown in the area, particularly just to the west. However there is no evidence of recorded quarrying on the site itself, although small unrecorded quarries cannot be entirely precluded.
- 3.5 Due to time and cost constraints, it has not been possible to consult with local history journals and newspapers. This can be carried out if requested at additional cost, but is unlikely to provide any significant additional information.
- 3.6 It is not believed that the study site is of archaeological interest but it would be prudent to make enquiries with West Yorkshire Archaeology Service (tel: 01924 306797).

4 GEOLOGY AND MINING

4.1 Geology

4.1.1 Maps of the British Geological Survey (BGS), in particular 1:50,000 scale sheet 86 show the site to be underlain by Rough Rock, a prominent medium and coarse grained sandstone of the Carboniferous Millstone Grit Series.

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

4.2 Mining

4.2.1 A mining report has been obtained from the Coal Authority, and is reproduced in full in Appendix 6. It states that there has been no recorded mining beneath the site.

4.2.2 The report makes no mention of shallow workings being present or that shallow unrecorded workings might be present. The Coal Authority holds no record of any notice or subsidence claim having been made.

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

4.3 GroundSure Geo-Insight

4.3.1 A GroundSure Geo-Insight Report has been obtained for the site and is reproduced in Appendix 5. The report is based on the British Geological Survey (BGS) geological maps, GroundSure data and miscellaneous other geological sources.

4.3.2 None of the following are recorded beneath the site.

Geology
Artificial Ground / Made Ground present beneath the site Records relating to permeability of artificial ground within the site Superficial Ground / Drift Geology present beneath the site Records relating to permeability of superficial geology within the site boundary Records of Landslip within 500m of site boundary Records relating to permeability of Landslips within the site boundary Bedrock and Solid Geology beneath the site Records relating to permeability of bedrock within the site boundary Faults within 500m of the site boundary

Ground Workings
Historical Surface Ground Working Features from Small Scale Mapping Historical Underground Working Features from Small Scale Mapping Current Ground Workings

Mining, Extraction and Natural Cavities
Historical Mining Coal Mining Johnson Poole and Bloomer Mining Area Non-Coal Mining Non-Coal Mining Cavities Natural Cavities Brine Extraction Gypsum Extraction Tin Mining Clay Mining

Railways and Tunnels
Tunnels Historical Railway and Tunnel Features Historical Railways Active Railways Railway Projects

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

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

- 4.3.3 A number of boreholes have been sunk in the vicinity of the site and their records could probably be obtained if necessary. However soil variability in the area would render them of limited use. In terms of determining the actual ground conditions on the site there would be no substitute for the intrusive ground investigation.

5 HYDROGEOLOGY AND FLOODING

Hydrogeology

- 5.1 Since April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive.
- 5.2 The aquifer within the bedrock deposits is designated as Secondary A. This is described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
- 5.3 Details provided by the Environment Agency in the GroundSure Enviro-Insight report, indicate there to be no licensed surface water or groundwater abstraction points within at least 400m of the site.

Flooding

- 5.4 There are no open watercourses in the immediate vicinity of the site, and according to data supplied by the Environment Agency in the GroundSure Enviro-Insight report, the site is not at risk from flooding.
- 5.5 The Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) database provides an indication of river and coastal flood risk at a national level on a 50m grid as used by many of the insurance companies. RoFRaS data is based on a 50m grid system, with the flood rating at the centre of the grid calculated and given below. The

data considers the probability that the flood defences will overtop or breach, and the distance from the river or the sea.

- 5.6 RoFRaS data for the study site indicates the property, or an area within 25m, to have a Very Low (less than 1 in 1000) chance of flooding in any given year.

6 GROUNDSURE ENVIRO-INSIGHT REPORT

- 6.1 A GroundSure Enviro-Insight Report has also been commissioned for this site. None of the following features are recorded within 250m of the site. Full details are given in Appendix 4.

Environmental Permits, Incidents and Registers
Historic IPC Authorisations Part A(1) and IPPC Authorised Activities Red List Discharge Consents List 1 Dangerous Substances Inventory sites List 2 Dangerous Substances Inventory sites Part A(2) and Part B Activities and Enforcements Category 3 or 4 Radioactive Substances Authorisations Licensed Discharge Consents Water Industry Referrals Planning Hazardous Substance Consents and Enforcements (within 500m) COMAH and NIHHS sites Environment Agency Recorded Pollution Incidents Sites Determined as Contaminated Land under Part 2A EPA 1990

Landfill and Other Waste Sites
Environment Agency Registered Landfill Sites Environment Agency Historic Landfill Sites BGS/DoE Landfill Site Survey Landfills in Local Authority and Historical Mapping Records Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites Environment Agency Licensed Waste Sites

Current Land Uses
Records of Petrol and Fuel Sites National Grid Underground Electricity Cables National Grid Gas Transmission Pipelines

Hydrogeology and Hydrology
Groundwater Abstraction Licences Surface Water Abstraction Licences Potable Water Abstraction Licences Source Protection Zones Source Protection Zones within Confined Aquifer Environment Agency information on river quality Groundwater Vulnerability and Soil Leaching Potential Environment Agency information on River quality River Network entries Surface Water Features

Flooding
Environment Agency Zone 2 floodplains Environment Agency Zone 3 floodplains Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Defences Areas benefiting from Flood Defences Areas used for Flood Storage BGS Groundwater Flooding susceptibility (within 50m) BGS confidence rating for the Groundwater Flooding susceptibility areas

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

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

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

7 CONTAMINATED LAND

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

8 RADON

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

9 THE INVESTIGATION

- 9.1 The investigation was designed to provide preliminary information on ground and groundwater conditions on the site, together with identifying potential areas of contamination. The investigation was undertaken in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001 and under the full-time supervision of a Fellow of the Geological Society from Michael D Joyce Associates LLP.
- 9.2 The ground investigation was carried out on 25th and 26th April 2016 and comprised trial pitting and window sampling. The exploratory positions are shown on figure 3.
- 9.3 The trial pitting consisted of excavating a number of trial holes using a mechanical excavator. On completion, soakaway tests were carried out and the excavations were subsequently backfilled with the arisings.
- 9.4 The window sampling consisted of driving a series of 1m and 2m long tubes into the ground using a dropping weight. On completion of each run, the tube was withdrawn. The next tube was then inserted and the process repeated to provide a continuous profile of the ground. On each run the tube diameter was reduced in order to assist in its recovery.
- 9.5 It was also possible to carry out Standard Penetration Tests using the window sampling equipment, which has the same specification as a conventional cable percussive SPT. On completion the boreholes were backfilled with the arisings and any tarmacked areas reinstated accordingly.

10 STRATA PROFILE

- 10.1 The full exploratory borehole records are presented in Appendix 1. These give full strata descriptions based on visual examination and are in accordance with the requirements of BS EN ISO 14688-1:2002 "Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 1", BS EN ISO 14688-2:2004 "Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 2", and BS EN ISO 14689-1:2003 "Geotechnical Investigation and Testing - Identification and Classification of Rock - Part 1".
- 10.2 The trial pits and window sample boreholes encountered between 0.2m and 0.6m of topsoil overlying weathered sandstone bedrock.
- 10.3 The sandstone comprised orange or orange-brown slightly weathered coarse grained sandstone. In places the sandstone was more weathered and was encountered on a relatively thin layer of brown clayey gravelly sandstone.
- 10.4 The sandstone became more competent with depth, such that all of the window sample boreholes and trial pits terminated in sandstone bedrock at relatively shallow depth of between 0.15m and 1.50m depth.
- 10.5 All the window sample borehole and trial pits were dry on completion.
- 10.6 There was no unusual colouration or odours to any of the soils encountered during the investigation and no obvious visual evidence of contamination, such as asbestos, was found during the investigation. This does not mean that asbestos containing materials or asbestos fibres are not present.

- 10.7 It should be noted that lateral and vertical changes can occur between exploratory points and care is needed when extrapolation is used.

11 IN-SITU AND LABORATORY TESTING

11.1 In-Situ Gas Monitoring

- 11.1.1 Methane is the dominant constituent of landfill gas, and can form an explosive mixture in air at concentrations of between 5% and 15%. Thus 5% methane in air is known as the Lower Explosive Limit (LEL). Concentrations less than this do not normally ignite. Carbon dioxide can also be a potential problem, especially where it occurs in concentrations greater than 1.5%.
- 11.1.2 In-situ gas tests were carried out in the boreholes on completion and in probe holes made in the sides of the trial pits. Testing was with a portable meter, which measures the methane content as its percentage volume in air. The corresponding oxygen and carbon dioxide concentrations are also measured.
- 11.1.3 No methane, carbon monoxide or hydrogen sulphide gases were detected in any of the boreholes. Carbon dioxide ranged from zero to 0.2% by volume.
- 11.1.4 The risks associated with the gases have been considered in accordance with British Standard BS 8485:2007 "Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments", CIRIA report C665, "Assessing Risks Posed by Hazardous Ground Gases to Buildings" and NHBC Report No. 4 "Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present".

11.2 Soakaway Testing

- 11.2.1 Soakaway tests were carried out in trial pits TP1, TP3 and TP6 in accordance with BRE Digest 365: Soakaway Design. This involved filling the trial pit with water from a water bowser and recording the fall in water level over a period of time. From this it is possible to calculate the Soil Infiltration Rate (SIR) based on the trial pit dimensions and the rate of dissipation as follows.

Trial Pit No.	Soil Infiltration Rate (m/s)
TP1	1.39×10^{-4}
TP3	1.41×10^{-5}
TP6	1.93×10^{-5}

- 11.2.2 The three trial pits all emptied between 70 minutes and 240 minutes, indicating that soakaways should be suitable.

11.3 Geotechnical Laboratory Testing

The soil testing was carried out to BS1377:1990 Methods of Test for Soils for Civil Engineering Purposes. Testing was carried out by Envirolab of Cheshire of Cheshire to UKAS accredited procedures. The full results are presented in Appendix 3.

11.3.1 Sulphate and Acidity Tests

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

Trial pit / Borehole No.	Depth (m)	Water Soluble Sulphate Content (g/l)	pH
TP1	0.20	<0.01	6.4
TP4	0.40	<0.01	5.2
WS1	0.30	<0.01	5.0
WS2	0.10	<0.01	5.2
WS6	0.10	<0.01	4.5
WS7	0.30	<0.01	4.9
WS8	0.60	<0.01	5.2
WS9	0.30	<0.01	4.2

Contamination testing recorded negligible water soluble sulphate contents and moderately acidic pH values.

11.4 Contamination Testing

Rationale

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

- 11.4.2 The aim of this was to make a preliminary assessment of the level of any contamination on the site in order to determine if there was any significant risk associated with contaminants in respect of both human health and the environment, including controlled waters.
- 11.4.3 Standard Appendix B attached to this report discusses the methodology for the assessment of contamination and should be read in conjunction with the comments overleaf.
- 11.4.4 The Contaminated Land Report (CLR) series of documents have been produced by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency, to provide regulators with "relevant, appropriate, authoritative and scientifically based information and advice on the assessment of risk from contamination in soils".
- 11.4.5 The Environment Agency has issued a number of Soil Guideline Values (SGVs) which, whilst non-binding, may be used as guidance in the assessment of land and in setting remediation targets. They should only be applied to human health assessments.
- 11.4.6 The SGVs have been derived using the Contaminated Land Exposure Assessment Model (CLEA) and are based on assumptions relating to soil conditions, pollutant type and behaviour, land use patterns and the availability of receptors. SGVs are also subject to statistical assessment. The CLR documentation requires that the results of laboratory testing are subject to statistical analysis to remove uncertainty over a so-called 'averaging area'.

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

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

11.4.8 DEFRA previously issued “Outcome of the Way Forward Exercise on Soil Guideline Values”. This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

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

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

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

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

11.4.12 Since the regime was first introduced in 2000 there has been considerable uncertainty over how to decide when land is, and is not, contaminated land on grounds of the legal test of *significant possibility of significant harm to human health or the environment*.

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

- Category 1 describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.
- Categories 2 and 3 cover less straightforward land where more detailed consideration is needed before the regulator can decide either: (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or (b) that such a case does not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.
- Category 4 describes land that is clearly not contaminated land, as discussed below.

- 11.4.14 One of the main purposes of including the Categories in the Statutory Guidance is to provide a legal framework against which new technical tools can be developed by the land contamination sector to describe the Categories in more detail with regard to specific substances and/or situations.
- 11.4.15 The new Category 4 test is particularly important in terms of reducing uncertainty over when land is definitely not caught by the regime.
- 11.4.16 The new Statutory Guidance makes clear what land should be placed into Category 4, for example:
- (a) Land where no relevant contaminant linkage has been established.
 - (b) Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise. In other words land with normal background concentrations in the soil.
 - (c) Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.
 - (d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed to in the normal course of their lives).

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

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

3.28 *Local authorities may use GACs and other technical tools to inform certain decisions under the Part 2A regime, provided: (i) they understand how they were derived and how they can be used appropriately; (ii) they have been produced in an objective, scientifically robust and expert manner by reputable organisations; and (iii) they are only used in a manner that is in accordance with Part 2A and this Guidance.*

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

- (a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.
- (b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

- (c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.
 - (d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.
 - (e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.
- 11.4.18 The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.
- 11.4.19 The C4SLs are intended as “*relevant technical tools*” (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

11.4.20 The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

“The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land”.

11.4.21 A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

“SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health”.

11.4.22 C4SLs, therefore, should not be viewed as “SPOSH levels” and they should not be used as a legal trigger for the determination of land under Part 2A.

11.4.23 In 2014 CL:AIRE (Contaminated Land: Application in Real Environments) published “Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination”. In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	PoS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5.0	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

Results

11.4.24 The following range of results was obtained and the full results are presented in Appendix 3.

Soils

Analyte	Concentration Range (mg/kg)		SGV/C4SL Concentration for Residential Use (mg/kg)
Arsenic	2	16	32 (2) / 37 (3)
Cadmium	<0.5	0.7	10 (2) / 22 (3)
Chromium (vi)	<1	<1	21 (3)
Copper	4	25	2330 (1)
Mercury	<0.17	<0.17	170 (2)
Nickel	2	12	130 (2)
Selenium	<1	<1	350 (2)
Lead	10	67	200 (3)
Zinc	16	62	3750 (1)
Phenol	<0.2	<0.2	420 (2)
Benzo(a)pyrene	0.11	3.99	5.0 (3)
Dibenzo(a,h)anthracene	<0.04	0.55	0.9 (1)
Naphthalene	<0.03	0.04	8.7 (1)
Fluorene	<0.03	0.12	780 (1)
Asbestos	None	None	None

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

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

(3) C4SL published 2014.

11.4.25 All the results fell below their respective SGVs and C4SLs. Six samples were also tested for asbestos, although none were found.

12 GEOENVIRONMENTAL RISK ASSESSMENT

Conceptual Site Model

- 12.1 A quantitative health and environmental risk assessment has been carried out as part of this assessment. The process of risk assessment is set out in Part IIA of the Environment Protection Act 1990 and amended in part by The Water Act 2003. This defines contaminated land as *"any land which appears to the local authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that there is a significant possibility of significant harm being caused, or that significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused"*.
- 12.2 The Act introduces the concept of a pollution linkage. This linkage consists of a pollution (contaminative) source or hazard and a receptor, together with an established pathway between the two. For land to be contaminated, a pollution linkage (hazard-pathway-receptor) must exist. This forms a so-called 'conceptual model' of the site.
- 12.3 Examples of pathways and effects from land contamination (after PPS 23) are given below, and these are illustrated on figure 4.

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

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

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

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

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

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

12.5 **Buildings (Pathways 7 and 8)**

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

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

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

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

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

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

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

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

Sources

- 12.8 The site has only ever been used in the past as agricultural land. It has had no previously recorded commercial or industrial use recorded on the historical maps. As such no specific potential contaminants have been identified. There are former sandstone quarried to the west of the site, but there is no record of them having been infilled with anything that may generate significant landfill gases.

Risk Assessment based on Conceptual Site Model

Summary of Hazards, Pathways and Receptors

Source	Potential Pollutant	Pathways	Receptor	Risk (1)
Possible past minor spillages and metals.	No specific contaminative sources identified. Oils, fuels, grease, hydraulic fluid, metals, asbestos.	1 - 5	A. Present Occupants.	Site Unoccupied.
			B. Groundworkers.	Low Risk involved with excavation work, providing Personnel to adopt suitable precautions, together with washing facilities.
			C. Future Occupants.	Low Risk for residential use.
		6	D. Controlled Waters.	Low Risk.
			E. Ecosystems.	Low Risk.
		7	F. Building Materials and Services.	Low Risk.
Organic Material.	Landfill Gases, Radon, VOCs, SVOCs.	8	A - F	Low Risk. Low values of ground gases present during the investigation.
Waste materials.	Fly-tipping.			Any waste materials to be removed from site.

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

Pathways and Receptors

- 12.9 The principal receptors are groundworkers, future residents and controlled waters (Receptors B, C and D). However based on the past history of the site and the laboratory testing to date, the probability of contamination being present sufficient to affect the identified receptors is considered to be a low risk.
- 12.10 The overall risk is assessed to be low. At this stage it is not considered that there is likely to be any significant risk and further intrusive investigation in respect of contamination is not considered necessary.
- 12.11 With any site, the possibility of contaminants being present, sufficient to cause significant harm cannot be entirely precluded without extensive intrusive investigation, sampling and testing since it is not always possible to determine if contaminants have been tipped on the site, or have seeped into the ground, or have migrated below the ground onto the site from adjacent pieces of land. However, based on the investigation carried out to date, this is considered unlikely.
- 12.12 It is recommended that if during construction any suspicious or unusual odours, colours, liquids or soils are uncovered, these should be brought to the attention of Michael D Joyce Associates LLP and appropriate advice sought.

13 RECOMMENDATIONS

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

13.2 Foundation Criteria

Normal Strip Footings

- 13.2.1 Normal strip footings will therefore be suitable for the new houses. They will have to be sited below any Made Ground and original topsoil still remaining after site clearance, and founded upon the underlying bedrock or weathered bedrock. This material is non-plastic and as such has a low swelling and shrinkage potential, and foundations should be at least 0.75m below groundlevel. At this depth, for foundations sited upon the slightly clayey sand, an allowable bearing pressure of up to 100kN/m^2 can be adopted. If sandstone bedrock is encountered, an allowable bearing pressure of 250kN/m^2 can be adopted. It would also be prudent to lightly reinforce the footings.
- 13.2.2 All foundation excavations must be inspected to ensure that no footings are sited upon any weak Made Ground, softer clays or other such weak materials that would be incapable of safely sustaining the applied foundation loads. This will be particularly important wherever any appreciable amounts of Made Ground occur. Wherever any suspect ground is encountered at proposed foundation level, then that footing must be deepened until a satisfactory bearing medium is obtained.

13.3 Building Near Trees

- 13.3.1 Wherever any houses are located near existing or proposed new trees, their foundations must be sited below the potential root growth zone. Reference should therefore be made to the NHBC Standards Chapter 4.2 "Building Near Trees", which gives guidance on foundation criteria, depths and construction. All services will also have to be similarly protected. It should however be noted that non-plastic soils are expected with negligible swelling and shrinkage properties.

13.4 Landfill and Radon Gas

- 13.4.1 The site is not in an area where radon protection measures are required for new properties, and no elevated levels of ground or landfill gases have been found on the site. No special precautions are necessary, although in accordance with best practice, consideration should be given to incorporate basic gas protection measures in the new houses by way of an appropriate moisture-resistant membrane.
- 13.4.2 If suspended concrete beams and block ground floors are adopted for the houses, it is recommended that a layer of Visqueen 1200 gauge membrane or equivalent is laid over the concrete blocks and covered by a concrete screed in accordance with the manufacturer's recommendations.
- 13.4.3 Any void spaces beneath ground floors must be well ventilated both internally and externally with closely spaced air-bricks. Sleeper walls should either be of honeycomb structure or contain sufficient openings to ensure a through draught. Air-bricks must be placed at the top of the void space and not allowed to become blocked by soil or vegetation. They should be lined or cased through cavity walls.

13.4.4 The Building Research Establishment Report BR414 "Protective Measures for Housing on Gas Contaminated Land", together with the CIRIA Report 149 "Protecting Development from Methane" and BR211 "Radon: Guidance on Protective Measures for New Buildings" all give construction advice for preventing gases entering buildings, the principles of which are incorporated in the above recommendations. Advice is also given in respect of sealing services where they pass through impermeable membranes.

13.5 Existing Drains and Services

13.5.1 No drains or buried service channels are anticipated on the site

13.6 Road Construction

13.6.1 The new road should conform to "The Specifications of Highway Works" and "The Notes for Guidance on the Specification for Highway Works".

13.6.2 The design of trafficked pavements must take account of the ground conditions and likely traffic loads during the life of the development. Designs meeting the following requirements will normally be acceptable. At sites where particular poor ground conditions are encountered or where it is anticipated that there will be a particularly high frequency of commercial vehicle or abnormal load movements, further analysis in accordance with the "Design Manual for Roads and Bridges" will be required to demonstrate integrity of the design.

- 13.6.3 A preliminary design can be prepared using an “Equilibrium CBR” value based on the appropriate type of sub-grade material as set out in the table below. However, if this method of CBR estimation is used, testing by an approved laboratory will be required prior to construction in order to verify the CBR value used for design.

Equilibrium CBR Value to be used for Design Purposes		
Type of Soil	Plasticity Index	Equilibrium CBR (%)
Heavy Clay	50 or greater	Less than 2
Heavy Clay	40 to 49	2
Heavy Clay	30 to 39	2
Silty Clay	20 to 29	3
Sandy Clay	10 to 19	4
Silt	Less than 10	1
Sand (Poorly graded)	Non-plastic	20
Sand (well graded)	Non-plastic	40
Gravel (poorly graded)	Non-plastic	40
Sandy Gravel (well graded)	Non-plastic	60

(Based on Design Manual for Roads and Bridges)

- 13.6.4 A granular foundation comprising sub-base or a combination of sub-base and a capping layer can be provided in accordance with the table below.

Pavement Foundation Design					
CBR (%)	Capping (mm)	+	Sub-Base (mm)	OR	Sub-Base (mm)
Less than 2	600	+	150		--
2	450	+	150		--
3	350	+	150	OR	300
4	300	+	150	OR	275
5 to 15	250	+	150	OR	225
> than 15	--	+	--		150

- 13.6.5 Sub-grades that have CBR values significantly less than 2% and deform under construction traffic may be unsuitable to support the pavement. In this case, special measures will be required. No material within 450mm of the finished road surface should be frost susceptible.
- 13.6.6 The subgrade comprises either sandstone bedrock or weathered sandstone and a CBR in excess of 15% can be expected, requiring 150mm of sub-base. Prior to the application of any sub-base, all subgrades must be checked by proof rolling to ensure that an adequate CBR exists. Where any loose granular or soft clayey areas remain, these must be either dug out and replaced by compacted material or an additional 150mm of sub-base added. This will be especially important wherever trench works for drains, sewers and other services have been carried out. Old foundations should be removed to a depth of 1m below subgrade level to prevent hardspots occurring. It will also be necessary to prevent the deterioration of the subgrade due to the effects of wet weather and the site traffic.

13.7 Sustainable Surface Water Drainage

- 13.7.1 The soakaway test carried out was unsuccessful. In general the site will be unsuitable for soakaways and consideration will have to be given to discharging surface water to a piped system.
- 13.7.2 As this site is underlain by sandstone bedrock, soakaways for carriageway and/or house roof surface water drainage should be feasible. Each soakaway will have to be sited in the clean, unweathered zone of the sandstone bedrock, which should be at a reasonable depth. If soakaways are proposed, it will be necessary to carry out some further representative tests in order to establish the permeabilities of the sandstone

bedrock, and depths of clean unweathered zones at the actual locations of the proposed soakaways. Soakaways should be designed in accordance with BRE Digest 365: *Soakaway Design* and sized so that they discharge the design storm within 24 hours.

- 13.7.3 No soakaways should be placed within 5m of building foundations, nor should they discharge into any Made Ground if encountered.

13.8 Excavations and Groundwater

- 13.8.1 Soft ground plant should prove suitable for most of the excavations. However sandstone bedrock exists at shallow depth in places and will require heavier plant. For all deep excavations in excess of 1.2m where vertical sides are necessary, trench supports should be provided as the soils will not be self-supporting for any appreciable length of time.

- 13.8.2 No groundwater seepages were noted in the near surface. However it should be remembered that trapped groundwater can be released from areas of Made Ground when they are excavated. In addition seasonal variation in groundwater levels will occur and groundwater will be shallower during the winter months.

13.9 Re-use of Materials

- 13.9.1 In England, the SWMP Regulations 2008 came into force on 6th April 2008. They apply to 'construction projects', and to the whole life of a construction project, from design all the way through to completion. As well as including actual construction works, they include renovation projects, site preparation works, the installation of

services, and all kinds of demolition. If you carry out a construction project where the value of the materials plus labour exceeds £300,000, it becomes a criminal offence (for both the project manager and the main contractor) not to produce a SWMP.

- 13.9.2 The Plans must include basic elements such as who prepared it, who's in charge of the project, who's the main contractor, what's the location, and what's the estimated value. But it must also include details of the decisions taken at the outset on (1) the design of the project, (2) the methods employed and (3) the materials employed in order to minimise the quantity of waste produced on site. It will therefore be necessary to have evidence of that thought process. The SWMP must describe each type of waste that will be produced, and estimate the volume.

13.10 Contamination

- 13.10.1 Laboratory testing to date has recorded no contamination and no special precautions are necessary. The existing topsoil can be reused.

13.11 Cement and Buried Concrete

- 13.11.1 The soils have been found to contain low levels of soluble sulphates.
- 13.11.2 In accordance therefore with the Building Research Establishment Special Digest No. 1 "Concrete in Aggressive Ground", a normal Portland cement in accordance with Group DS-1 Specifications can be used for all buried concrete and mortar.

13.12 Services

- 13.12.1 Wherever drains and mains services pass from natural to Made Ground strata, adequate flexibility should be provided so that breakages do not occur due to adverse settlements between materials of differing compressibility.

13.13 Further Monitoring and Inspection

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



A D Joyce

BSc MSc ARSM CEng CGeol CEnv MICE FGS SiLC

May 2016

This report is subject to the provisions of the Copyright Acts and is for the sole benefit of Jones Homes (Yorkshire) Limited in respect of a preliminary assessment of geotechnical and contamination conditions on the site. It does not purport to provide specialist legal advice in respect of environmental issues. The report cannot be assigned to, or relied on, by any other party without prior permission.

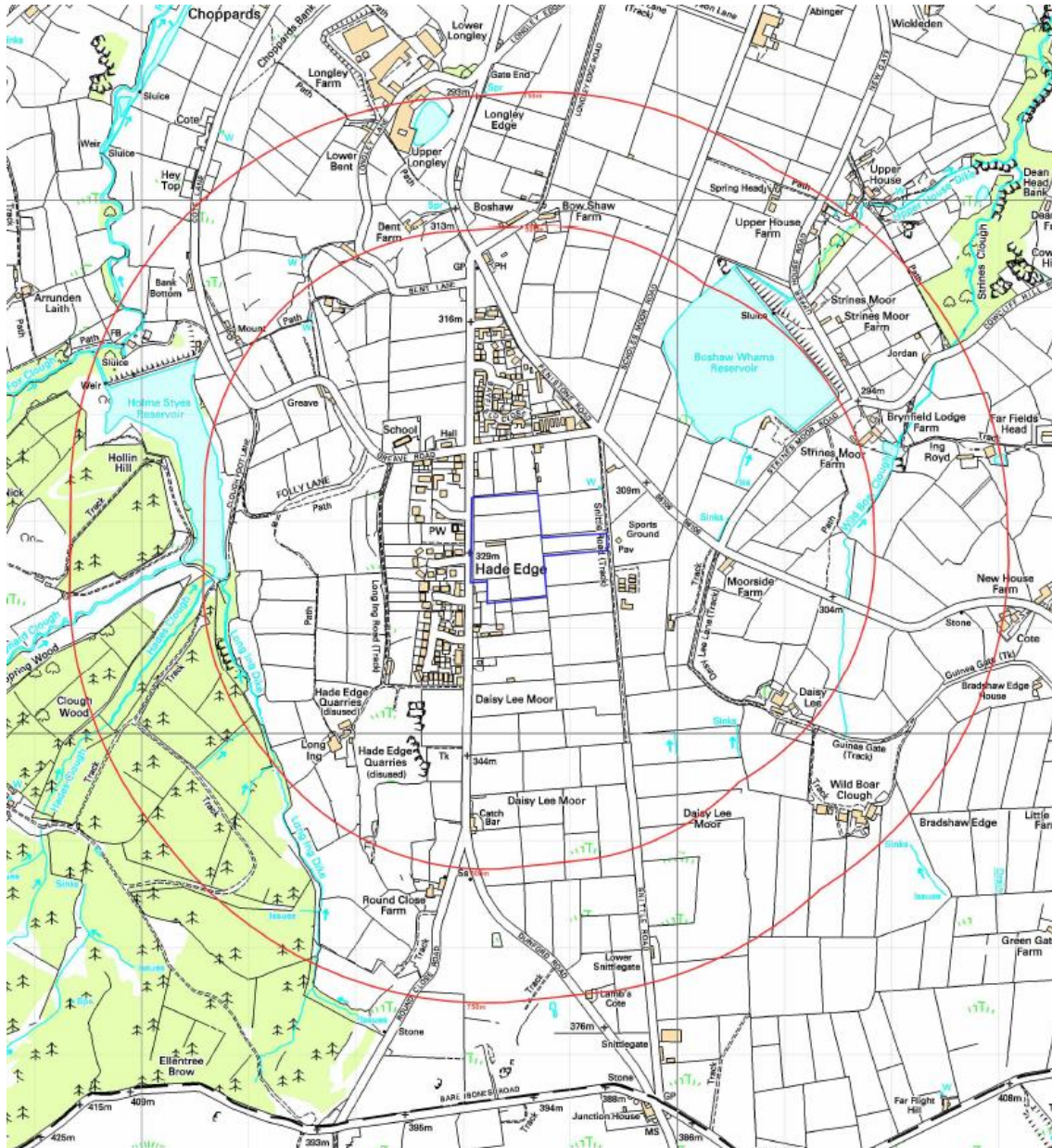
Procedure Notes

The desk study and ground investigation have been carried out in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001, and the terms of the client's brief. By its very nature any ground investigation only samples a small percentage of the ground. Consequently changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimize such risks. Conclusions and recommendations are based on the information presented in this report, but unforeseen features may exist. Therefore, actual ground conditions should be noted during construction and further advice sought if they differ significantly from those predicted.

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

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

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



Dunford Road, Hade Edge, Holmfirth
General Site Location

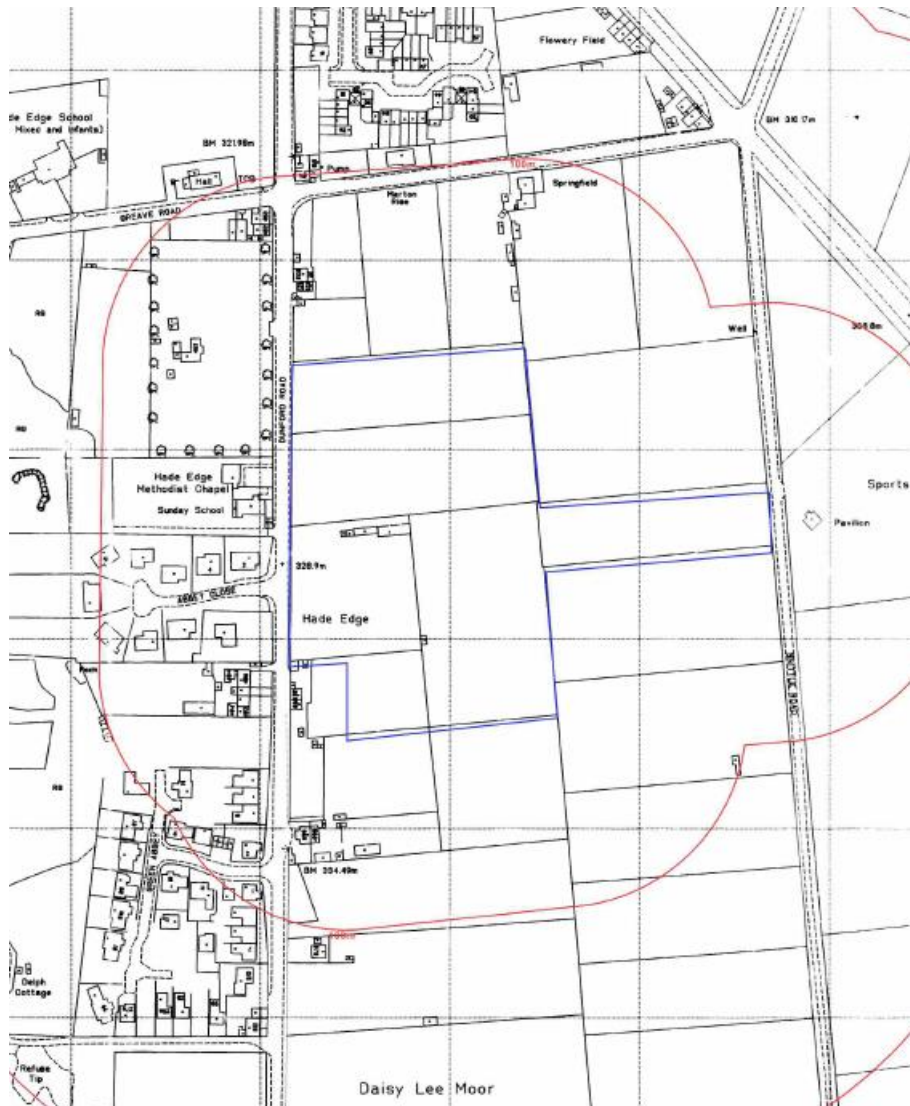
Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

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Scale: NTS

Figure: 1



Dunford Road, Hade Edge, Holmfirth
Site Plan

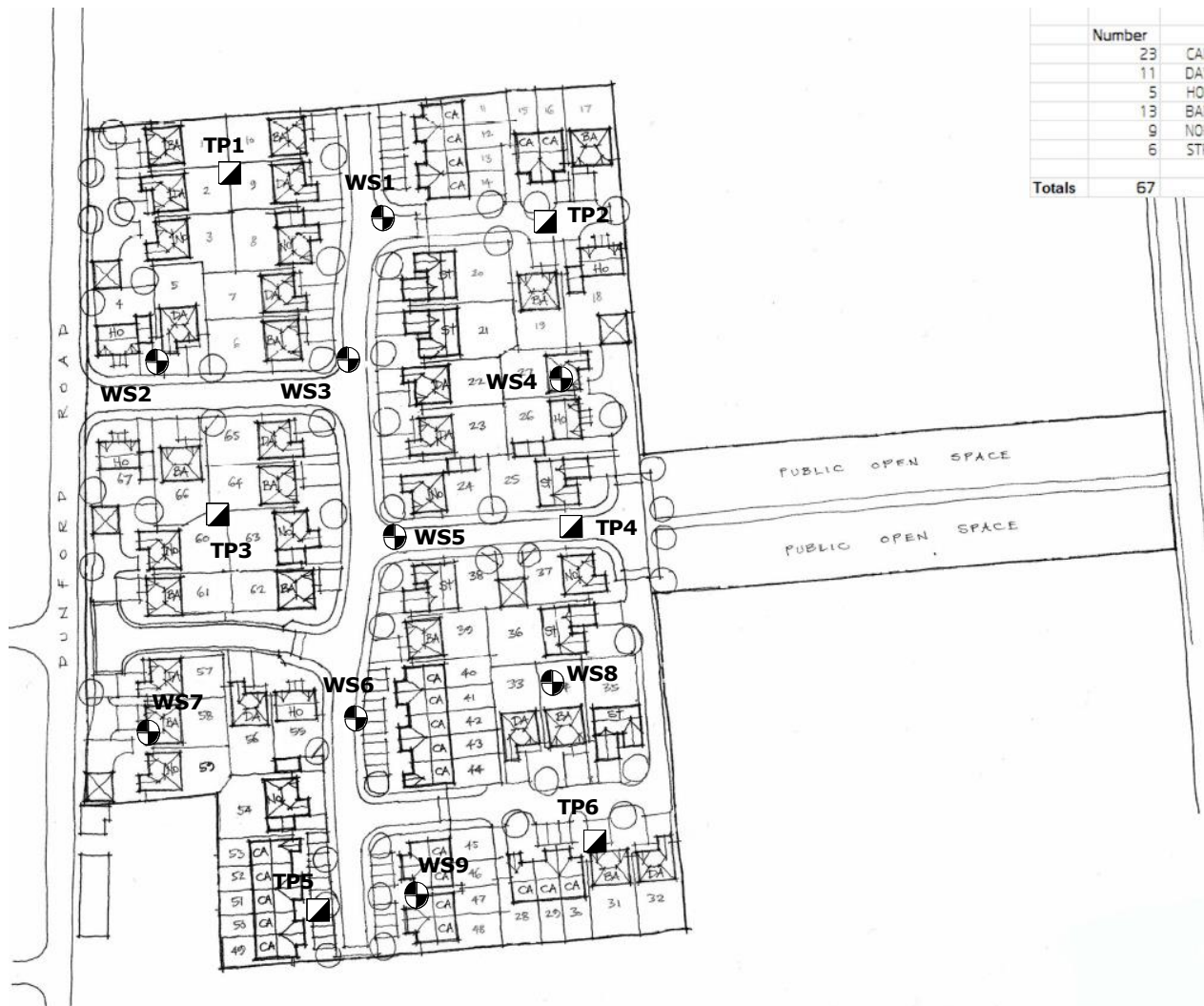
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Scale: NTS

Figure: 2



Number	
23	CAI
11	DAI
5	HO
13	BAI
9	NOI
6	STI
Totals	67

Dunford Road, Hade Edge, Holmfirth
 Development Proposals with Exploratory Borehole and Trial Pit Positions

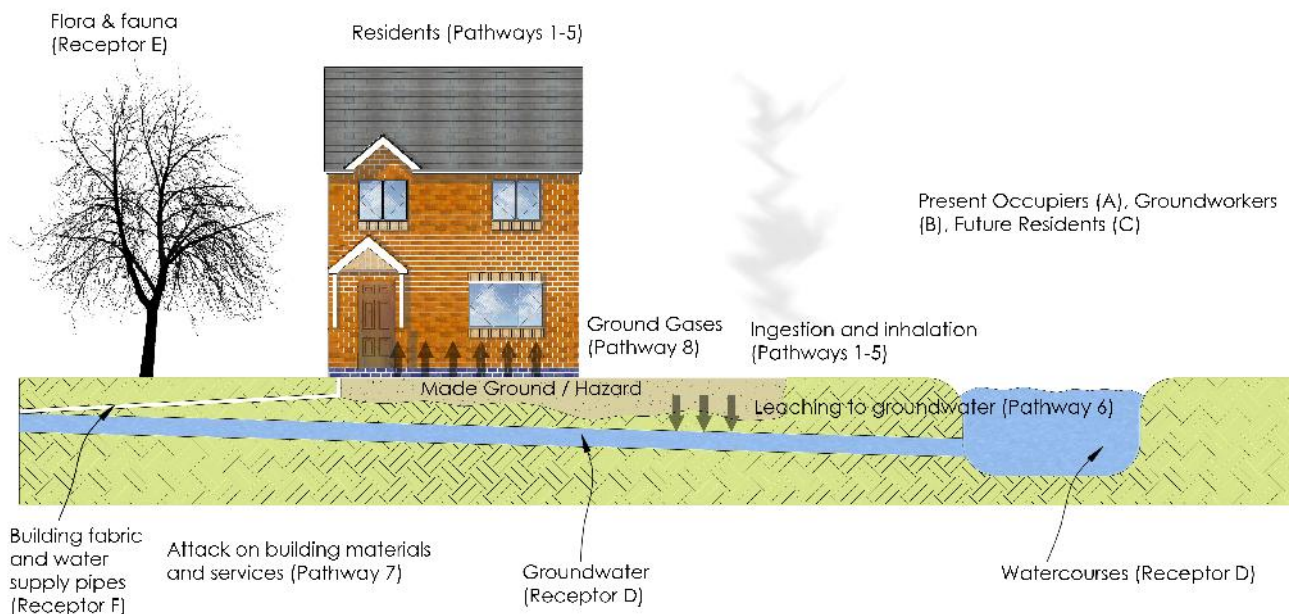
Michael D Joyce Associates LLP
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Scale: NTS

Figure: 3



Pathways

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

Receptors

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

Schematic Representation of Conceptual Site Model

Schematic Representation of Conceptual Site Model

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

Figure: 4

APPENDIX 1

Window Sampling Records

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

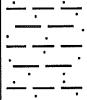
Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 1

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.30	ES					Turf over dark brown silty sandy TOPSOIL.	
0.60	D			-0.5		Brown-orange slightly clayey fine to medium SAND.	
				-0.8		Orange slightly weathered coarse grained SANDSTONE.	
1.00 - 1.45	SPT		10,10,12,28 N >50	-1	1	End of Borehole	
					2		
					3		
					4		

General: Refusal at 1m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

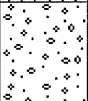
Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 2

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.10	ES			0	0	Ground Surface	
				-0.3		Turf over dark brown silty sandy TOPSOIL.	
0.60	D			-0.7		Dark brown, light brown clayey gravelly SAND. Gravel of fine to medium sandstone.	
				-0.8		Orange-brown slightly weathered coarse grained SANDSTONE.	
0.80 - 1.00	SPT		12,13,16,22 N >50			End of Borehole	
					1		
					2		
					3		
					4		
					5		

General: Refusal at 0.8m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 3

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.70 0.70 - 0.95	D SPT		15,28 N >43	0	0	Ground Surface	
						Turf over dark brown silty sandy TOPSOIL.	
				-0.5		Orange-brown slightly weathered coarse grained SANDSTONE.	
				-0.7		End of Borehole	
					1		
					2		
					3		
					4		

General: Refusal at 0.7m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

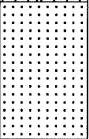
Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 4

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.80 0.90 - 1.15	D SPT		12,14,22 N >48	0	0	Ground Surface	
						Turf over dark brown silty sandy TOPSOIL.	
				-0.5		Light brown-orange slightly weathered gravelly coarse grained SANDSTONE.	
				-0.9		End of Borehole	
					1		
					2		
					3		
					4		

General: Refusal at 0.9m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 5

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.10	ES			0	0	Ground Surface	
						Turf over dark brown silty sandy TOPSOIL.	
				-0.15		Grey-brown medium coarse grained slightly weathered SANDSTONE.	
						End of Borehole	
					1		
					2		
					3		
					4		

General: Refusal at 0.15m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

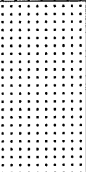
Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 6

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.10	ES			0	0	Ground Surface	
						Turf over dark brown silty sandy TOPSOIL.	
				-0.3		Brown-orange gravelly moderately weathered coarse grained sand, becoming coarse grained SANDSTONE.	
0.70	D		11,18,26 N >50	-0.8			
0.80 - 1.05	SPT					End of Borehole	
					1		
					2		
					3		
					4		

General: Refusal at 0.8m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 7

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.30	ES			0	0	Ground Surface	
						Turf over dark brown silty sandy TOPSOIL.	
				-0.5			
0.70 - 0.95	SPT		12,14,14,23 N >50	-0.7		Orange-brown slightly weathered coarse grained SANDSTONE.	
						End of Borehole	
					1		
					2		
					3		
					4		

General: Refusal at 0.7m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

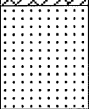
Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 8

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.40	ES			0	0	Ground Surface	
						Turf over dark brown silty sandy TOPSOIL.	
				-0.5		Brown-orange slightly weathered gravelly coarse grained SANDSTONE.	
0.80 0.80 - 1.05	D SPT		10,12,16,23 N >50	-0.8		End of Borehole	
					1		
					2		
					3		
					4		

General: Refusal at 0.8m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

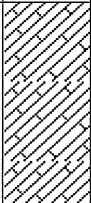
Method: Dart Rig

Date: 25th April 2016

Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: 9

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.30	ES			0	0	Ground Surface	
						Turf over dark brown silty sandy TOPSOIL.	
0.70 - 0.95	SPT		10,12,13,18 N >50	-0.6			
				-0.7		Orange slightly weathered coarse grained SANDSTONE.	
						End of Borehole	
					1		
					2		
					3		
					4		

General: Refusal at 0.7m on rockhead

Groundwater: None encountered

Remarks: Backfilled with arisings on completion

APPENDIX 2

Trial Pit Records

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

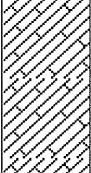
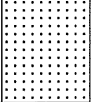
Excavated by: JCB 3CX

Date: 26th April 2016

Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: 1

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.20	ES		W 0.60m x L 2.00m	0	0	Ground Surface	
						Turf over brown slightly silty sandy TOPSOIL.	
0.70 - 1.00	B			-0.5		Orange slightly weathered medium grained SANDSTONE.	
				-0.8		End of Trial Pit	
					1		
					2		
					3		
					4		

Stability: Abandoned at 1.3m refusal on rockhead

General: Soakway test carried out

Groundwater: None encountered

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

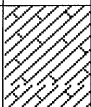
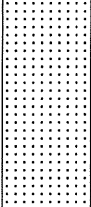
Excavated by: JCB 3CX

Date: 26th April 2016

Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: 2

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
			W 0.60m x L 1.80m	0	0	Ground Surface	
						Turf over brown slightly silty sandy TOPSOIL.	
				-0.3		Orange slightly weathered coarse grained iron rich SANDSTONE.	
				-0.9		End of Trial Pit	
					1		
					2		
					3		
					4		

Stability: Abandoned at 0.9m refusal on rockhead

General: Backfilled with arisings on completion

Groundwater: None encountered

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

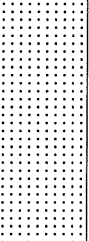
Excavated by: JCB 3CX

Date: 26th April 2016

Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: 3

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
			W 0.60m x L 1.80m	0	0	Ground Surface	
						Turf over brown slightly silty sandy TOPSOIL.	
				-0.5		Orange slightly weathered iron rich coarse grained SANDSTONE.	
				-1.2	1	End of Trial Pit	
					2		
					3		
					4		

Stability: Refusal at 1.2m on intact rockhead

General: Soakway test carried out

Groundwater: None encountered

Site: Dunford Road [3624]

Location: Hade Edge, Holmfirth

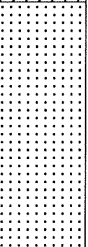
Excavated by: JCB 3CX

Date: 26th April 2016

Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: 4

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.20	ES		W 0.60m x L 2.00m	0	0	Ground Surface	
						Turf over brown slightly silty sandy TOPSOIL.	
				-0.3		Orange-brown slightly weathered coarse grained SANDSTONE.	
				-1	1	End of Trial Pit	
					2		
					3		
					4		

Stability: Refusal at 1m on solid bedrock

General: Backfilled with arisings on completion

Groundwater: None encountered

Stability: Refusal at 1.3m on solid bedrock
General: Backfilled with arisings on completion
Groundwater: None encountered

APPENDIX 3

Laboratory Test Results

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/02578
Issue Number: 1

Date: 10 May, 2016

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

Project Manager: Mr Anthony Joyce
Project Name: Dunford Road, Hade Edge, Holmfirth
Project Ref: Not specified
Order No: N/A
Date Samples Received: 29/04/16
Date Instructions Received: 04/05/16
Date Analysis Completed: 10/05/16

Prepared by:

Approved by:



Melanie Marshall
Laboratory Coordinator



Lianne Bromiley
Senior Client Manager

Envirolab Job Number: 16/02578

Client Project Name: Dunford Road, Hade Edge, Holmfirth

Client Project Ref: Not specified

Lab Sample ID	16/02578/1	16/02578/2	16/02578/3	16/02578/4	16/02578/5	16/02578/6	16/02578/7	16/02578/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP4	WS1	WS2	WS6	WS7	WS8	WS9		
Depth to Top	0.20	0.40	0.30	0.10	0.10	0.30	0.60	0.30		
Depth To Bottom										
Date Sampled	26-Apr-16	26-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4AE	4AE	4AE	4AE	4AE	4AE	4E	4AE		
% Stones >10mm _A [#]	2.1	<0.1	<0.1	1.7	<0.1	1.6	<0.1	<0.1	% w/w	A-T-044
pH _D ^{M#}	6.43	-	4.97	5.22	4.51	4.87	-	4.18	pH	A-T-031s
pH BRE _D ^{M#}	-	5.17	-	-	-	-	5.23	-	pH	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	g/l	A-T-026s
Sulphate BRE (water sol 2:1) _D ^{M#}	-	<10	-	-	-	-	<10	-	mg/l	A-T-026s
Cyanide (total) _A ^{M#}	<1	-	<1	<1	<1	<1	-	<1	mg/kg	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	<0.2	mg/kg	A-T-050s
Arsenic _D ^{M#}	12	-	2	6	8	9	-	16	mg/kg	A-T-024s
Cadmium _D ^{M#}	0.6	-	<0.5	<0.5	<0.5	0.6	-	0.7	mg/kg	A-T-024s
Copper _D ^{M#}	25	-	4	10	11	12	-	16	mg/kg	A-T-024s
Chromium (hexavalent) _D	<1	-	<1	<1	<1	<1	-	<1	mg/kg	A-T-040s
Lead _D ^{M#}	67	-	10	28	40	52	-	53	mg/kg	A-T-024s
Mercury _D	<0.17	-	<0.17	<0.17	<0.17	<0.17	-	<0.17	mg/kg	A-T-024s
Nickel _D ^{M#}	10	-	2	5	5	12	-	7	mg/kg	A-T-024s
Selenium _D	<1	-	<1	<1	<1	<1	-	<1	mg/kg	A-T-024s
Zinc _D ^{M#}	62	-	16	47	21	47	-	16	mg/kg	A-T-024s

Envirolab Job Number: 16/02578

Client Project Name: Dunford Road, Hade Edge, Holmfirth

Client Project Ref: Not specified

Lab Sample ID	16/02578/1	16/02578/2	16/02578/3	16/02578/4	16/02578/5	16/02578/6	16/02578/7	16/02578/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP4	WS1	WS2	WS6	WS7	WS8	WS9		
Depth to Top	0.20	0.40	0.30	0.10	0.10	0.30	0.60	0.30		
Depth To Bottom										
Date Sampled	26-Apr-16	26-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4AE	4AE	4AE	4AE	4AE	4AE	4E	4AE		
Asbestos in Soil (inc. matrix)										
Asbestos in soil _A [#]	NAD	-	NAD	NAD	NAD	NAD	-	NAD		A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	-	N/A	N/A	N/A	N/A	-	N/A		Gravimetry

Envirolab Job Number: 16/02578

Client Project Name: Dunford Road, Hade Edge, Holmfirth

Client Project Ref: Not specified

Lab Sample ID	16/02578/1	16/02578/2	16/02578/3	16/02578/4	16/02578/5	16/02578/6	16/02578/7	16/02578/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP4	WS1	WS2	WS6	WS7	WS8	WS9		
Depth to Top	0.20	0.40	0.30	0.10	0.10	0.30	0.60	0.30		
Depth To Bottom										
Date Sampled	26-Apr-16	26-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16	25-Apr-16		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	4AE	4AE	4AE	4AE	4AE	4AE	4E	4AE		
PAH 16										
Acenaphthene _A ^{M#}	0.14	-	<0.01	0.01	<0.01	<0.01	-	0.03	mg/kg	A-T-019s
Acenaphthylene _A ^{M#}	0.14	-	0.01	0.01	<0.01	<0.01	-	0.08	mg/kg	A-T-019s
Anthracene _A ^{M#}	0.75	-	<0.02	0.05	<0.02	<0.02	-	0.10	mg/kg	A-T-019s
Benzo(a)anthracene _A ^{M#}	4.25	-	0.22	0.33	0.10	0.10	-	0.46	mg/kg	A-T-019s
Benzo(a)pyrene _A ^{M#}	3.99	-	0.25	0.33	0.12	0.11	-	0.43	mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	4.73	-	0.32	0.40	0.17	0.15	-	0.63	mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{M#}	2.00	-	0.14	0.17	0.07	<0.05	-	0.24	mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	1.91	-	0.11	0.16	<0.07	<0.07	-	0.20	mg/kg	A-T-019s
Chrysene _A ^{M#}	4.53	-	0.25	0.37	0.13	0.12	-	0.60	mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.55	-	<0.04	<0.04	<0.04	<0.04	-	0.06	mg/kg	A-T-019s
Fluoranthene _A ^{M#}	8.96	-	0.38	0.62	0.21	0.20	-	1.12	mg/kg	A-T-019s
Fluorene _A ^{M#}	0.12	-	<0.01	<0.01	<0.01	<0.01	-	0.06	mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	2.42	-	0.18	0.22	0.10	0.07	-	0.29	mg/kg	A-T-019s
Naphthalene _A ^{M#}	<0.03	-	<0.03	<0.03	<0.03	<0.03	-	0.04	mg/kg	A-T-019s
Phenanthrene _A ^{M#}	2.99	-	0.08	0.18	0.07	0.06	-	0.82	mg/kg	A-T-019s
Pyrene _A ^{M#}	7.81	-	0.36	0.56	0.20	0.18	-	0.96	mg/kg	A-T-019s
PAH (total 16) _A ^{M#}	45.3	-	2.30	3.44	1.20	1.01	-	6.13	mg/kg	A-T-019s

REPORT NOTES

Notes - Soil chemical analysis

All results are reported as dry weight (<40 °C).

For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.

Superscript "M" indicates method accredited to MCERTS.

If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.

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

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample. Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

APPENDIX 4

GroundSure Geo-Insight and Enviro-Insight Reports

Groundsure Enviroinsight

Address: 414710, 405310,
Date: 11 Apr 2016
Reference: HMD-354-2894230
Client: Michael D Joyce Associates LLP

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 26-Mar-2012
Grid Reference: 414689,405365
Site Size: 2.91ha

Report Reference: HMD-354-2894230
Client Reference: Dunford_Road_-_Hade_Edge

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Overview of Findings

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

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	2	31	13
1.2 Additional Information – Historical Tank Database	0	0	0	0
1.3 Additional Information – Historical Energy Features Database	0	0	0	0
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Potentially Infilled Land	0	0	30	23
Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

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

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

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	None
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	No					
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	2	0	0	6	14
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	2	1	7
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	1	1	3
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	1	0	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500

Section 6: Hydrogeology and Hydrology				0-500m		
6.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	0	0	4	15	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding			
7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No		
7.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site	No		
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low		
7.4 Are there any Flood Defences within 250m of the study site?	No		
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No		
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No		
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential		
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low		

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	9
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	1
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	1
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	2	2	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	1	0
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.11 Records of National Parks	0	0	0	0	1	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	1	0	0	0	1	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?

Very Low

9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?

Negligible

9.1.2 What is the maximum Landslides hazard rating identified on the study site?

Very Low

9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?

Negligible

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

Negligible

9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?

Very Low

9.1.6 What is the maximum Running Sand hazard rating identified on the study site?

Negligible

9.2 Radon

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

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

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

No radon protective measures are necessary.

Section 10: Mining

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

Yes

10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?

Yes

10.3 Are there any brine affected areas within 75m of the study site?

No

Using this report

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

1. Historical Industrial Sites

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

2. Environmental Permits, Incidents and Registers

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

3. Landfills and Other Waste Sites

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

4. Current Land Uses

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

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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

8. Designated Environmentally Sensitive Sites

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

9. Natural Hazards

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

10. Mining

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

11. Contacts

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

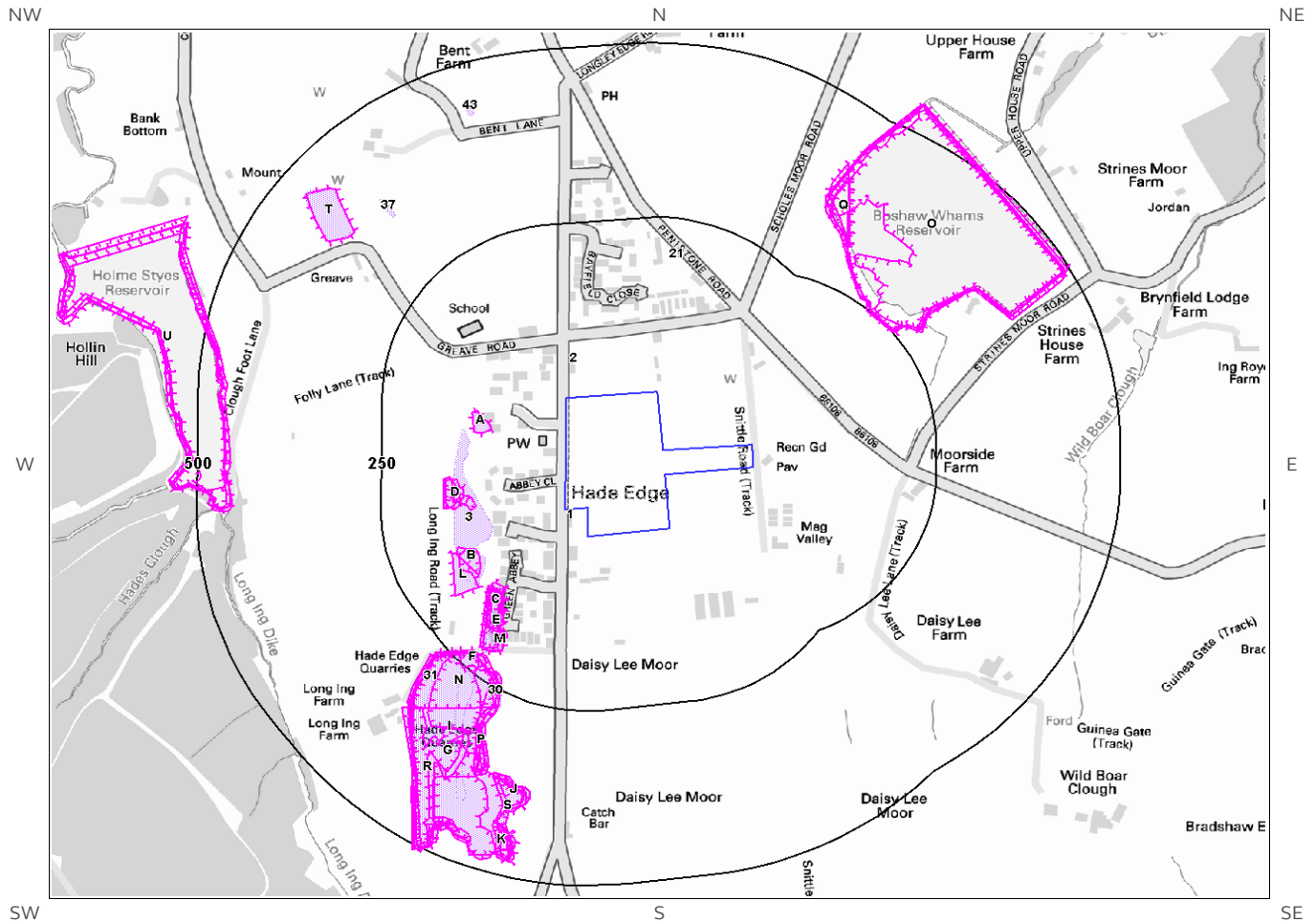
Note: Maps

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

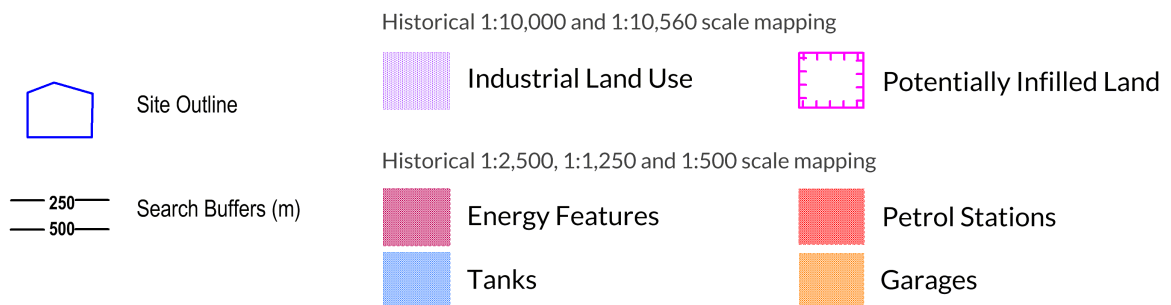
Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

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

1. Historical Land Use



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1. Historical Industrial Sites

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

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

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 46

ID	Distance [m]	Direction	Use	Date
1	12	S	Unspecified Pump	1854
2	50	N	Unspecified Pump	1854
3	101	W	Sandstone Quarries	1854
4A	102	W	Unspecified Pit	1980
5A	102	W	Unspecified Pit	1970
6D	120	W	Unspecified Quarry	1948
7B	132	SW	Unspecified Pit	1980
8B	132	SW	Unspecified Pit	1970
9C	135	SW	Refuse Heap	1970
10C	135	SW	Refuse Heap	1980
11D	137	W	Unspecified Pit	1980
12D	137	W	Unspecified Pit	1970
13C	139	SW	Sand Pit	1965
14E	140	SW	Unspecified Quarries	1955
15D	141	W	Unspecified Quarry	1906
16E	143	SW	Sand Pit	1906
17E	144	SW	Unspecified Quarry	1948
18C	144	SW	Refuse Heap	1888
19L	157	SW	Unspecified Quarry	1906
20M	174	SW	Unspecified Pit	1965
21	194	N	Unspecified Pump	1854
22N	220	SW	Unspecified Quarries	1965
23F	224	SW	Refuse Heap	1980
24F	224	SW	Refuse Heap	1970
25G	225	SW	Unspecified Quarries	1888
26G	227	SW	Unspecified Quarries	1948
27I	228	SW	Unspecified Quarries	1906
28H	230	SW	Unspecified Quarries	1919
29H	230	SW	Unspecified Quarries	1878
30	238	SW	Unspecified Quarries	1955
31	241	SW	Unspecified Quarries	1955
32G	241	SW	Unspecified Quarries	1878
33G	241	SW	Unspecified Quarries	1919
34I	251	SW	Sandstone Quarries	1854

35P	278	SW	Unspecified Quarry	1951
36R	323	SW	Unspecified Disused Quarries	1951
37	348	NW	Sandstone Quarry	1854
38J	361	S	Unspecified Quarries	1919
39J	361	S	Unspecified Quarries	1878
40S	361	S	Unspecified Disused Quarry	1951
41J	366	S	Unspecified Quarries	1906
42T	376	NW	Water Works Reservoir	1955
43	425	N	Sandstone Quarry	1854
44K	427	S	Unspecified Quarry	1919
45K	429	S	Unspecified Quarry	1906
46K	440	S	Unspecified Disused Quarries	1979

1.2 Additional Information – Historical Tank Database

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

Records of historical tanks within 500m of the search boundary: 0

Database searched and no data found.

1.3 Additional Information – Historical Energy Features Database

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

Records of historical energy features within 500m of the search boundary: 0

Database searched and no data found.

1.4 Additional Information – Historical Petrol and Fuel Site Database

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

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

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

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

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

Database searched and no data found.

1.6 Potentially Infilled Land

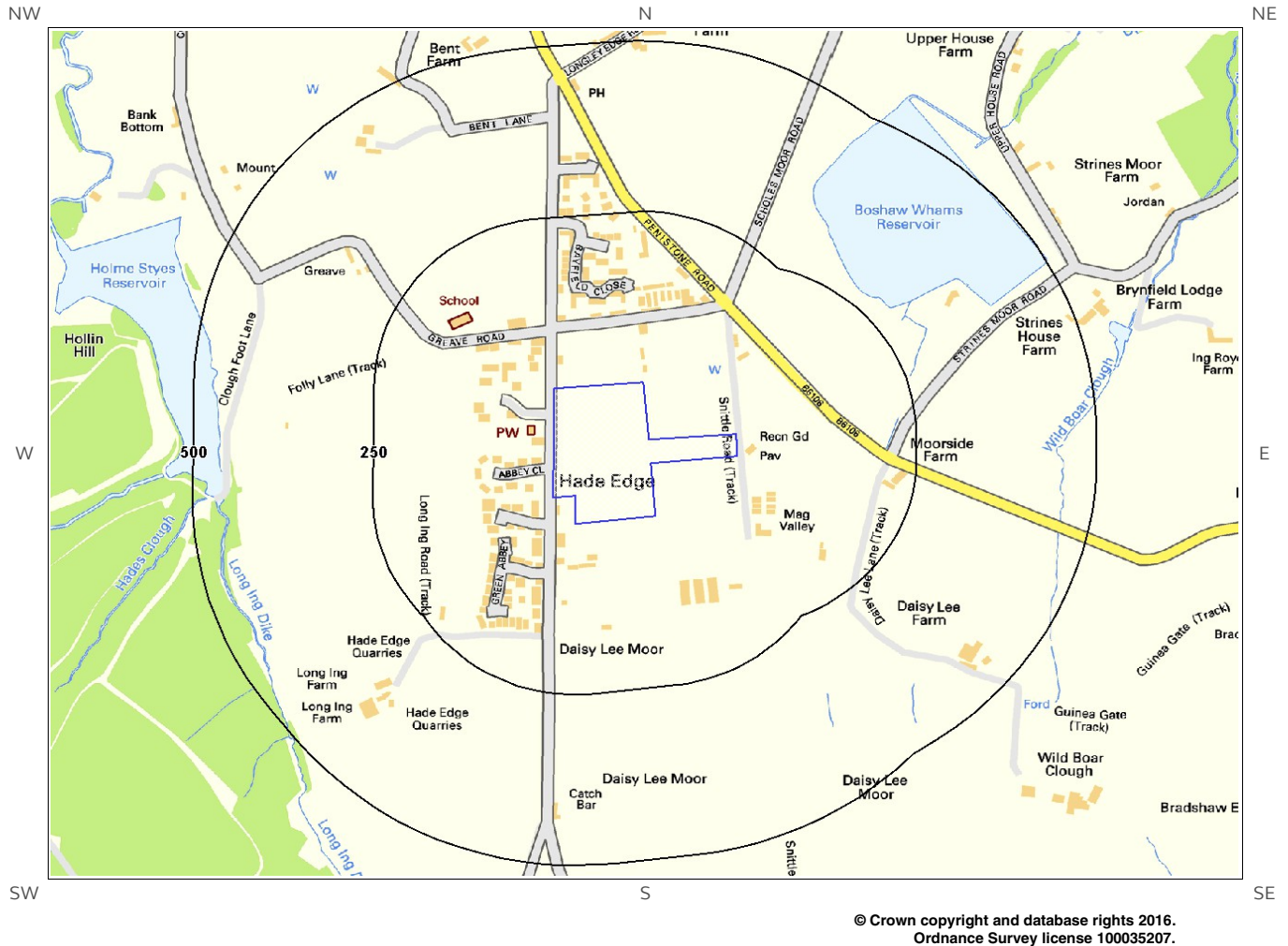
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 53

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

ID	Distance(m)	Direction	Use	Date
47A	102	W	Unspecified Pit	1980
48A	102	W	Unspecified Pit	1970
49D	120	W	Unspecified Quarry	1948
50B	132	SW	Unspecified Pit	1980
51B	132	SW	Unspecified Pit	1970
52C	135	SW	Refuse Heap	1980
53C	135	SW	Refuse Heap	1970
54D	137	W	Unspecified Pit	1980
55D	137	W	Unspecified Pit	1970
56C	139	SW	Sand Pit	1965
57D	141	W	Unspecified Quarry	1906
58E	143	SW	Sand Pit	1906
59E	144	SW	Unspecified Quarry	1948
60C	144	SW	Refuse Heap	1888
61L	157	SW	Unspecified Quarry	1906
62M	174	SW	Unspecified Pit	1965
63N	220	SW	Unspecified Quarries	1965
64F	224	SW	Refuse Heap	1980
65F	224	SW	Refuse Heap	1970
66G	225	SW	Unspecified Quarries	1888
67G	227	SW	Unspecified Quarries	1948
68I	228	SW	Unspecified Quarries	1906
69H	230	SW	Unspecified Quarries	1919
70H	230	SW	Unspecified Quarries	1878
71G	241	SW	Unspecified Quarries	1878
72G	241	SW	Unspecified Quarries	1919
73O	247	NE	Reservoir	1948
74O	250	NE	Reservoir	1955
75O	250	NE	Reservoir	1970
76O	250	NE	Reservoir	1980

77O	251	NE	Reservoir	1906
78O	254	NE	Reservoir	1888
79P	278	SW	Unspecified Quarry	1951
80Q	314	NE	Reservoir	1965
81Q	314	NE	Reservoir	1970
82Q	316	NE	Pond	1980
83R	323	SW	Unspecified Disused Quarries	1951
84J	361	S	Unspecified Quarries	1878
85J	361	S	Unspecified Quarries	1919
86S	361	S	Unspecified Disused Quarry	1951
87S	366	S	Unspecified Quarries	1906
88T	373	NW	Reservoir	1970
89T	373	NW	Reservoir	1965
90T	373	NW	Reservoir	1980
91K	427	S	Unspecified Quarry	1919
92K	429	S	Unspecified Quarry	1906
93K	440	S	Unspecified Disused Quarries	1979
94U	453	W	Reservoir	1980
95U	453	W	Reservoir	1970
96U	453	W	Reservoir	1965
97U	455	W	Reservoir	1906
98U	459	W	Reservoir	1948
99U	460	W	Reservoir	1888

2. Environmental Permits, Incidents and Registers Map



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

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

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

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

0

Database searched and no data found.

2.3 Environment Agency Recorded Pollution Incidents

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

0

Database searched and no data found.

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

0

Database searched and no data found.

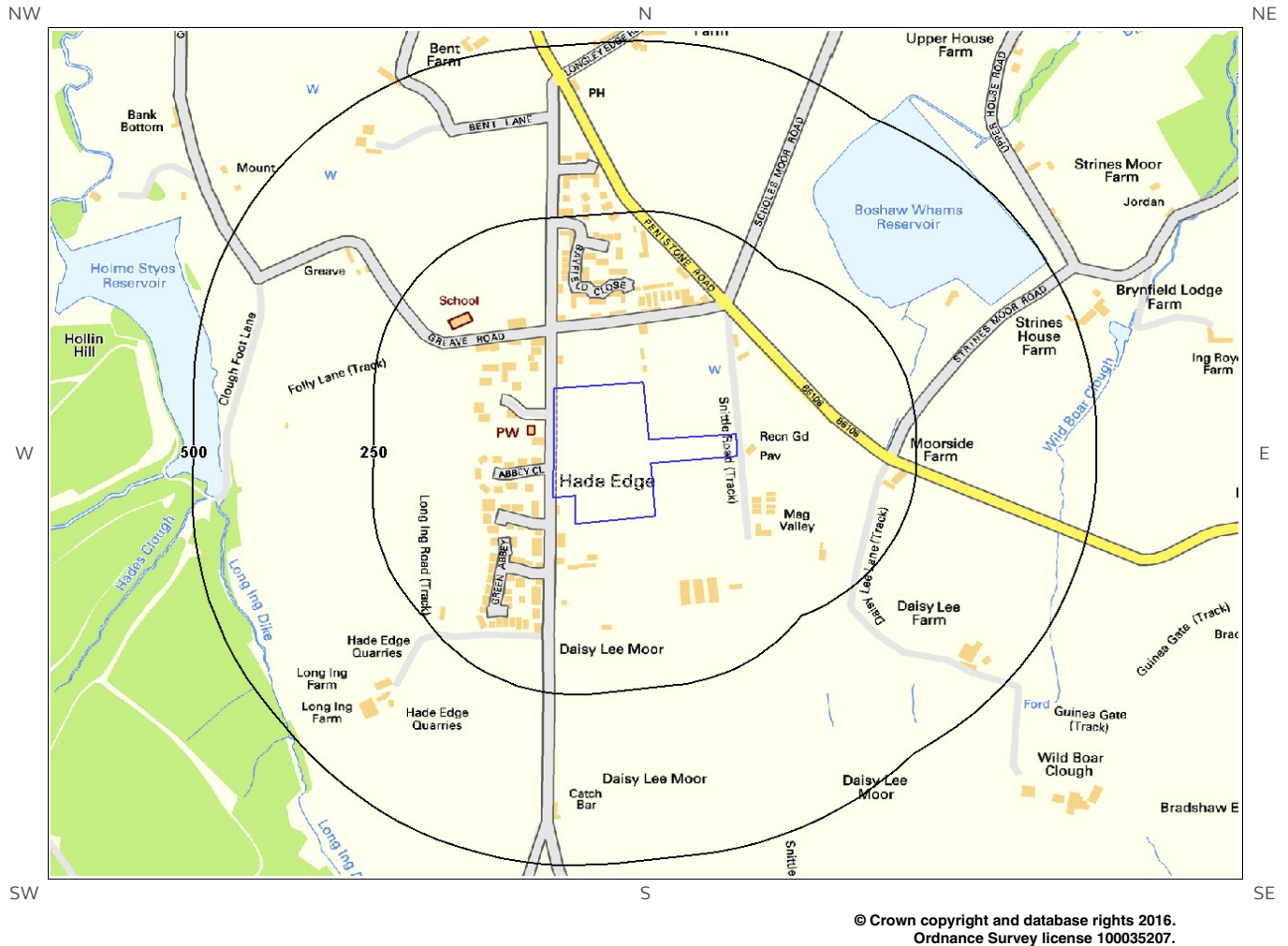
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

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

0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



- | | | | | | |
|---|---------------------------|---|--------------------------|---|---|
|  | Site Outline |  | E.A. Active Landfill |  | Historic and Planned Waste Sites |
|  | E.A. Historic Landfill |  | E.A. Licensed Waste Site |  | Local Authority/Historical Mapping Landfill Records |
|  | BGS / DoE Survey Landfill | | | | |
-  250 Search Buffers (m)
 500

3. Landfill and Other Waste Sites

3.1 Landfill Sites

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

3.2 Other Waste Sites

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

0

Database searched and no data found.

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

2

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

ID	Distance (m)	Direction	NGR	Details
Not shown	1376	N	414340 406792	Site Address: Washpit Mills, Holmfirth, Huddersfield, West Yorkshire, HD7 1RD Type: Industrial Waste Landfill (Factory curtilage) Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WES001 EPR reference: - Operator: Westwood Yarns Limited Waste Management licence No: 60995 Annual Tonnage: 0.0 Issue Date: 19/01/1982 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Washpit Mills Correspondence Address: -, Washpit Mills, Holmfirth, Huddersfield, West Yorkshire, HD7 1RD
Not shown	1376	N	414340 406792	Site Address: Washpit Mills, Holmfirth, Huddersfield, West Yorkshire, HD9 2RD Type: Industrial Waste Landfill (Factory curtilage) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WES001 EPR reference: EA/EPR/UP3795ZF/A001 Operator: Westwood Yarns Limited Waste Management licence No: 60995 Annual Tonnage: 4000.0 Issue Date: 19/01/1982 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Washpit Mills Correspondence Address: -, -

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 1

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	102	N	Pump	414642 405548	HD9	Water Pumping Stations	Industrial Features

4.2 Petrol and Fuel Sites

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

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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

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

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

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

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

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

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

5.2 Superficial Ground and Drift Geology

Database searched and no data found.

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

5.3 Bedrock and Solid Geology

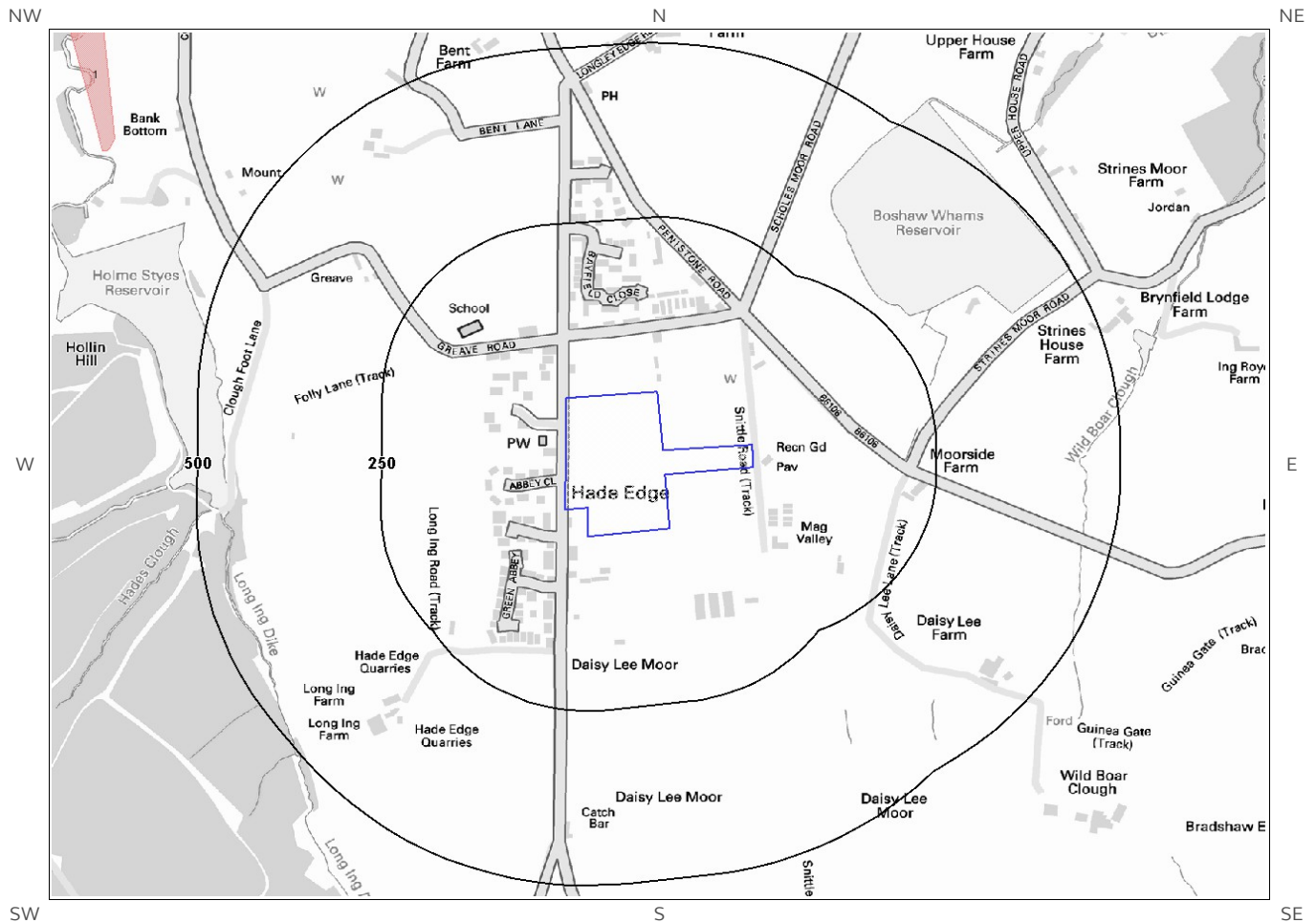
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
RR-SDST	ROUGH ROCK	SANDSTONE

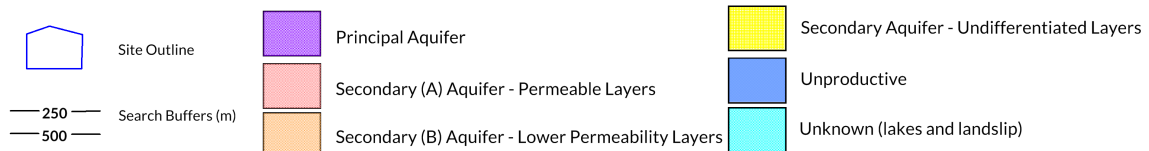
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

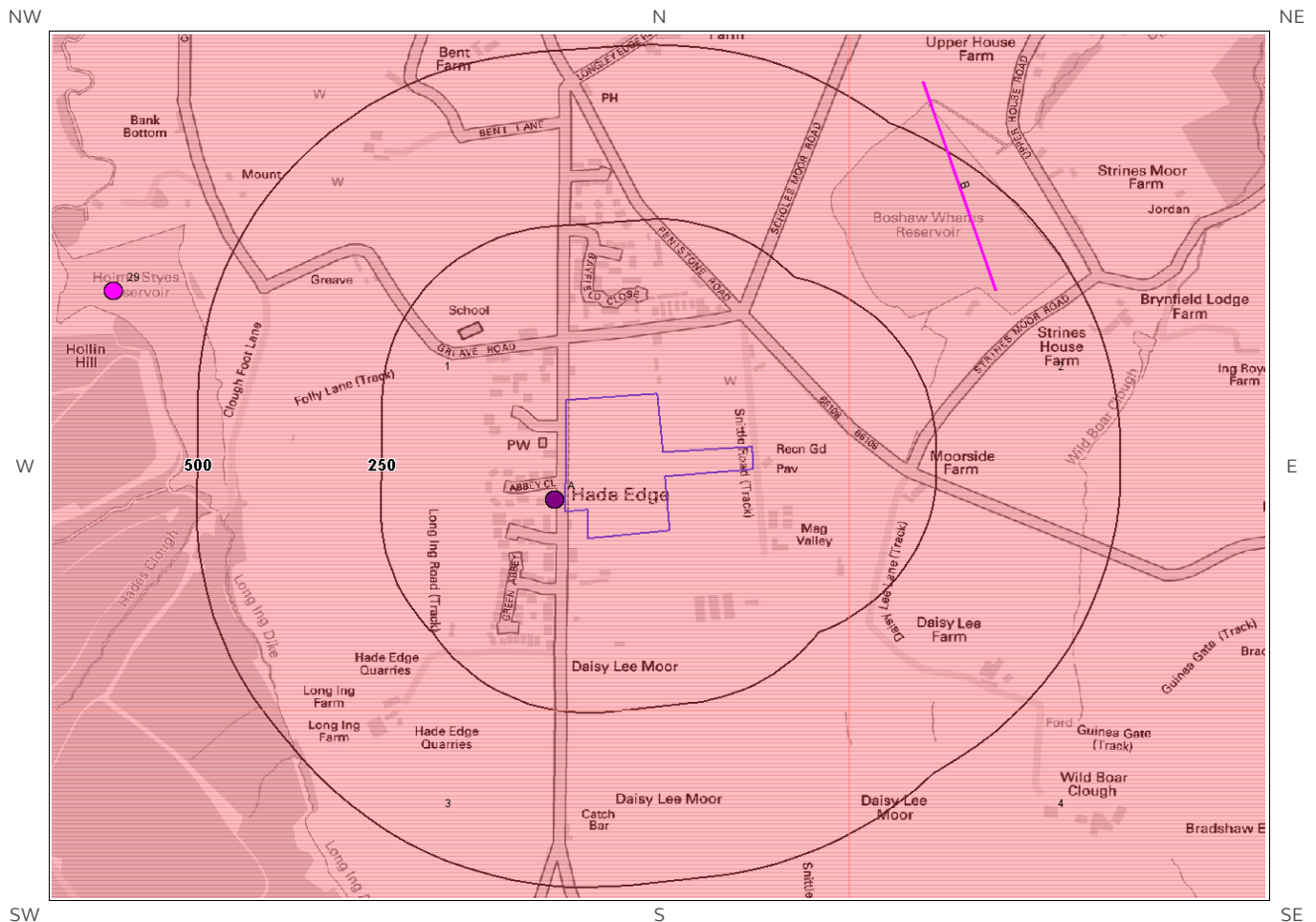
6a. Aquifer Within Superficial Geology



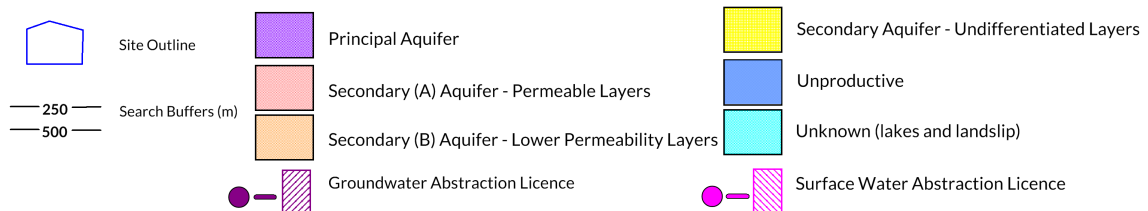
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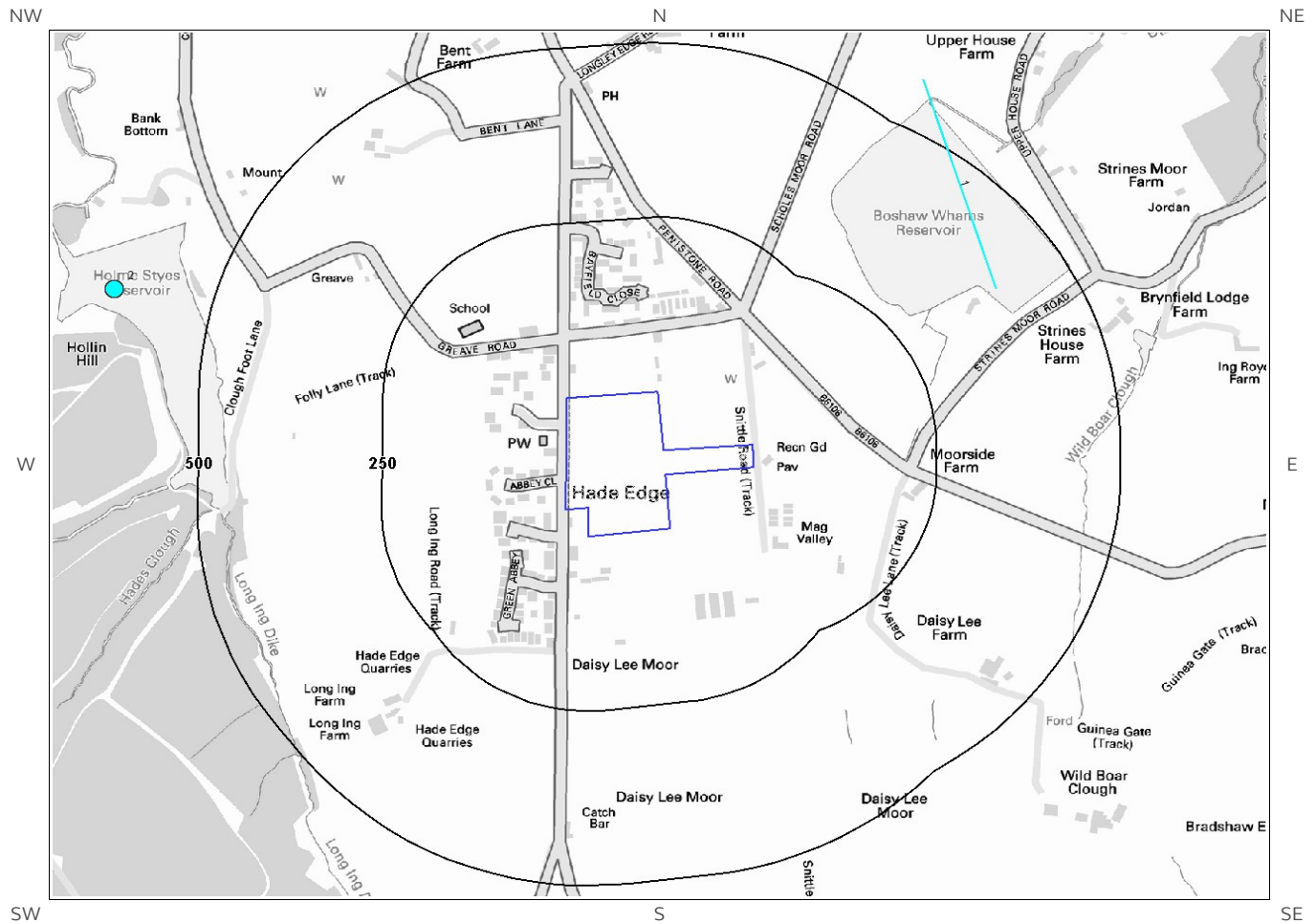
6b. Aquifer Within Bedrock Geology and Abstraction Licenses



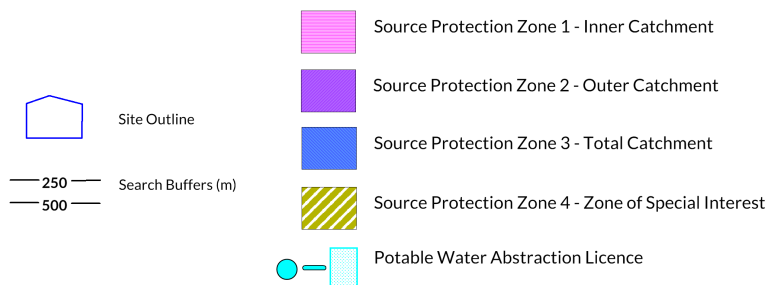
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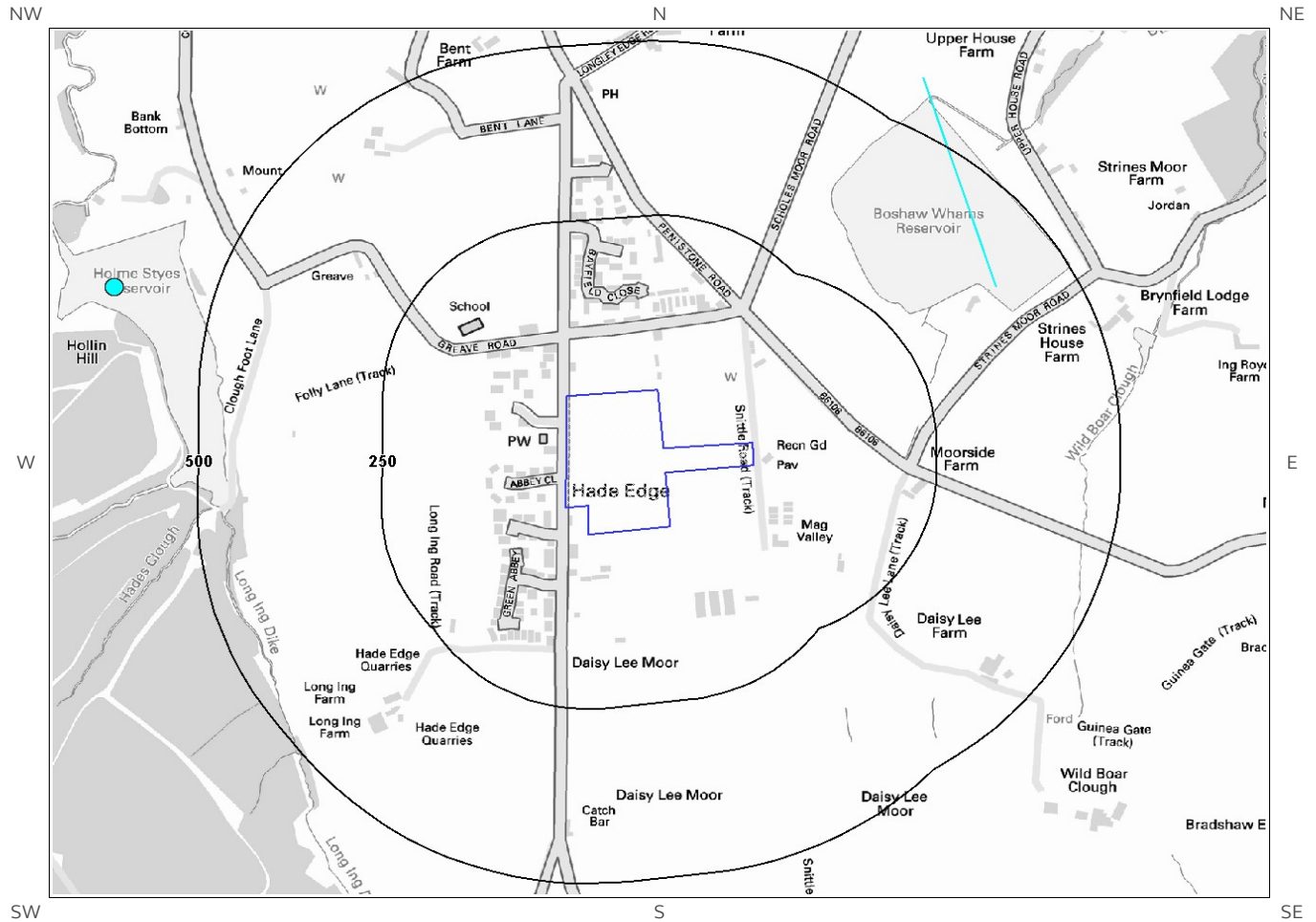
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



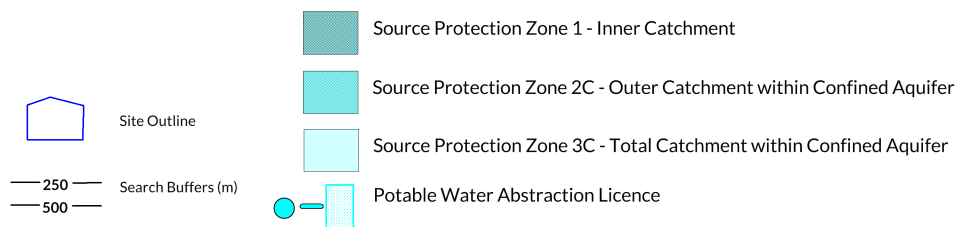
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6d. Hydrogeology – Source Protection Zones within confined aquifer



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[illegible]

- Report Reference: HMD-354-2894230
Client Reference: Dunford Road - Hade Edge

6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property?
No

Database searched and no data found.

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

6.2 Aquifer within Bedrock Deposits

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

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

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

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	131	E	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
3	246	S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	355	SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.3 Groundwater Abstraction Licences

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

Yes

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

ID	Distance (m)	Direction	NGR	Details
5A	14	W	414600 405300	Status: Historical Licence No: 2/27/10/098 Details: General Farming & Domestic Direct Source: Groundwaters Point: Well - Millstone Grit - Hade Edge Holmfirth Data Type: Point Name: LILES Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 03660 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:
6A	14	W	414600 405300	Status: Historical Licence No: 2/27/10/098 Details: General Farming & Domestic Direct Source: Groundwaters Point: Well Data Type: Point Name: LILES Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 3660 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:
Not shown	556	N	414600 406000	Status: Historical Licence No: 2/27/10/084 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring Data Type: Point Name: TAYLOR Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 3662 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:
Not shown	556	N	414600 406000	Status: Historical Licence No: 2/27/10/084 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring - Hade Edge Data Type: Point Name: TAYLOR Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 03662 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:
Not shown	568	N	414500 406000	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 Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 0366202 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:
Not shown	568	N	414500 406000	Status: Historical Licence No: 2/27/10/085 Details: General Farming & Domestic Direct Source: Groundwaters Point: Well Data Type: Point Name: TAYLOR Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 366202 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	986	E	415800 405700	Status: Historical Licence No: 2/27/10/104 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring Data Type: Point Name: BOOTH	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 2197 Original Start Date: 30/6/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/1/1970 Version End Date:
Not shown	986	E	415800 405700	Status: Historical Licence No: 2/27/10/104 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring - Hepworth Data Type: Point Name: BOOTH	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 02197 Original Start Date: 30/6/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/1/1970 Version End Date:
Not shown	1023	NW	413700 405900	Status: Historical Licence No: 2/27/10/057A Details: General Farming & Domestic Direct Source: Groundwaters Point: Well Data Type: Point Name: WALTERS	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 3280 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/1/1966 Version End Date:
Not shown	1023	NW	413700 405900	Status: Historical Licence No: 2/27/10/057A Details: General Farming & Domestic Direct Source: Groundwaters Point: Well - Millstone Grit - Carworth Moor Holmfirth Data Type: Point Name: WALTERS	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 03280 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/1/1966 Version End Date:
Not shown	1102	NE	415700 406100	Status: Historical Licence No: 2/27/10/100 Details: General Farming & Domestic Direct Source: Groundwaters Point: Well X2 Data Type: Line Name: HALL	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 3754 Original Start Date: 26/5/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/5/1966 Version End Date:
Not shown	1102	NE	415700 406100	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	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 03754 Original Start Date: 26/5/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/5/1966 Version End Date:
Not shown	1257	N	414900 406700	Status: Historical Licence No: 2/27/10/075 Details: General Farming & Domestic Direct Source: Groundwaters Point: -- Gravity Data Type: Point Name: GARLICK	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 4199 Original Start Date: 26/5/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/5/1966 Version End Date:
Not shown	1257	N	414900 406700	Status: Historical Licence No: 2/27/10/075 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring Data Type: Point Name: GARLICK	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 04199 Original Start Date: 26/5/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/5/1966 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1332	E	416200 405300	Status: Historical Licence No: 2/27/10/074 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring Data Type: Point Name: DENTON	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 4120 Original Start Date: 17/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/3/1966 Version End Date:
Not shown	1332	E	416200 405300	Status: Historical Licence No: 2/27/10/074 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring - Hepworth Data Type: Point Name: DENTON	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 04120 Original Start Date: 17/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/3/1966 Version End Date:
Not shown	1555	NW	413700 406700	Status: Historical Licence No: 2/27/10/113 Details: Raw Water Supply Direct Source: Groundwaters Point: Well - Millstone Grit - Carworth Moor Holmfirth Data Type: Point Name: WELLHOUSES RESIDENT ASSOCIATION	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 05671 Original Start Date: 24/7/1980 Expiry Date: - Issue No: 101 Version Start Date: 9/9/2002 Version End Date:
Not shown	1555	NW	413700 406700	Status: Historical Licence No: 2/27/10/113 Details: Raw Water Supply Direct Source: Groundwaters Point: Well Data Type: Point Name: WELLHOUSE PUMP BOARD	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 5671 Original Start Date: 24/7/1980 Expiry Date: - Issue No: 100 Version Start Date: 24/7/1980 Version End Date:
Not shown	1571	N	414400 407000	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	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 01319 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:
Not shown	1571	N	414400 407000	Status: Historical Licence No: 2/27/10/080 Details: General Farming & Domestic Direct Source: Groundwaters Point: Wells X3 Data Type: Point Name: BATTYE	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 1319 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:
Not shown	1608	E	416370 405950	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	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 04254 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:
Not shown	1608	E	416370 405950	Status: Historical Licence No: 2/27/10/086 Details: General Farming & Domestic Direct Source: Groundwaters Point: -- Borehole Data Type: Point Name: SMITH	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 4254 Original Start Date: 28/4/1966 Expiry Date: - Issue No: 100 Version Start Date: 28/4/1966 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site?

Yes

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

ID	Distance (m)	Direction	NGR	Details	
27B	400	NE	415100 405900	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	Annual Volume (m³): - Max Daily Volume (m³): - Application No: 5434 Original Start Date: 3/8/1977 Expiry Date: - Issue No: 100 Version Start Date: 3/8/1977 Version End Date:
28B	400	NE	415100 405900	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	Annual Volume (m³): 55000 Max Daily Volume (m³): 450 Application No: 5434 Original Start Date: 3/8/1977 Expiry Date: - Issue No: 100 Version Start Date: 1/4/2006 Version End Date:
29	635	W	414000 405600	Status: Active Licence No: 2/27/10/063 Details: Potable Water Supply - Direct Direct Source: Surface Water Point: Holme Styles Reservoir Data Type: Point Name: YORKSHIRE WATER SERVICES LTD	Annual Volume (m³): 5840000 Max Daily Volume (m³): 5840000 Application No: NPS/WR/012980 Original Start Date: 27/1/1966 Expiry Date: - Issue No: 101 Version Start Date: 7/3/2013 Version End Date:
Not shown	1175	NW	414100 406500	Status: Active 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	Annual Volume (m³): 295496 Max Daily Volume (m³): 1130 Application No: 1260(1) Original Start Date: 20/1/1966 Expiry Date: - Issue No: 101 Version Start Date: 12/10/2006 Version End Date:
Not shown	1175	NW	414100 406500	Status: Active 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	Annual Volume (m³): 295496 Max Daily Volume (m³): 1130 Application No: 1260(1) Original Start Date: 20/1/1966 Expiry Date: - Issue No: 101 Version Start Date: 12/10/2006 Version End Date:
Not shown	1451	N	414100 406800	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	Annual Volume (m³): 9092 Max Daily Volume (m³): 45.46 Application No: 1260(2) Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/4/2008 Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1451	N	414100 406800	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 Annual Volume (m³): - Max Daily Volume (m³): - Application No: 12602 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 3/5/1991 Version End Date:
Not shown	1692	SW	413500 404000	Status: Active Licence No: 2/27/05/026 Details: Potable Water Supply - Storage Direct Source: Surface Water Point: Winscar Reservoir Data Type: Point Name: YORKSHIRE WATER SERVICES LTD Annual Volume (m³): 10140000 Max Daily Volume (m³): 38640 Application No: 1467 Original Start Date: 7/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 24/2/1971 Version End Date:
Not shown	1704	SW	413600 403900	Status: Active Licence No: 2/27/05/026 Details: Potable Water Supply - Storage Direct Source: Surface Water Point: Snailsden Reservoir Data Type: Point Name: YORKSHIRE WATER SERVICES LTD Annual Volume (m³): 10140000 Max Daily Volume (m³): 38640 Application No: 1467 Original Start Date: 7/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 24/2/1971 Version End Date:
Not shown	1716	S	415200 403600	Status: Active Licence No: 2/27/05/026 Details: Potable Water Supply - Storage Direct Source: Surface Water Point: Harden Reservoir Data Type: Point Name: YORKSHIRE WATER SERVICES LTD Annual Volume (m³): 10140000 Max Daily Volume (m³): 38640 Application No: 1467 Original Start Date: 7/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 24/2/1971 Version End Date:

6.5 Potable Water Abstraction Licences

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

Yes

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

ID	Distance (m)	Direction	NGR	Details
1	400	NE	415100 405900	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 Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 5434 Original Start Date: 3/8/1977 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
2	635	W	414000 405600	Status: Active Licence No: 2/27/10/063 Details: Potable Water Supply - Direct Direct Source: Surface Water Point: Holme Styles Reservoir Data Type: Point Name: YORKSHIRE WATER SERVICES LTD Annual Volume (m³): 5840000 Max Daily Volume (m³): 5840000 Original Application No: NPS/WR/012980 Original Start Date: 27/1/1966 Expiry Date: - Issue No: 101 Version Start Date: Version End Date:

ID	Distance (m)	Direction	NGR	Details
Not shown	1692	SW	413500 404000	Status: Active Licence No: 2/27/05/026 Details: Potable Water Supply - Storage Direct Source: Surface Water Point: Winscar Reservoir Data Type: Point Name: YORKSHIRE WATER SERVICES LTD Annual Volume (m³): 10140000 Max Daily Volume (m³): 38640 Original Application No: 1467 Original Start Date: 7/12/1965 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1704	SW	413600 403900	Status: Active Licence No: 2/27/05/026 Details: Potable Water Supply - Storage Direct Source: Surface Water Point: Snailsden Reservoir Data Type: Point Name: YORKSHIRE WATER SERVICES LTD Annual Volume (m³): 10140000 Max Daily Volume (m³): 38640 Original Application No: 1467 Original Start Date: 7/12/1965 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1716	S	415200 403600	Status: Active Licence No: 2/27/05/026 Details: Potable Water Supply - Storage Direct Source: Surface Water Point: Harden Reservoir Data Type: Point Name: YORKSHIRE WATER SERVICES LTD Annual Volume (m³): 10140000 Max Daily Volume (m³): 38640 Original Application No: 1467 Original Start Date: 7/12/1965 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

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

No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

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

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site?

Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.
147	W	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

6.9 River Quality

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

No

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

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

Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details
1	203	E	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
2	211	E	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
3	211	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	230	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
5	255	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
6	290	NE	River Name: Boshaw Whams Reservoir Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
7	353	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
8	412	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
9	442	E	River Name: Wild Boar Clough Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
10	451	W	River Name: Long Ing Dike Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
11A	464	W	River Name: Holme Styes Reservoir Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
12	466	W	River Name: Holme Styes Reservoir Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
13A	466	W	River Name: Holme Styes Reservoir Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
14	469	SW	River Name: Long Ing Dike Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
15	469	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
16	474	W	River Name: Hades Clough Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
17	482	W	River Name: Holme Styes Reservoir Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
18	482	W	River Name: Holme Styes Reservoir Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
19	500	SW	River Name: Long Ing Dike Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

6.11 Surface Water Features

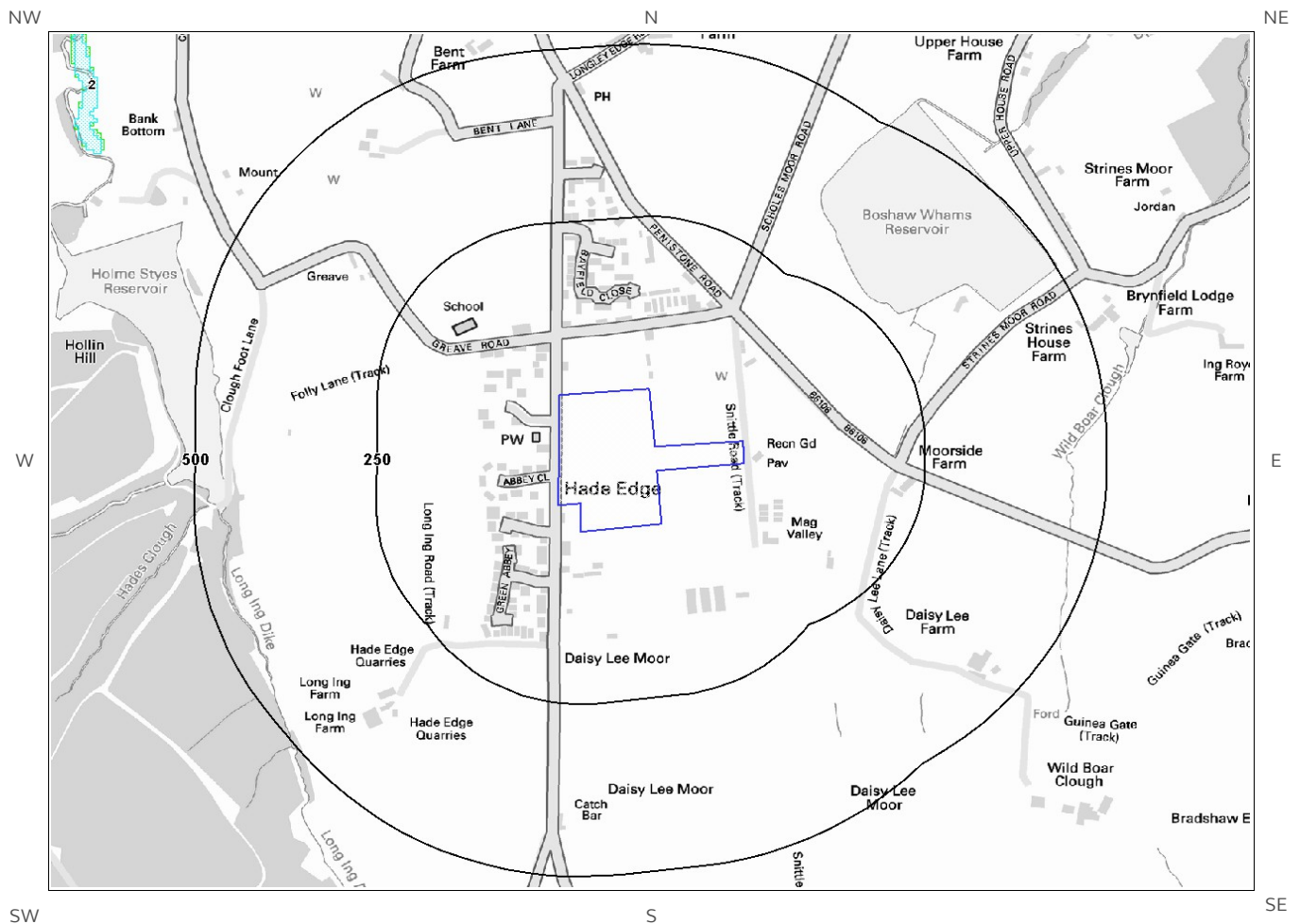
Are there any surface water features within 250m of the study site?

Yes

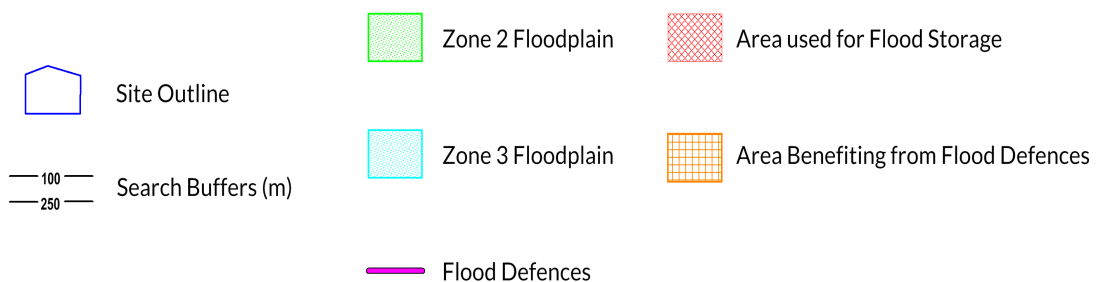
The following surface water records are not represented on mapping:

Distance (m)	Direction
211	E

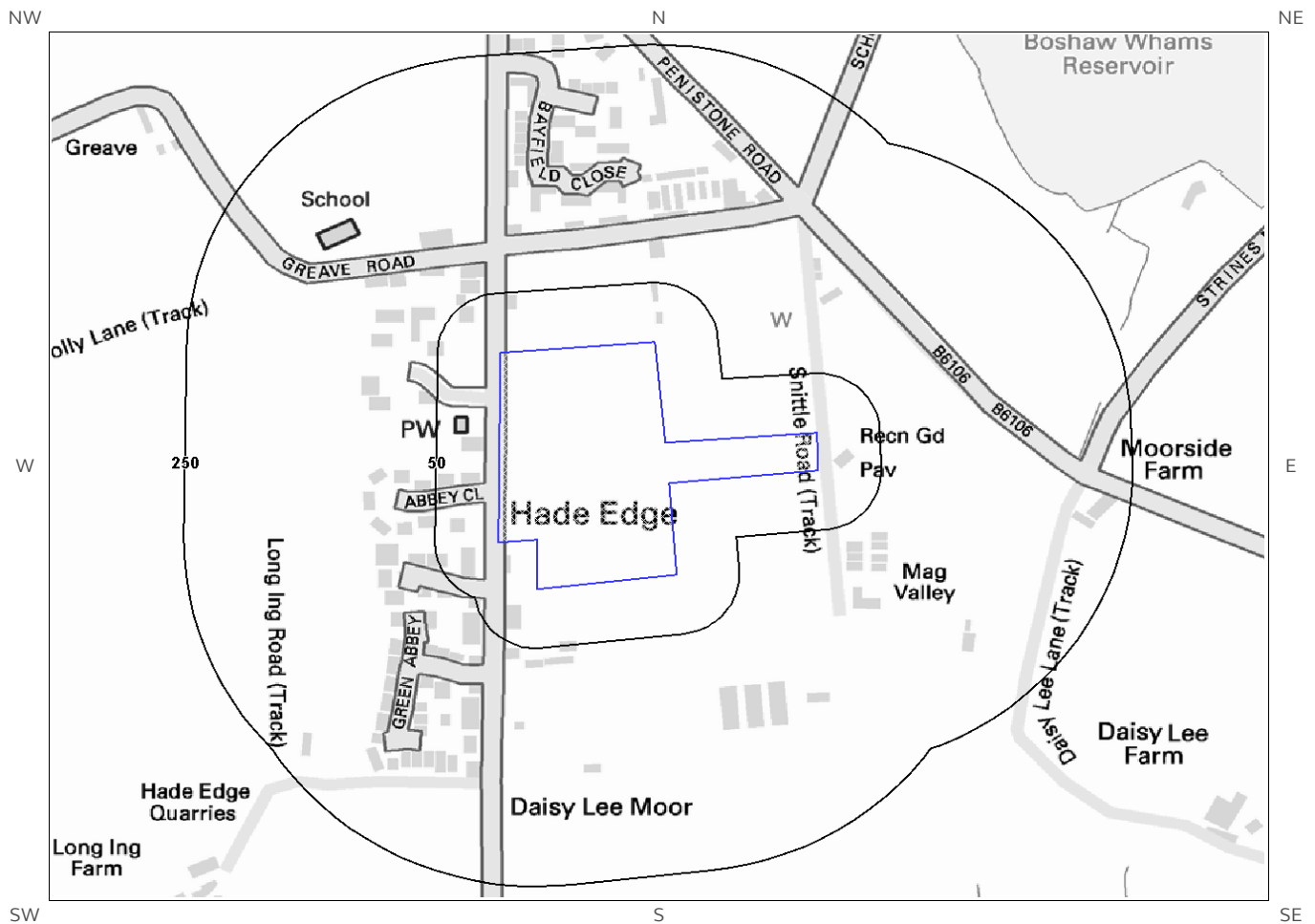
7a. Environment Agency Flood Map for Planning (from rivers and the sea)



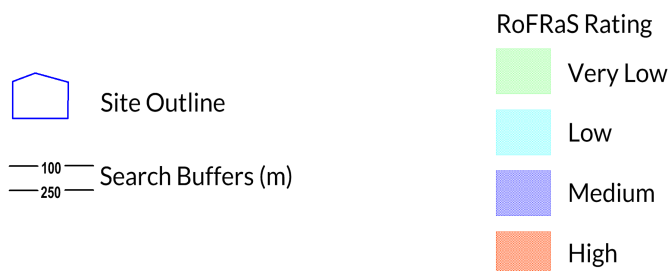
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7b. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency Zone 2 floodplain? No

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

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency Zone 3 floodplain? No

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

Database searched and no data found.

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

What is the highest risk of flooding onsite? Very Low

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

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

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

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

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

No

7.7 Groundwater Flooding Susceptibility Areas

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

Does this relate to Clearwater Flooding or Superficial Deposits Flooding?

Clearwater Flooding

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

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

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

7.8 Groundwater Flooding Confidence Areas

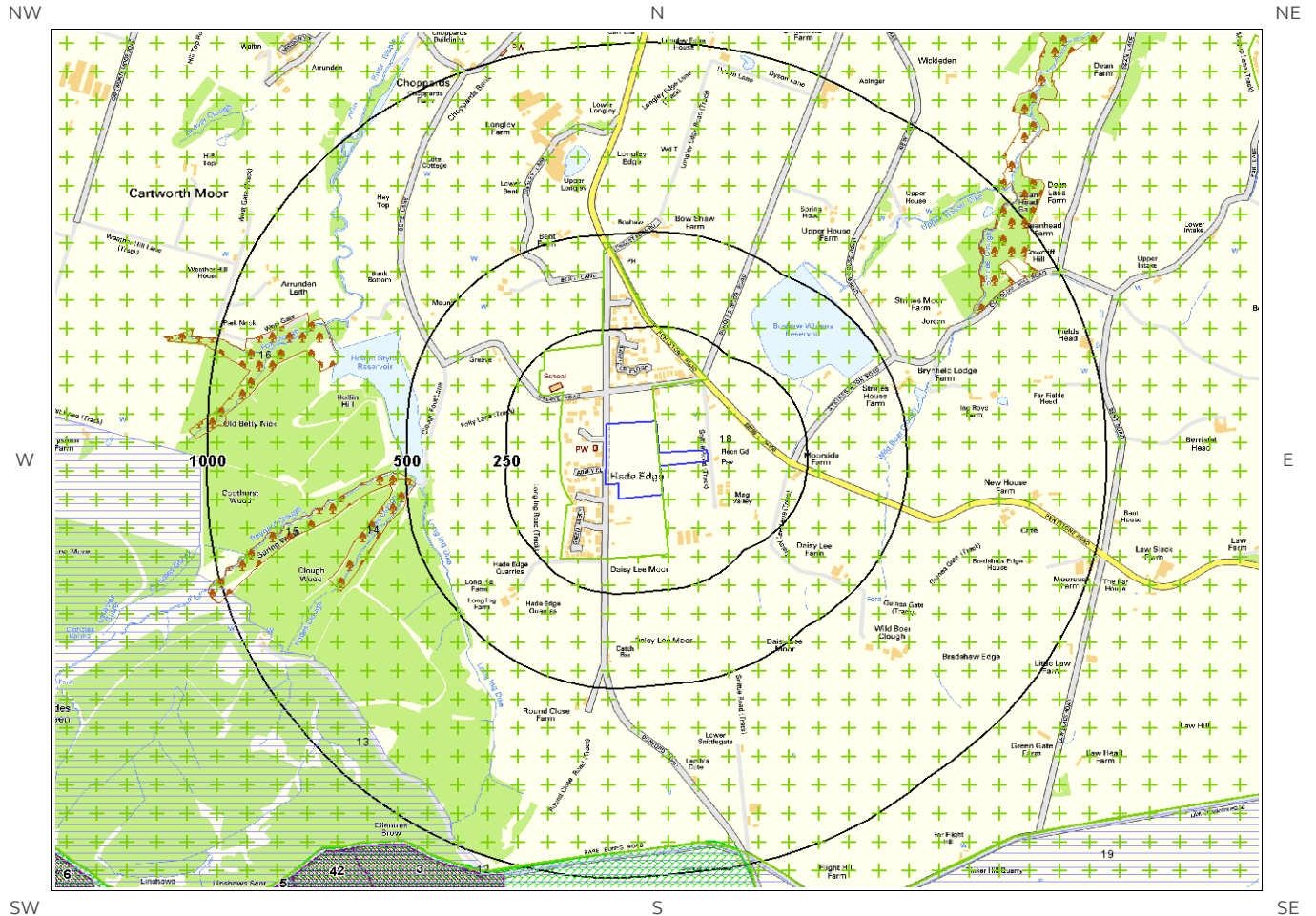
What is the British Geological Survey confidence rating in this result?

Low

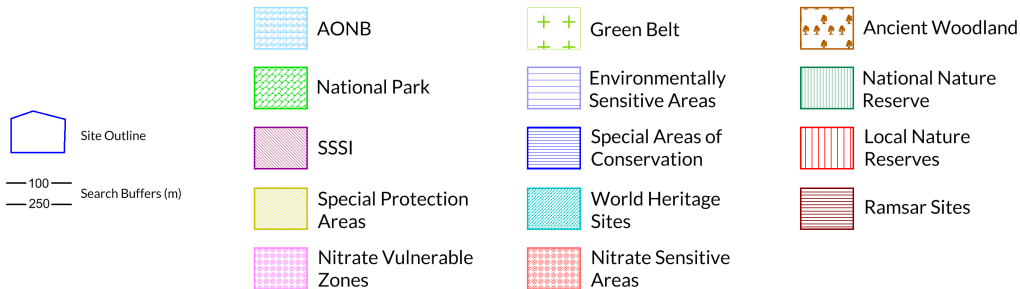
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

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

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site?

Yes

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

9

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

ID	Distance (m)	Direction	SSSI Name	Data Source
3	1033	S	Dark Peak	Natural England
4	1137	SW	Dark Peak	Natural England
5	1289	SW	Dark Peak	Natural England
6	1447	SW	Dark Peak	Natural England
Not shown	1547	S	Dark Peak	Natural England
Not shown	1654	W	Dark Peak	Natural England
Not shown	1680	W	Dark Peak	Natural England
Not shown	1840	SW	Dark Peak	Natural England
Not shown	1859	S	Dark Peak	Natural England

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	SAC Name	Data Source
1	1033	S	South Pennine Moors	Natural England

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

1

The following Special Protection Area (SPA) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SPA Name	Data Source
2	1033	S	Peak District Moors (South Pennine Moors Phase 1)	Natural England

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

0

Database searched and no data found.

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

4

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

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
14	479	W	UNKNOWN	Ancient Replanted Woodland
15	496	W	UNKNOWN	Ancient Replanted Woodland
16	696	W	UNKNOWN	Ancient Replanted Woodland
17	762	NE	UNKNOWN	Ancient and Semi-Natural Woodland

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

1

The following Environmentally Sensitive Area records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	ESA Name	Data Source
13	850	SW	North Peak	Natural England

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

0

Database searched and no data found.

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

1

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

ID	Distance (m)	Direction	SSSI Name	Data Source
12	923	S	Peak District	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

2

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

ID	Distance	Direction	Green Belt Name	Local Authority Name
18	0	On Site	Liverpool, Manchester and West Yorks Greenbelt	Kirklees District (B)
19	969	S	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

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

9.1.1 Shrink Swell

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

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

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

9.1.2 Landslides

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

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

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

9.1.3 Soluble Rocks

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

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

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

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

9.1.4 Compressible Ground

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

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

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

9.1.5 Collapsible Rocks

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

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

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

9.1.6 Running Sand

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

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

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

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

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

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

10. Mining

10.1 Coal Mining

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

Yes

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

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

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary?

Yes

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

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

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

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

No

Guidance: No Guidance Required.

Contact Details

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



British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:
Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk



**British
Geological Survey**
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506

Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk



Public Health England

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



Public Health
England

The Coal Authority

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



The Coal
Authority

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505



Local Authority

Authority: Kirklees Council
Phone: 01484 221 000
Web: <http://www.kirklees.gov.uk/>
Address: Civic Centre 3, Market Street, Huddersfield, HD1 1WG

Gemapping PLC

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



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

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

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

“Beneficiary” means the person or entity for whose benefit the Client has obtained the Services.

“Client” means the party or parties entering into a Contract with Groundsure.

“Commercial” means any building or property which is not Residential.

“Confidential Information” means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

“Support Services” means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

“Contract” means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

“Third Party Data Provider” means any third party providing Third Party Content to Groundsure.

“Data Reports” means reports comprising factual data with no accompanying interpretation.

“Fees” has the meaning set out in clause 5.1.

“Groundsure” means Groundsure Limited, a company registered in England and Wales under number 03421028.

“Groundsure Materials” means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

“Intellectual Property” means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

“Mapping” means a map, map data or a combination of historical maps of various ages, time periods and scales.

“Order” means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.

“Ordnance Survey” means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

“Order Website” means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

“Report” means a Risk Screening Report or Data Report for Commercial or Residential property.

“Residential” means any building or property used as or intended to be used as a single dwelling.

“Risk Screening Report” means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

“Services” means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

“Site” means the area of land in respect of which the Client has requested Groundsure to provide the Services.

“Third Party Content” means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

“User Guide” means the user guide, as amended from time to time, available upon request from Groundsure and on the website (www.Groundsure.com) and forming part of this Contract.

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

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client’s order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure's acceptance of an Order shall be binding only when made in writing and signed by Groundsure's authorised representative or when accepted through the Order Website.

3 The Client’s obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary’s needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client’s approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

- (i) the Beneficiary,
- (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
- (iv) the first purchaser or first tenant of the Site, and
- (v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 Groundsure shall charge and the Client shall pay fees at the rate and

frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

- (i) full payment of all relevant Fees and
- (ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

- (i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;
- (ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;
- (iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
- (iv) not combine the Services with or incorporate such Services into any other information data or service;
- (v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);
- (vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and
- (vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

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

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

- (i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or

subcontractors;

- (ii) any use made of the Reports, Services, Materials or any part of them; and
- (iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

- (i) loss of profits;
- (ii) loss of business;
- (iii) depletion of goodwill and/or similar losses;
- (iv) loss of anticipated savings;
- (v) loss of goods;
- (vi) loss of contract;
- (vii) loss of use;
- (viii) loss or corruption of data or information;
- (ix) business interruption;
- (x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
- (xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;
- (xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
- (xiii) loss or damage to a computer, software, modem, telephone or other property; and
- (xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

- (i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or
- (ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
- (iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
- (iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

- (a) supplied to the Client's specification(s) and in any event
- (b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner. In the event you are not satisfied with Groundsure's complaints handling process or you are unable to resolve the complaint, at your discretion you may refer the complaint to The Property Ombudsman Scheme at the following URL/email: website www.tpos.co.uk or email: admin@tpos.co.uk

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. © Groundsure Limited June 2013

Groundsure Geoinsight

Address: 414710, 405310,
Date: 11 Apr 2016
Reference: HMD-354-2894231
Client: Michael D Joyce Associates LLP



Aerial Photograph Capture date: 26-Mar-2012
Grid Reference: 414689,405365
Site Size: 2.91ha

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Overview of Findings

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

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

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

Section 1:Geology

1.1 Artificial Ground	1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?	No
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?	No
	1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	1.2.4 Are there any records relating to permeability of landslips within the study site boundary?	No
1.3 Bedrock, Solid Geology & Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?	Yes
	1.3.3 Are there any records of faults within 500m of the study site boundary?	Yes
1.4 Radon data	1.4.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level
	1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary

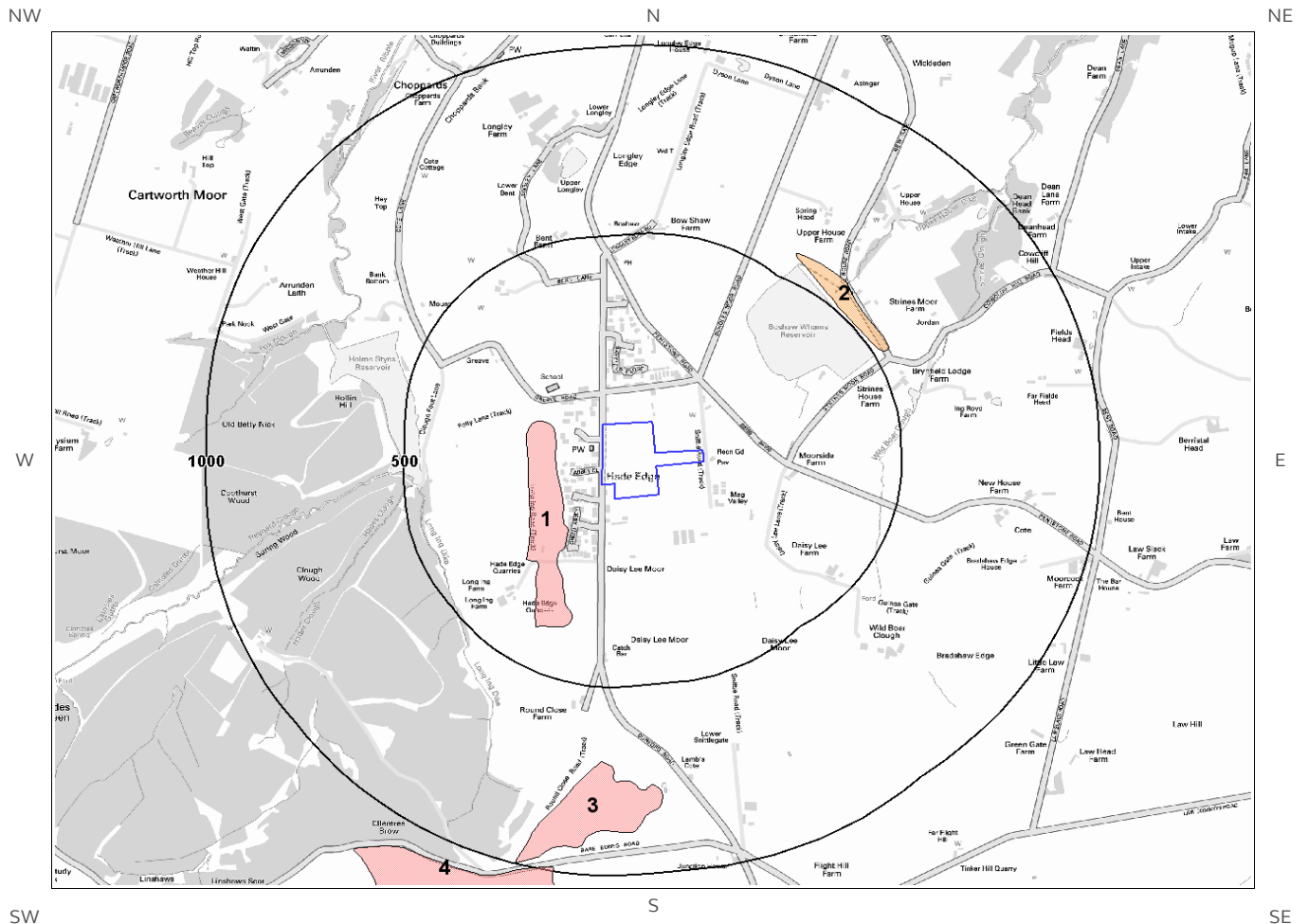
Section 2:Ground Workings	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	26	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	2	7	10

Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	1	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	1	0	2	1	1
3.5 Non-Coal Mining Cavities	0	0	1	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0
Section 4: Natural Ground Subsidence	On-site				
4.1 Shrink Swell Clay	Negligible				
4.2 Landslides	Very Low				
4.3 Ground Dissolution of Soluble Rocks	Negligible				
4.4 Compressible Deposits	Negligible				
4.5 Collapsible Deposits	Very Low				
4.6 Running Sand	Negligible				
Section 5: Borehole Records	On-site	0-50m	51-250		
5 BGS Recorded Boreholes	0	0	0		
Section 6: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
6 Records of Background Soil Chemistry	1	1	10		
Section 7: Railways and Tunnels	On-site	0-50m	51-250	251-500	
7.1 Tunnels	0	0	0	Not Searched	
7.2 Historical Railway and Tunnel Features	0	0	0	Not Searched	
7.3 Historical Railways	0	0	0	Not Searched	
7.4 Active Railways	0	0	0	Not Searched	

Section 7:Railways and Tunnels	On-site	0-50m	51-250	251-500
7.5 Railway Projects	0	0	0	0

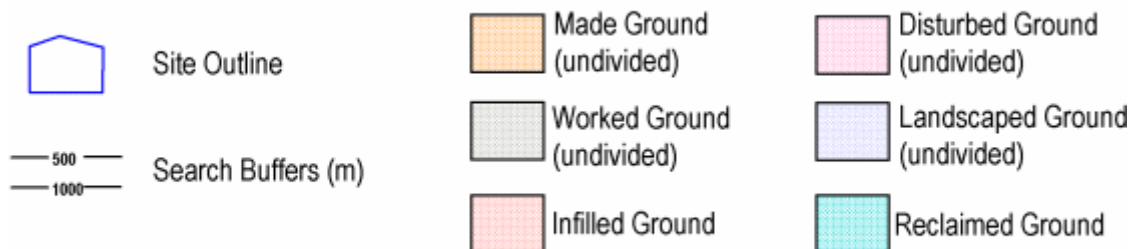
1 Geology

1.1 Artificial Ground Map



Artificial Ground Legend

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1 Geology

1.1 Artificial Ground

1.1.1 Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:086

Are there any records of Artificial/Made Ground within 500m of the study site boundary? Yes

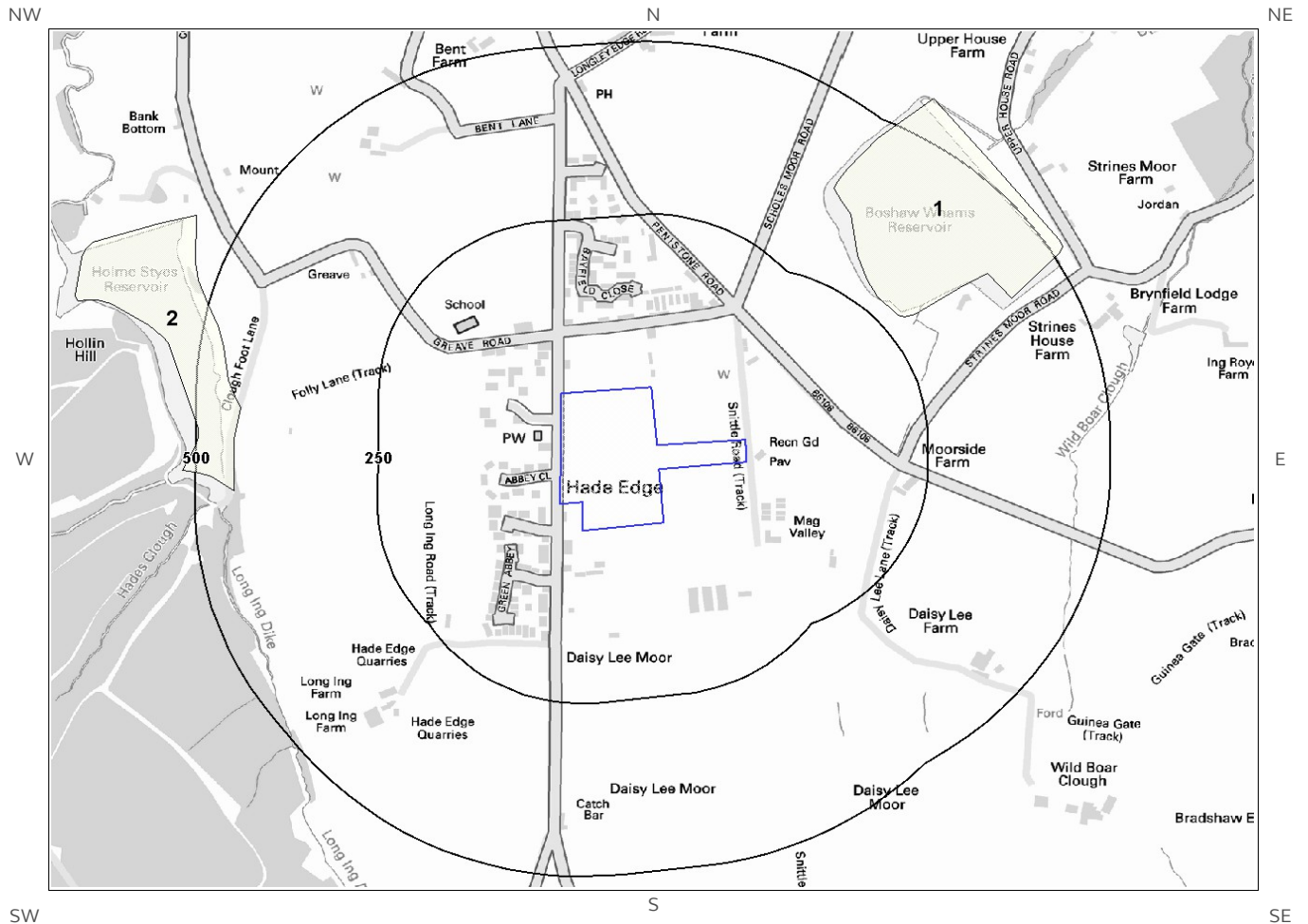
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	105.0	W	WMGR-MGRD	INFILLED GROUND	ARTIFICIAL DEPOSIT

1.1.2 Permeability of Artificial Ground

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

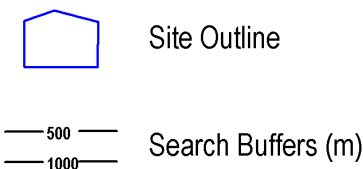
Database searched and no data found.

1.2 Superficial Deposits and Landslips Map



**Superficial Deposits and Landslips
Legend**

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1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	275.0	NE	SUPNM	SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY]	UNKNOWN/UNCLASSIFIED ENTRY
2	440.0	W	SUPNM	SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY]	UNKNOWN/UNCLASSIFIED ENTRY

1.2.2 Permeability of Superficial Ground

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

Database searched and no data found.

1.2.3 Landslip

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

Database searched and no data found.

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

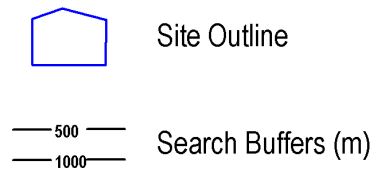
1.2.4 Landslip Permeability

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

Database searched and no data found.

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

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1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:086

1.3.1 Bedrock/ Solid Geology

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

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	RR-SDST	Rough Rock - Sandstone	Yeadonian
2B	105.0	W	RF-SDST	Rough Rock Flags - Sandstone	Yeadonian
3	172.0	W	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian
4C	352.0	W	MARSD-MDSI	Marsden Formation - Mudstone And Siltstone	Marsdenian
5	400.0	W	HDW-SDST	Huddersfield White Rock - Sandstone	Marsdenian
6	448.0	W	MARSD-MDSI	Marsden Formation - Mudstone And Siltstone	Marsdenian
7	450.0	NW	ROSSE-MDSI	Rossendale Formation - Mudstone And Siltstone	Yeadonian
8	459.0	NW	MARSD-MDSI	Marsden Formation - Mudstone And Siltstone	Marsdenian
9	470.0	NW	HDW-SDST	Huddersfield White Rock - Sandstone	Marsdenian
10	490.0	NW	HDW-SDST	Huddersfield White Rock - Sandstone	Marsdenian

1.3.2 Permeability of Bedrock Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	High	Moderate

1.3.3 Faults

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

ID	Distance (m)	Direction	Category Description	Feature Description
34	129.0	SW	ROCK	Coal seam, inferred
35B	169.0	SW	ROCK	Coal seam, observed
36	284.0	SW	ROCK	Coal seam, observed

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

ID	Distance (m)	Direction	Category Description	Feature Description
37C	352.0	W	FOSSIL_HORIZON	Marine band
38	367.0	S	ROCK	Coal seam, inferred
39	450.0	NW	FAULT	Fault, inferred, crossmark on downthrow side, throw in metres
40	459.0	NW	FOSSIL_HORIZON	Marine band
41	490.0	NW	FAULT	Fault, inferred, crossmark on downthrow side, throw in metres

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

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

1.4 Radon Data

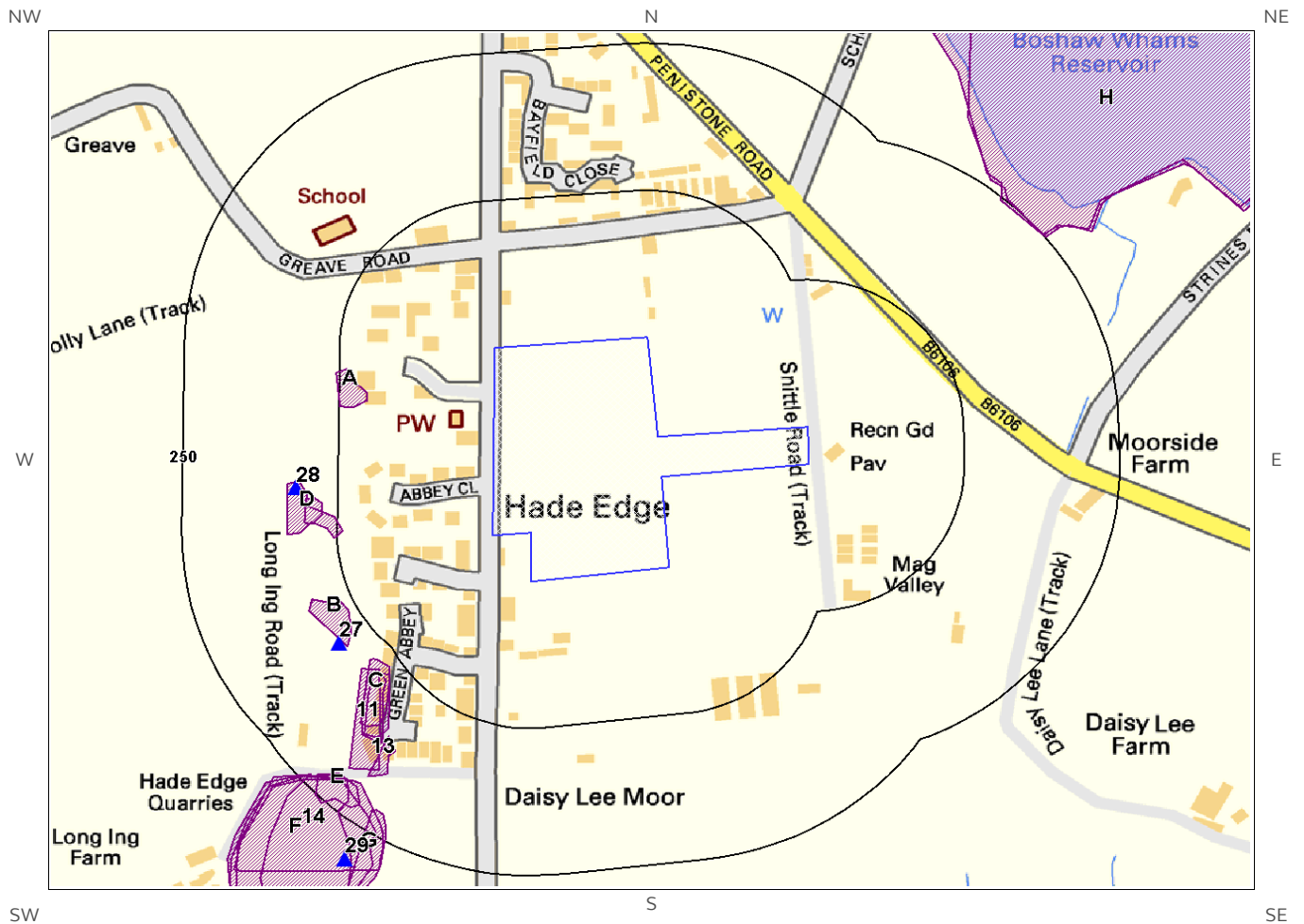
1.4.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level

1.4.2 Radon Protection

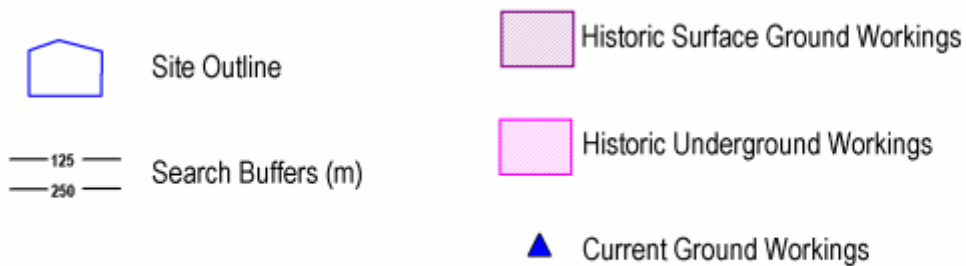
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary

2 Ground Workings Map



Ground Workings Legend

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2 Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

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

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

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

ID	Distance (m)	Direction	NGR	Use	Date
1A	102.0	W	414501 405410	Unspecified Pit	1980
2A	102.0	W	414501 405410	Unspecified Pit	1970
3D	120.0	W	414459 405308	Unspecified Quarry	1948
4B	132.0	SW	414483 405211	Unspecified Pit	1980
5B	132.0	SW	414483 405211	Unspecified Pit	1970
6C	135.0	SW	414520 405151	Refuse Heap	1980
7C	135.0	SW	414520 405151	Refuse Heap	1970
8D	137.0	W	414470 405306	Unspecified Pit	1980
9D	137.0	W	414470 405306	Unspecified Pit	1970
10C	139.0	SW	414521 405141	Sand Pit	1951
11	144.0	SW	414513 405129	Unspecified Quarry	1948
12C	144.0	SW	414518 405139	Refuse Heap	1888
13	174.0	SW	414525 405098	Unspecified Pit	1951
14	220.0	SW	414466 405038	Unspecified Quarries	1951
15E	224.0	SW	414489 405068	Refuse Heap	1980
16E	224.0	SW	414489 405068	Refuse Heap	1970
17F	225.0	SW	414460 404932	Unspecified Quarries	1888
18F	227.0	SW	414473 404931	Unspecified Quarries	1948
19G	230.0	SW	414501 404978	Unspecified Quarries	1919
20G	230.0	SW	414501 404978	Unspecified Quarries	1878

ID	Distance (m)	Direction	NGR	Use	Date
21F	241.0	SW	414445 404941	Unspecified Quarries	1919
22F	241.0	SW	414445 404941	Unspecified Quarries	1878
23H	247.0	NE	415131 405703	Reservoir	1948
24H	250.0	NE	415145 405702	Reservoir	1980
25H	250.0	NE	415145 405702	Reservoir	1970
26H	250.0	NE	415145 405702	Reservoir	1951

2.2 Historical Underground Working Features derived from Historical Mapping

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

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

Database searched and no data found.

2.3 Current Ground Workings

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

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

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

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
27	154.0	SW	414490 405193	Sandstone	Daisy Lee Moor Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
28	159.0	W	414455 405325	Sandstone	Hade Edge	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
29	280.0	SW	414495 405010	Sandstone	Hade Edge Quarries	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	341.0	SW	414475 404950	Sandstone	Hade Edge	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	370.0	NW	414373 405723	Sandstone	Greave Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	375.0	S	414547 404884	Sandstone	Hade Edge Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	399.0	SW	414472 404887	Sandstone	Hade Edge Quarries	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	434.0	N	414488 405859	Sandstone	Lane Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	448.0	S	414484 404828	Sandstone	Hade Edge Quarries	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	710.0	NE	415484 405731	Sandstone	Jordan Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	769.0	W	413875 405650	Sandstone	Park Nook Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	793.0	NW	414169 406099	Sandstone	Hey Top Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	794.0	N	414800 406245	Sandstone	Longley Edge	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	838.0	S	414535 404415	Sandstone	Goose Hole	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	862.0	S	414675 404385	Sandstone	Lambs Cote	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	911.0	S	414537 404341	Sandstone	Goose Hole	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	916.0	S	414822 404344	Sandstone	Bare Bones Road	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	956.0	S	414487 404303	Sandstone	Mount Pleasant	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	978.0	N	414965 406405	Sandstone	Longley	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3 Mining, Extraction & Natural Cavities

3.1 Historical Mining

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

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

Database searched and no data found.

3.2 Coal Mining

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

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

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

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

3.3 Johnson Poole and Bloomer

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

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

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

3.4 Non-Coal Mining

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

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

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

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Not available	Vein Mineral	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
2	131.0	E	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
3	246.0	S	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
4	355.0	SE	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
Not shown	648.0	S	Not available	Vein Mineral	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

3.5 Non-Coal Mining Cavities

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

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

The following Non-Coal Mining Cavities information provided by Peter Brett Associates:

ID	Distance (m)	Direction	NGR	Address	Superficial Deposits	Bedrock Deposits	Extracted Mineral
6	114.0	W	414500 405300	HADE EDGE, West Yorkshire	-	-	Firestone, Freestone, Hearthstone, Honestone, Ragstone, Sandstone, Scythestone, Silver Sand, Whetstone

3.6 Natural Cavities

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

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

Database searched and no data found.

3.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

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

Database searched and no data found.

3.8 Gypsum Extraction

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

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

Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level.

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

Database searched and no data found.

3.10 Clay Mining

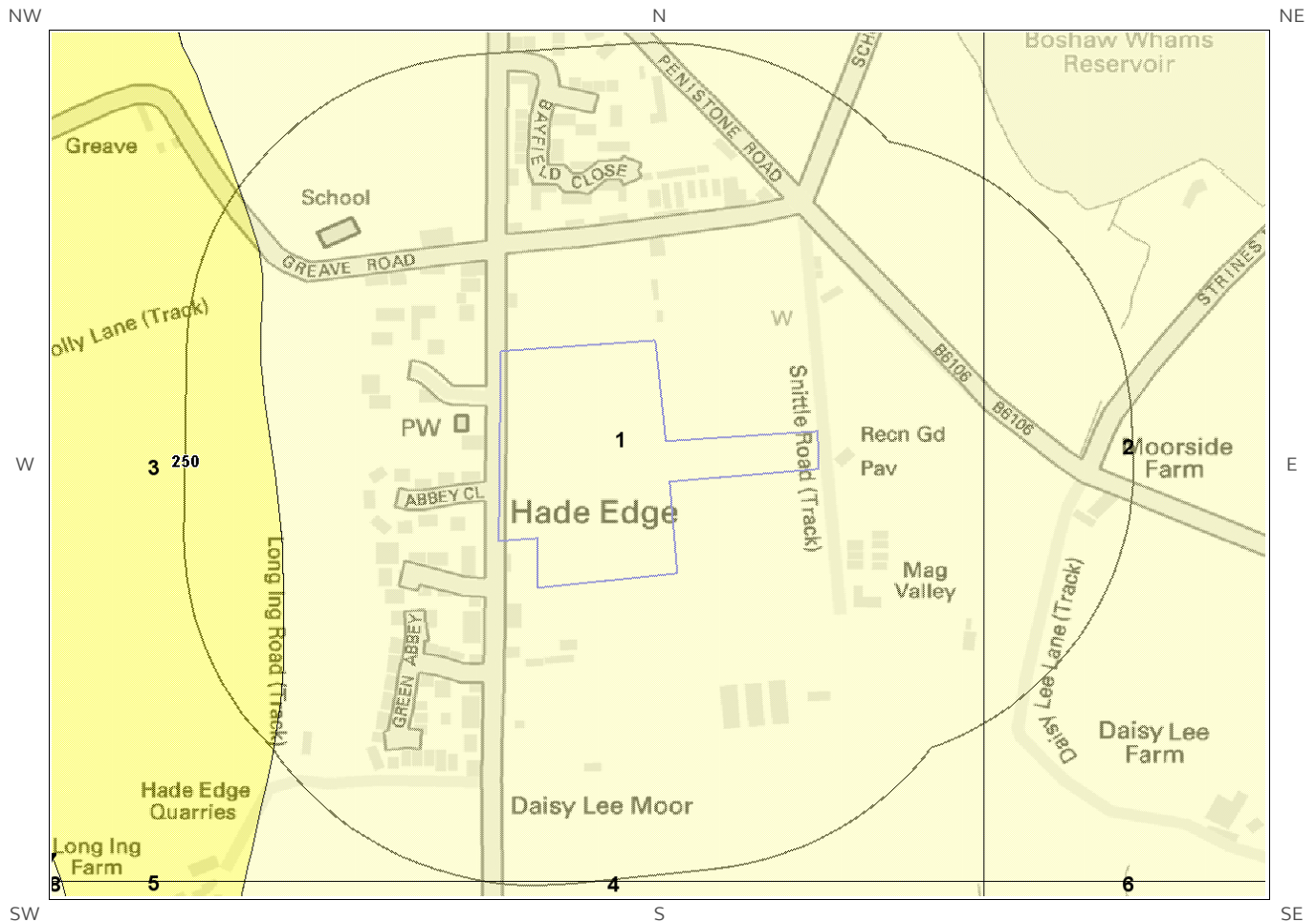
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

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

Database searched and no data found.

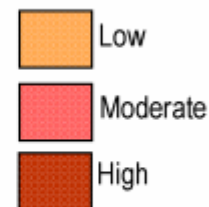
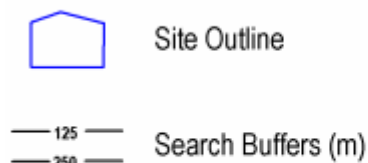
4 Natural Ground Subsidence

4.1 Shrink-Swell Clay Map

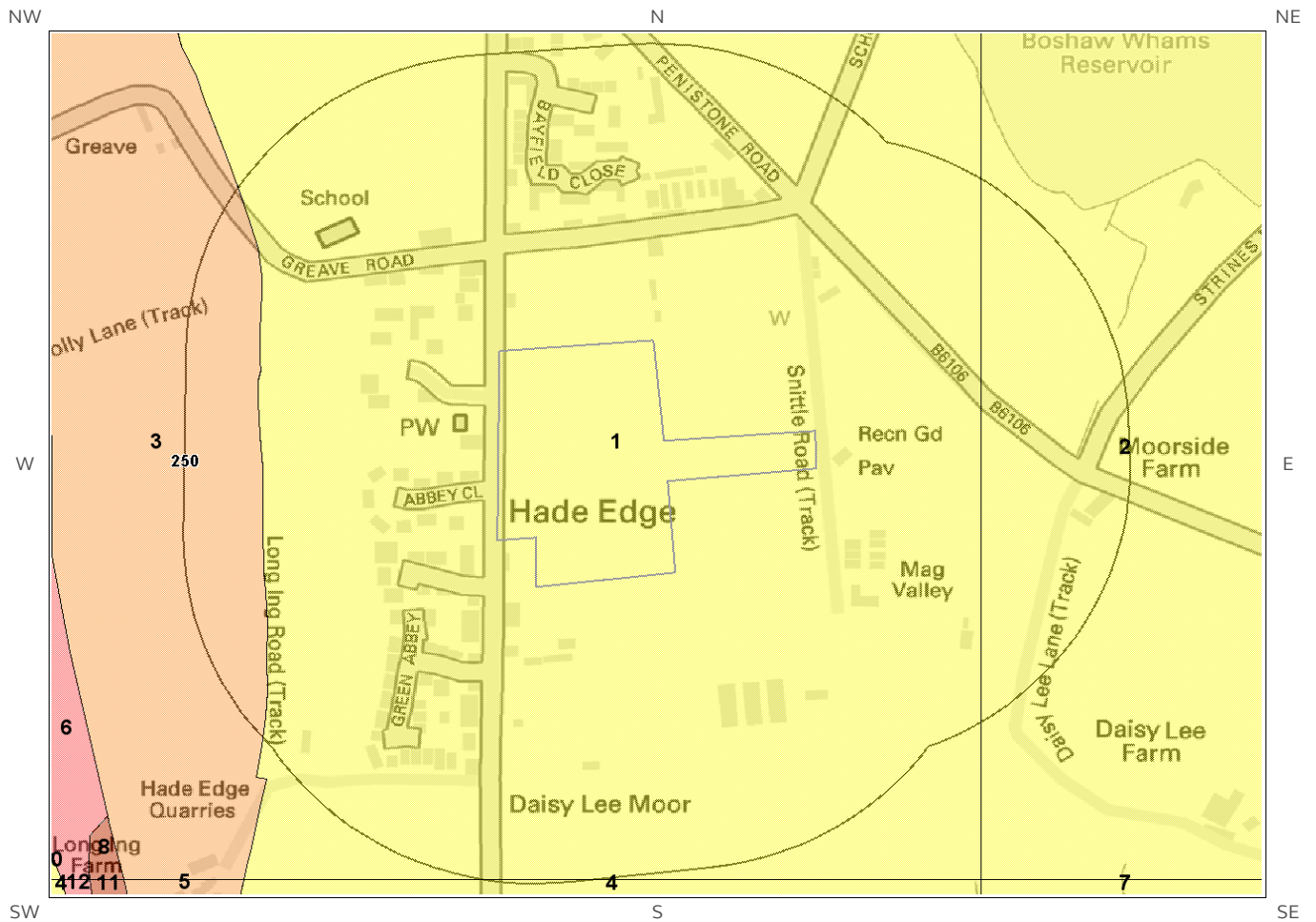


Shrink Swell Clay Legend

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4.2 Landslides Map

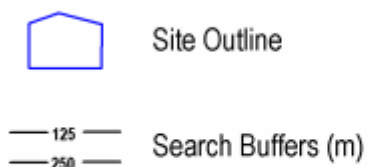
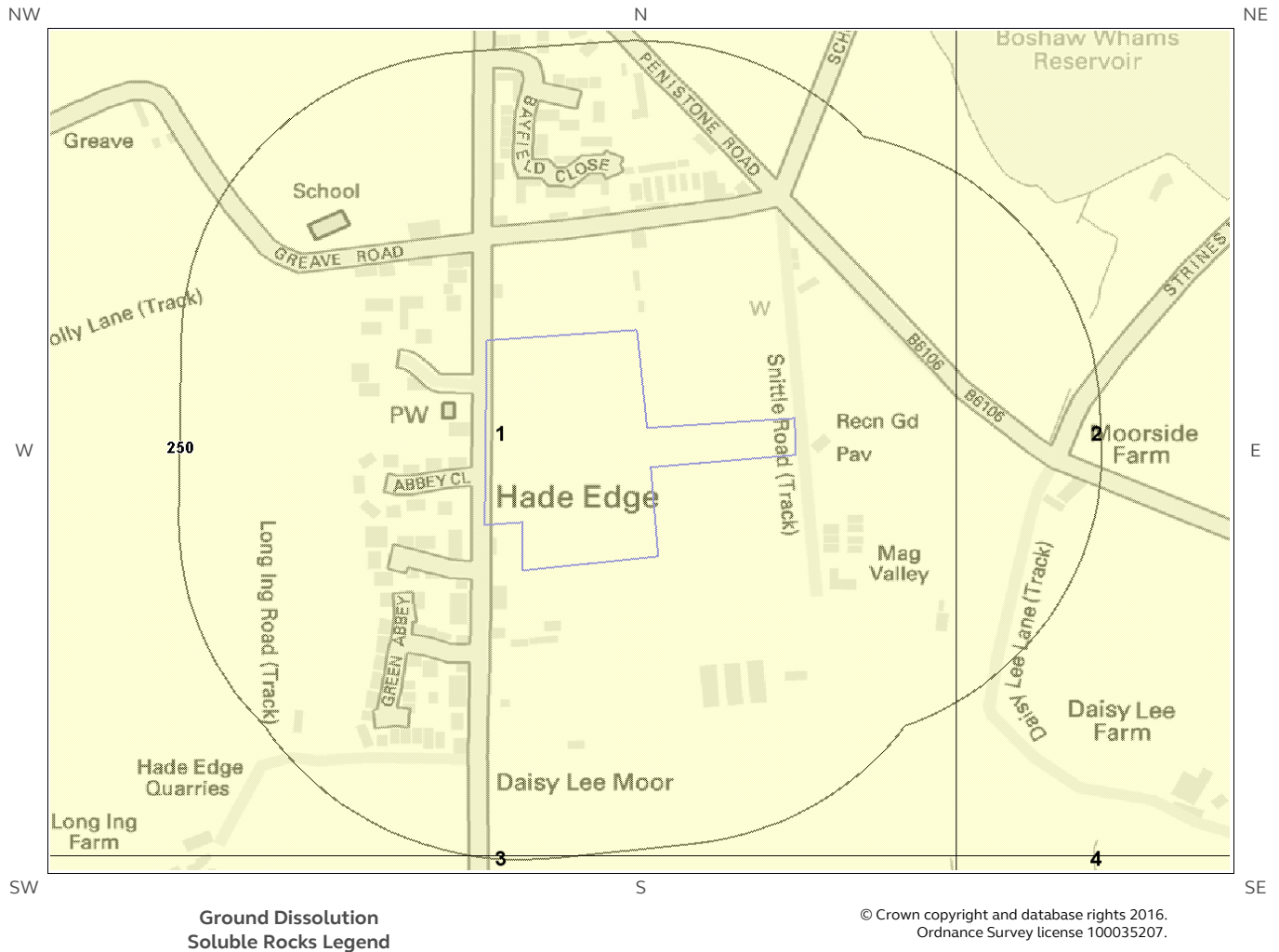


Landslides Legend

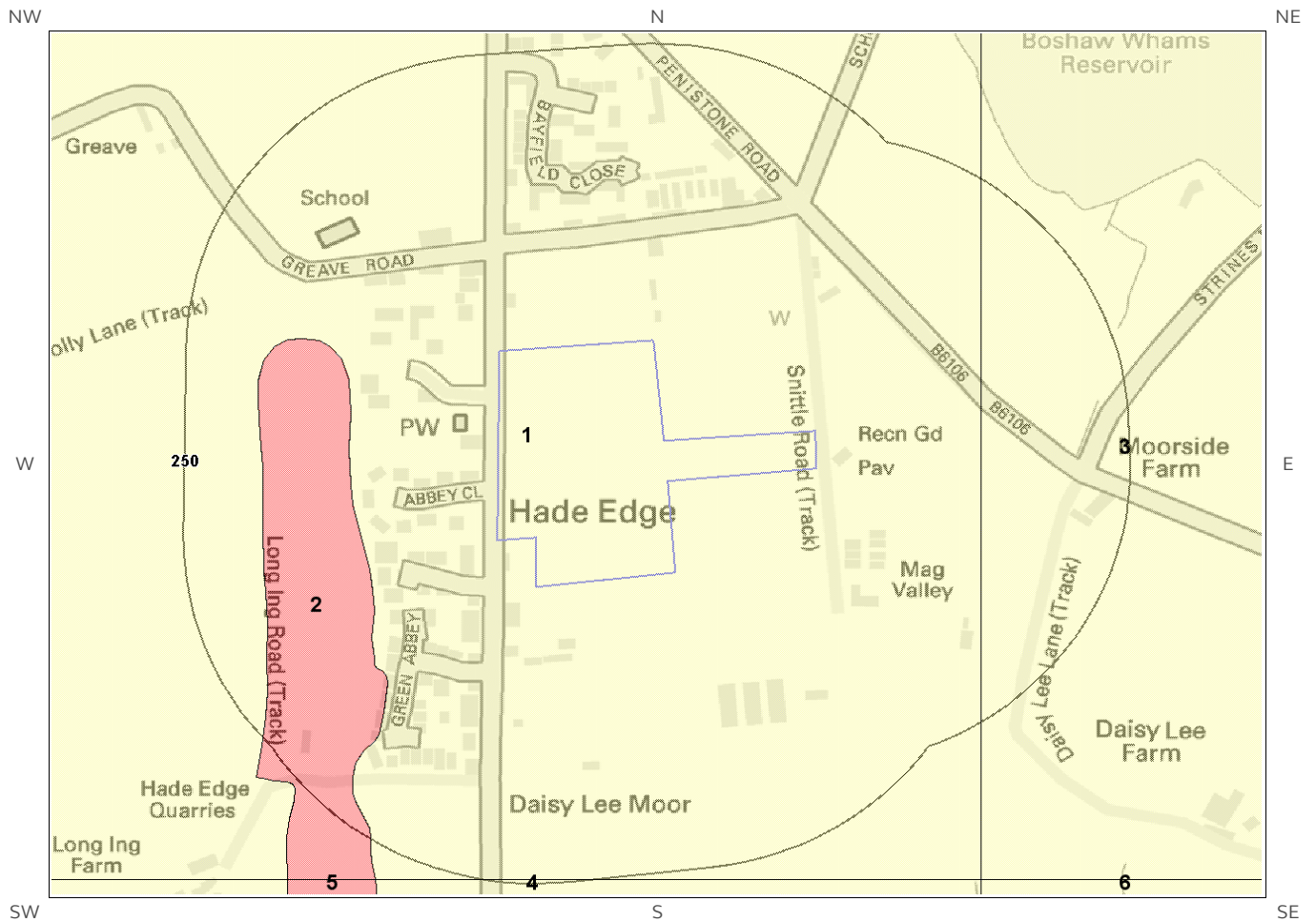
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4.3 Ground Dissolution Soluble Rocks Map



4.4 Compressible Deposits Map

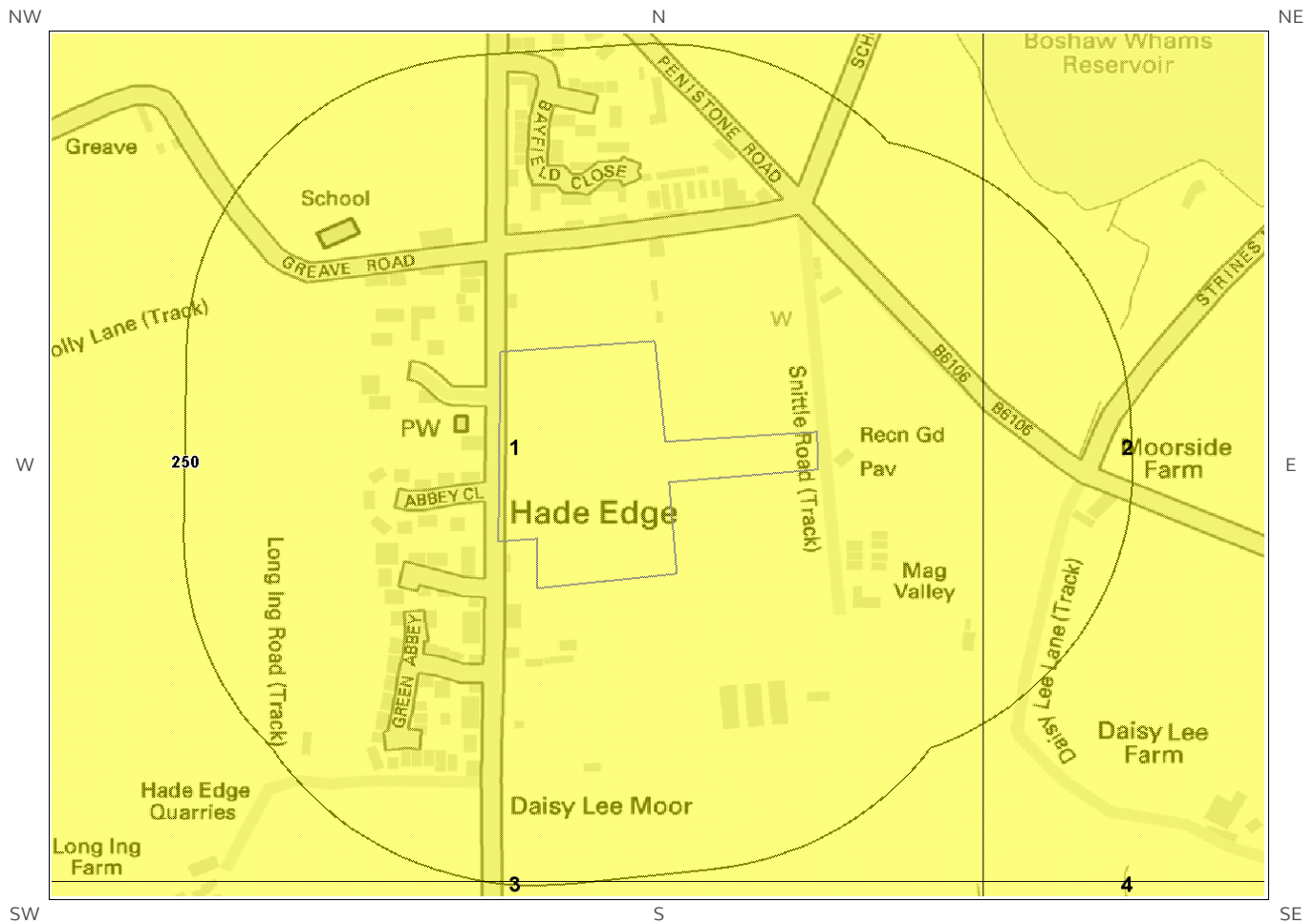


Compressible Deposits Legend

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4.5 Collapsible Deposits Map

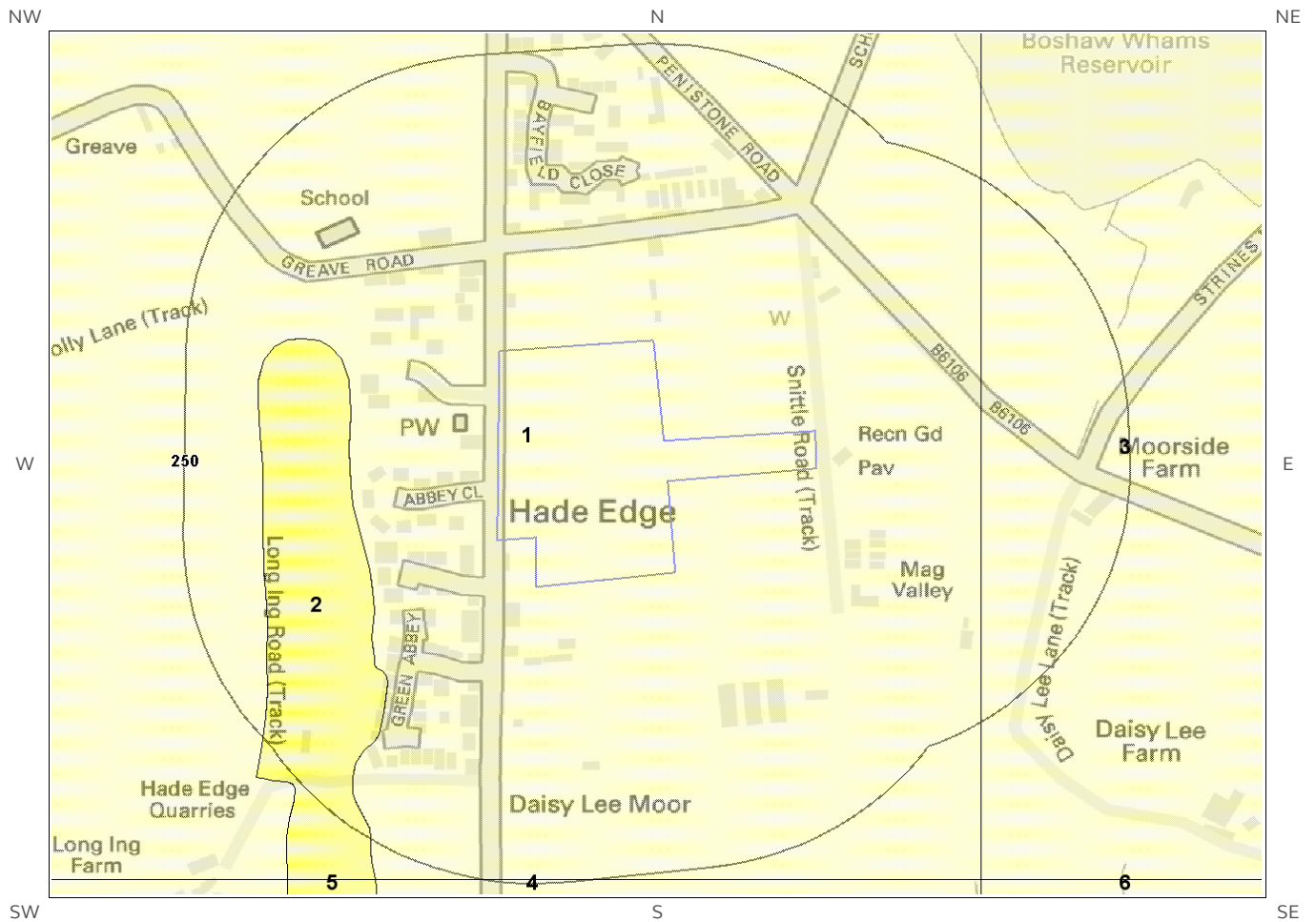


Collapsible Deposits Legend

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4.6 Running Sand Map



Running Sand Legend

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4 Natural Ground Subsidence

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

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

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

4.1 Shrink-Swell Clays

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

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

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

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

4.3 Ground Dissolution of Soluble Rocks

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

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

4.4 Compressible Deposits

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

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

4.5 Collapsible Deposits

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

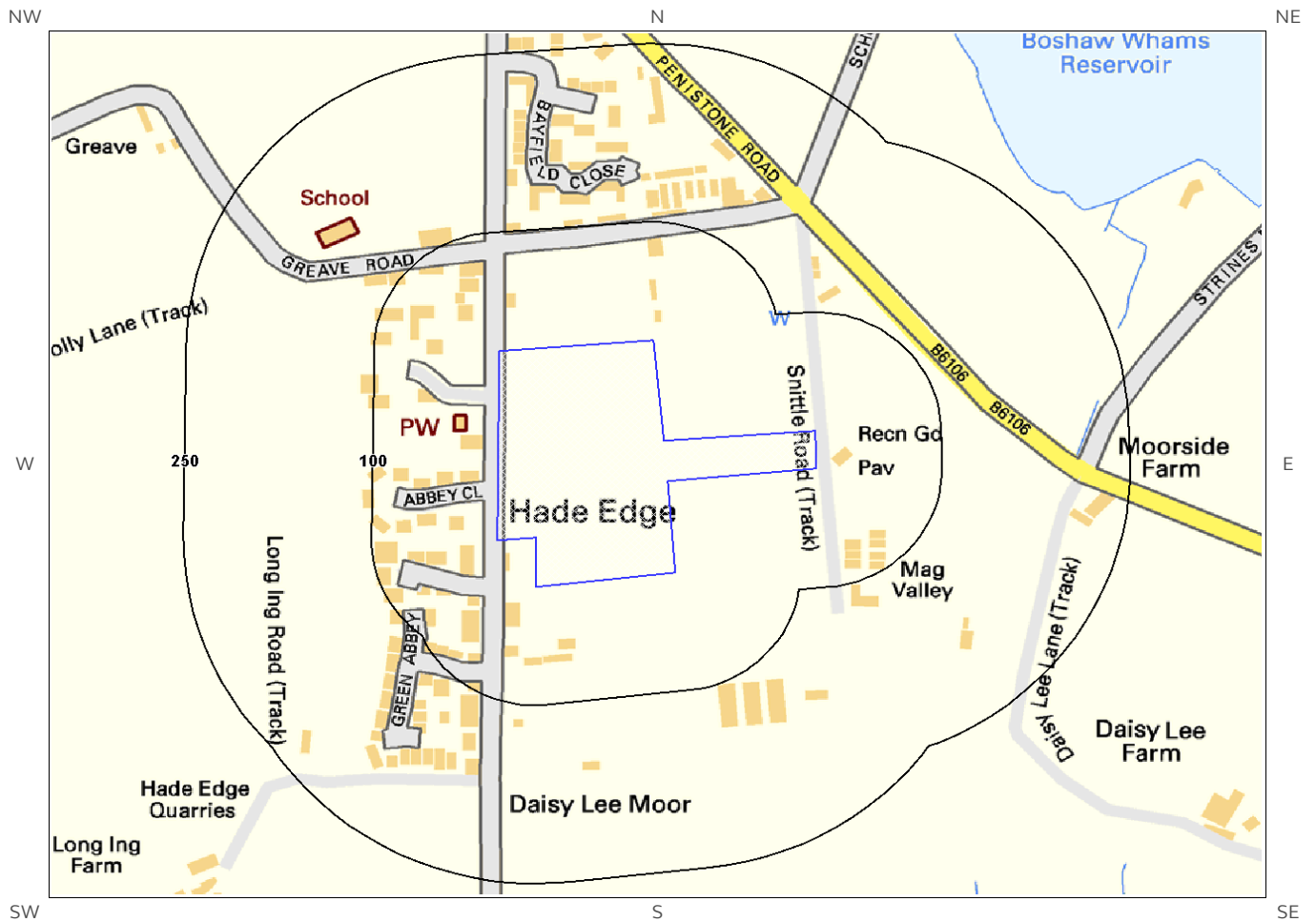
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible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

4.6 Running Sands

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

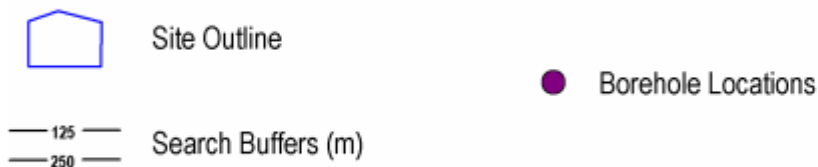
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due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

5 Borehole Records Map



Borehole Records Legend

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5 Borehole Records

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

Records of boreholes within 250m of the study site boundary: 0

Database searched and no data found.

6 Estimated Background Soil Chemistry

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

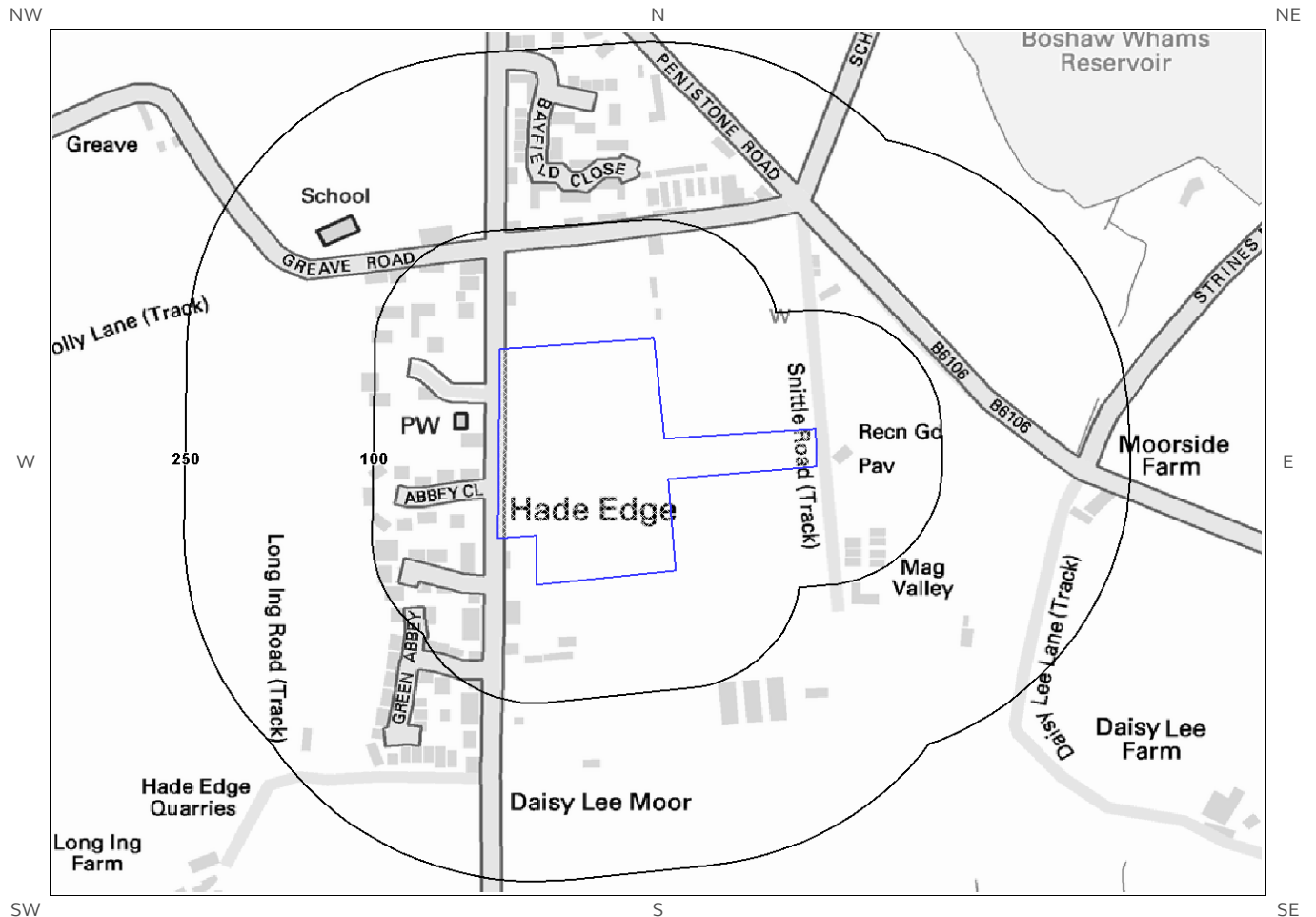
12

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

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
47.0	N	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
61.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
90.0	NW	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
114.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
129.0	NW	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
131.0	E	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
150.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
180.0	NE	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
190.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
246.0	S	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
246.0	S	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	100 - 200 mg/kg

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

7 Railways and Tunnels Map



Railways and Tunnels Legend

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	Site Outline		Underground or Partially Underground Railway / Subway System		Railway Track (OpenStreetMap)
	Search Buffers (m)		Railway Tunnel (OS Mapping)		High Speed 2
			Abandoned or Dismantled Railway (OpenStreetMap)		Crossrail 1
			Railway Track (OS Mapping)		Railway and/or Tunnel Feature from Historical Mapping

7 Railways and Tunnels

7.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

7.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

7.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

7.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

7.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail 1 rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

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BGS Geological Hazards Reports and general geological enquiries

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The Coal Authority

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Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

“Beneficiary” means the person or entity for whose benefit the Client has obtained the Services.

“Client” means the party or parties entering into a Contract with Groundsure.

“Commercial” means any building or property which is not Residential.

“Confidential Information” means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

“Support Services” means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

“Contract” means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

“Third Party Data Provider” means any third party providing Third Party Content to Groundsure.

“Data Reports” means reports comprising factual data with no accompanying interpretation.

“Fees” has the meaning set out in clause 5.1.

“Groundsure” means Groundsure Limited, a company registered in England and Wales under number 03421028.

“Groundsure Materials” means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

“Intellectual Property” means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

“Mapping” means a map, map data or a combination of historical maps of various ages, time periods and scales.

“Order” means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.

“Ordnance Survey” means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

“Order Website” means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

“Report” means a Risk Screening Report or Data Report for Commercial or Residential property.

“Residential” means any building or property used as or intended to be used as a single dwelling.

“Risk Screening Report” means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

“Services” means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

“Site” means the area of land in respect of which the Client has requested Groundsure to provide the Services.

“Third Party Content” means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

“User Guide” means the user guide, as amended from time to time, available upon request from Groundsure and on the website (www.Groundsure.com) and forming part of this Contract.

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

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure.

Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure's acceptance of an Order shall be binding only when made in writing and signed by Groundsure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,
(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
(iv) the first purchaser or first tenant of the Site, and
(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 Groundsure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together “Fees”).

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client (“Payment Date”). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and
(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure

acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

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

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

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

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event
(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

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

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner. In the event you are not satisfied with Groundsure's complaints handling process or you are unable to resolve the complaint, at your discretion you may refer the complaint to The Property Ombudsman Scheme at the following URL/email: website www.tpos.co.uk or email: admin@tpos.co.uk

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law

APPENDIX 5

Historical Mapping

Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: County Series

Map date: 1892

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1892
Revised 1892
Edition N/A
Copyright N/A
Levelled N/A

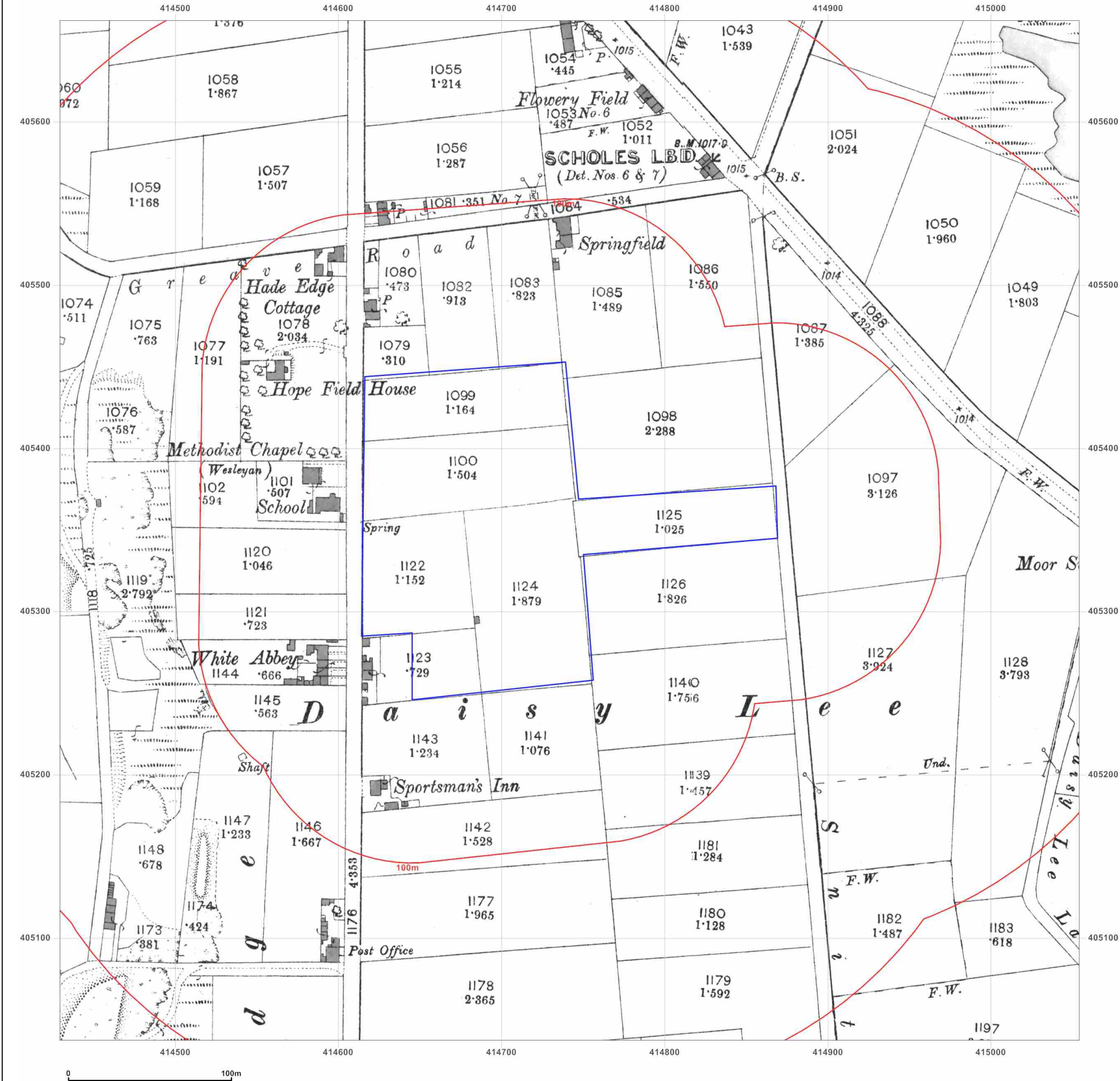


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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: County Series

Map date: 1906

Scale: 1:2,500

Printed at: 1:2,500



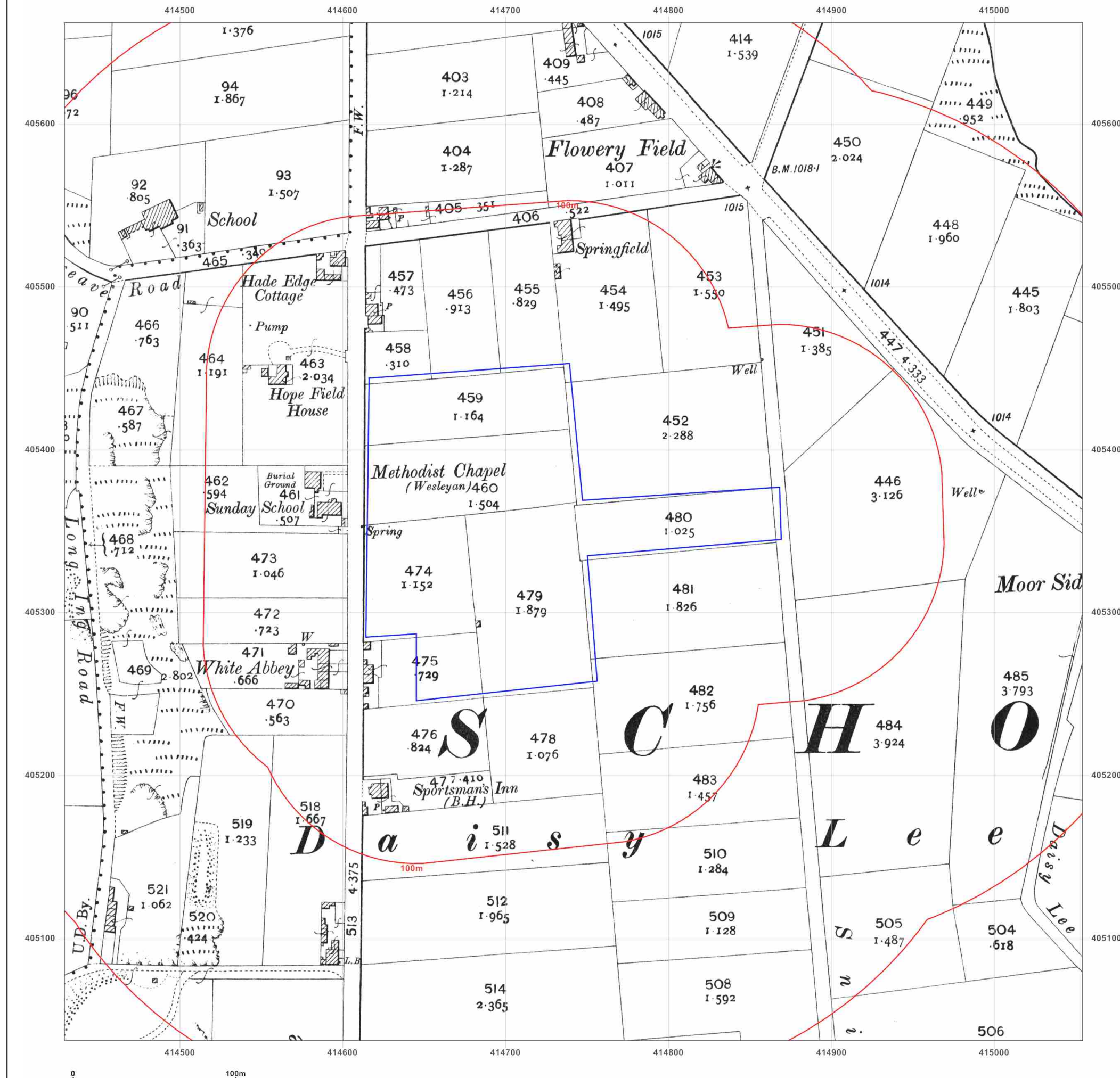
Surveyed 1906
Revised 1906
Edition N/A
Copyright N/A
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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: National Grid

Map date: 1962

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1962
 Revised 1962
 Edition N/A
 Copyright 1964
 Levelled 1958

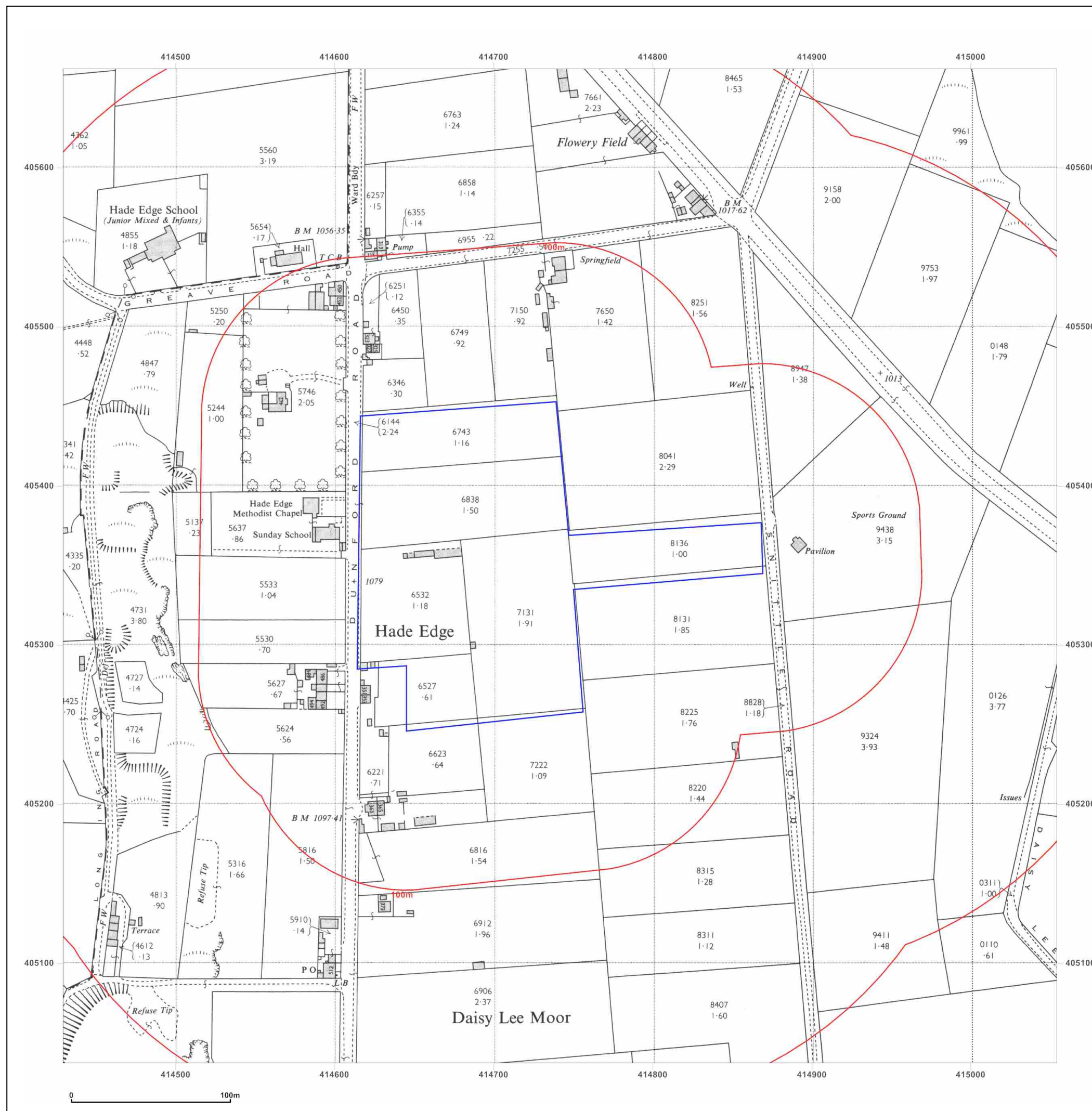


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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

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

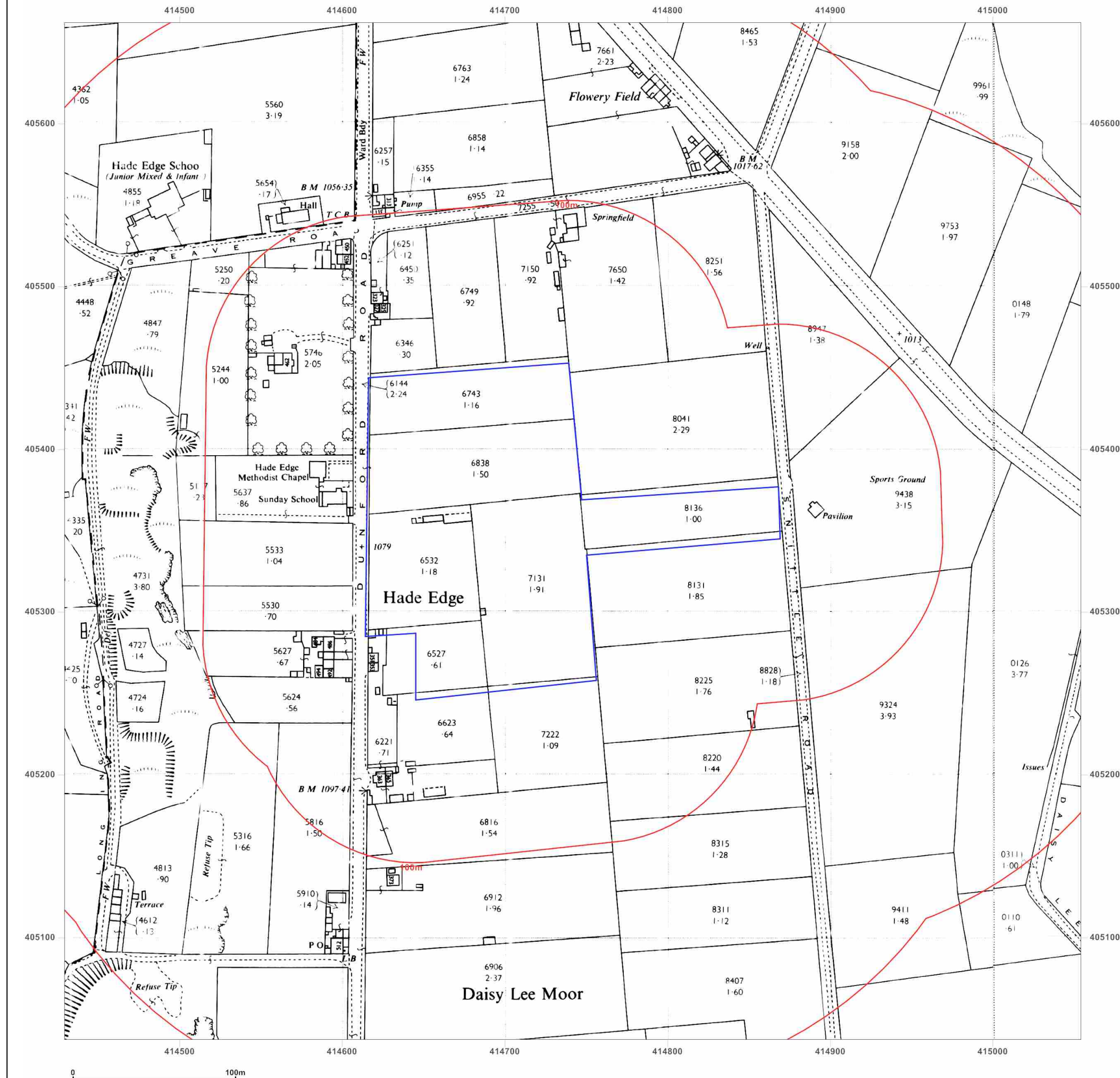
Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: National Grid

Map date: 1975

Scale: 1:2,500

Printed at: 1:2,500



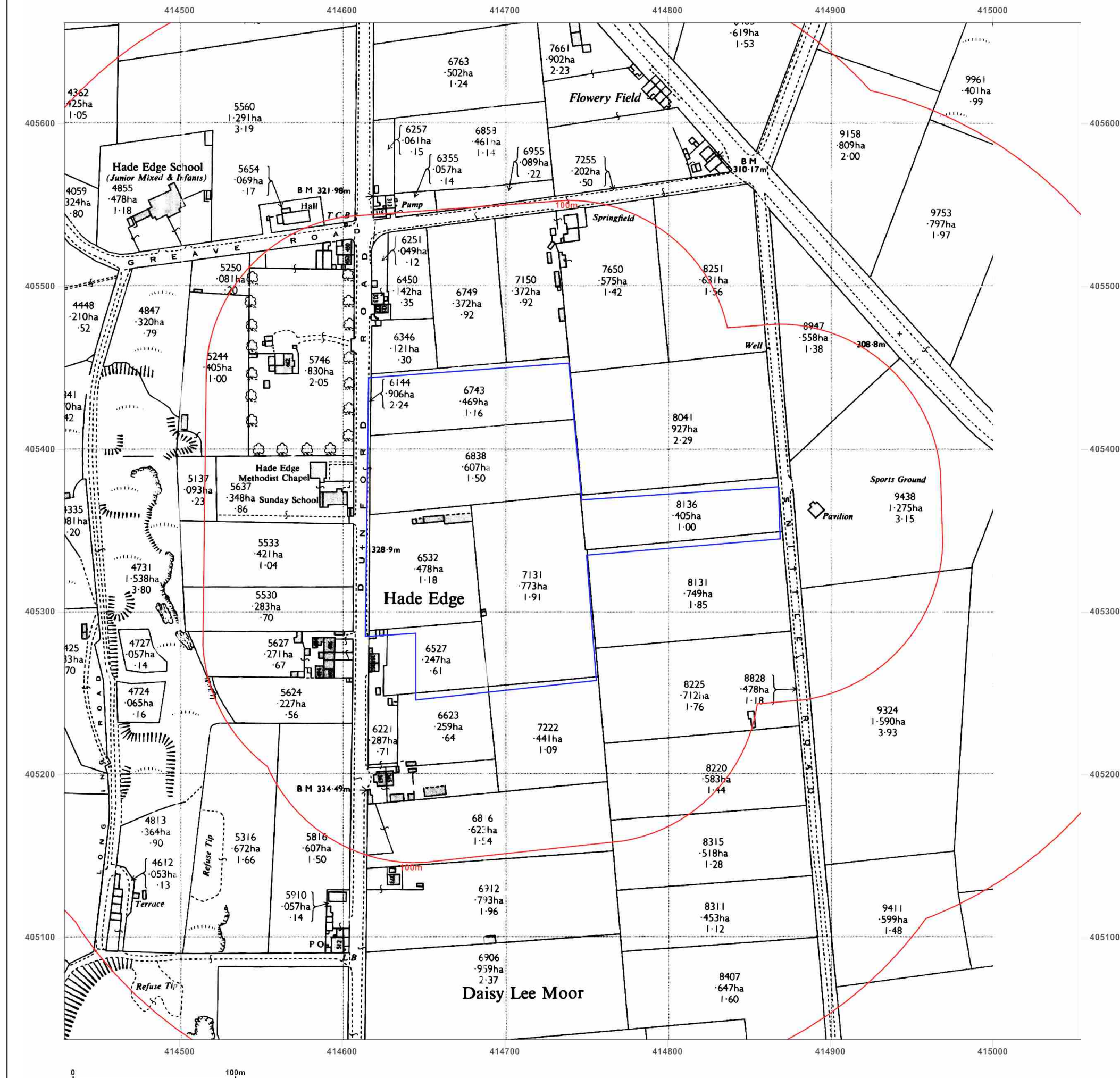
Surveyed 1962
Revised 1975
Edition N/A
Copyright N/A
Levelled N/A



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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: National Grid

Map date: 1992-1995

Scale: 1:2,500

Printed at: 1:2,500



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

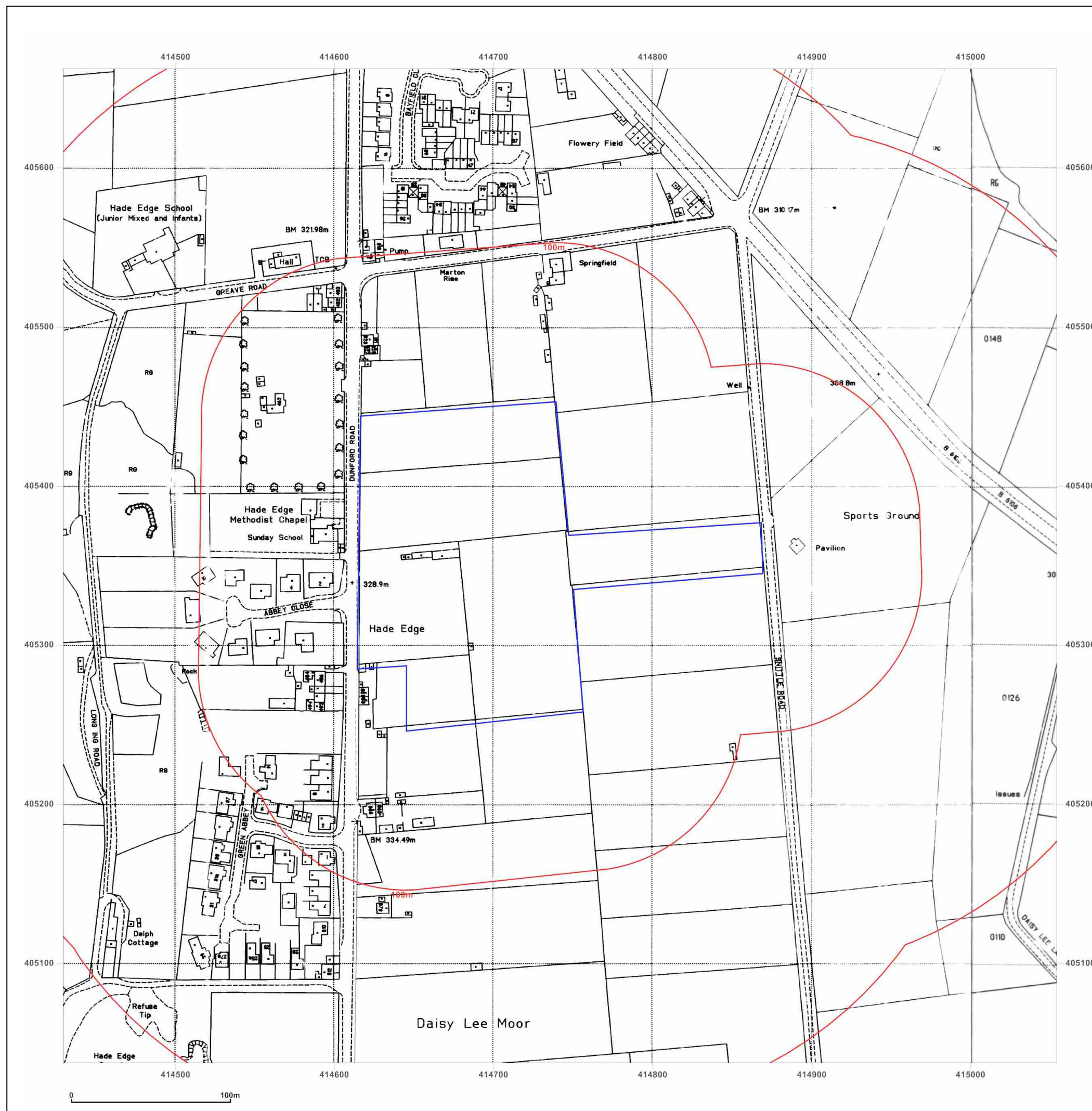
Surveyed 1992
Revised 1992
Edition N/A
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Levelled N/A



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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: County Series

Map date: 1854

Scale: 1:10,560

Printed at: 1:10,560



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



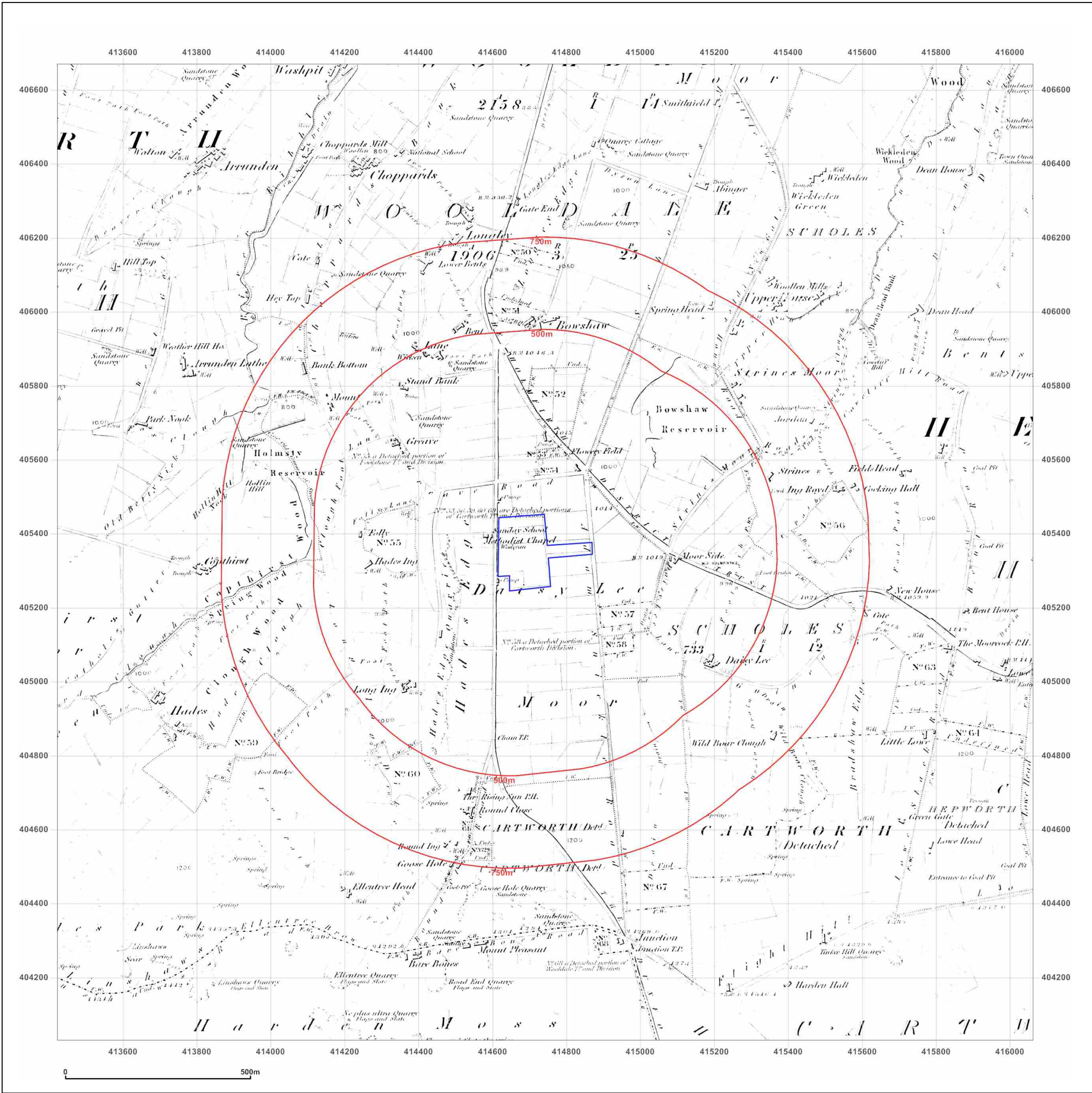
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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: County Series

Map date: 1888

Scale: 1:10,560

Printed at: 1:10,560



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

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

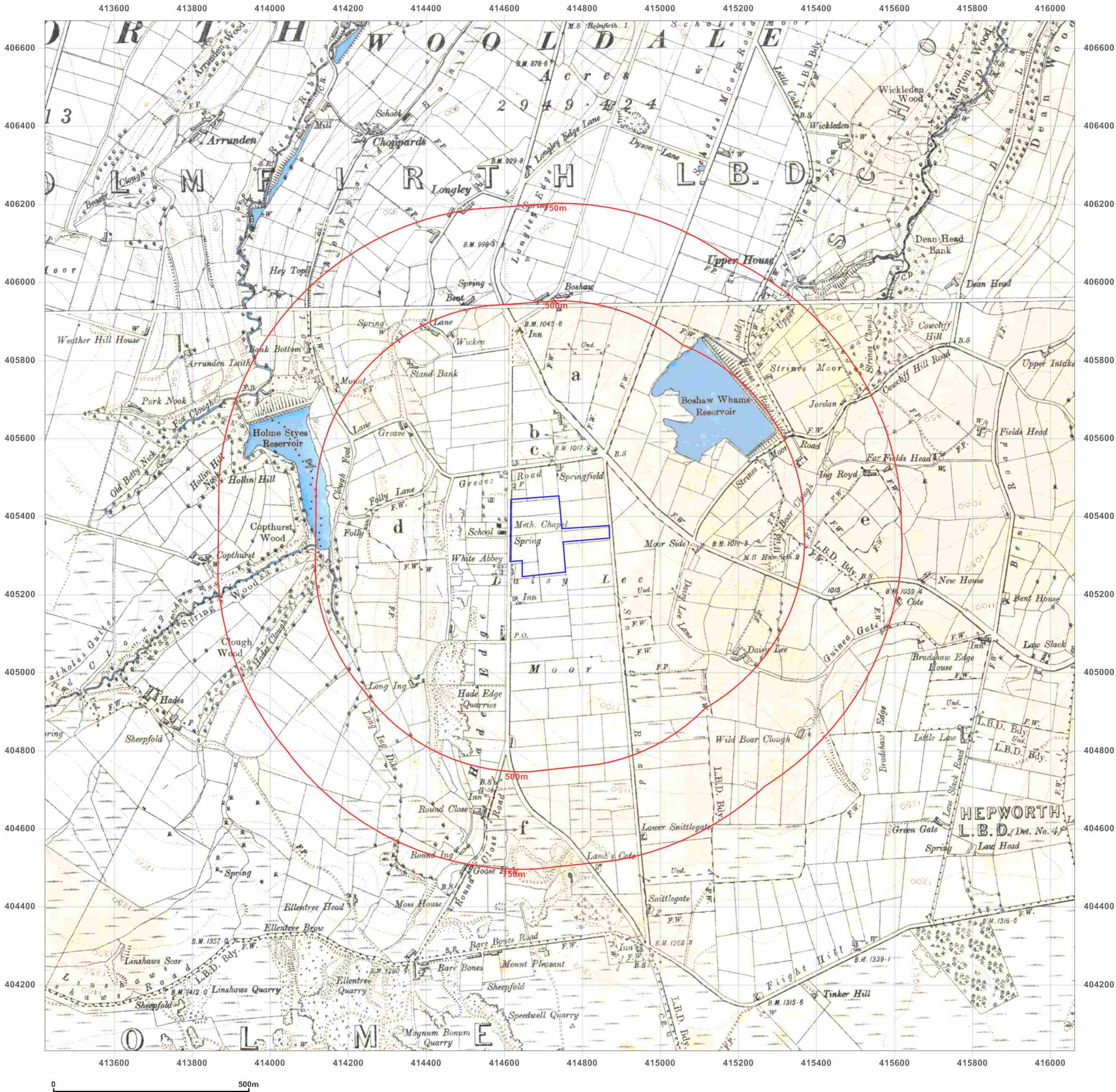


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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: County Series

Map date: 1904-1906

Scale: 1:10,560

Printed at: 1:10,560



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

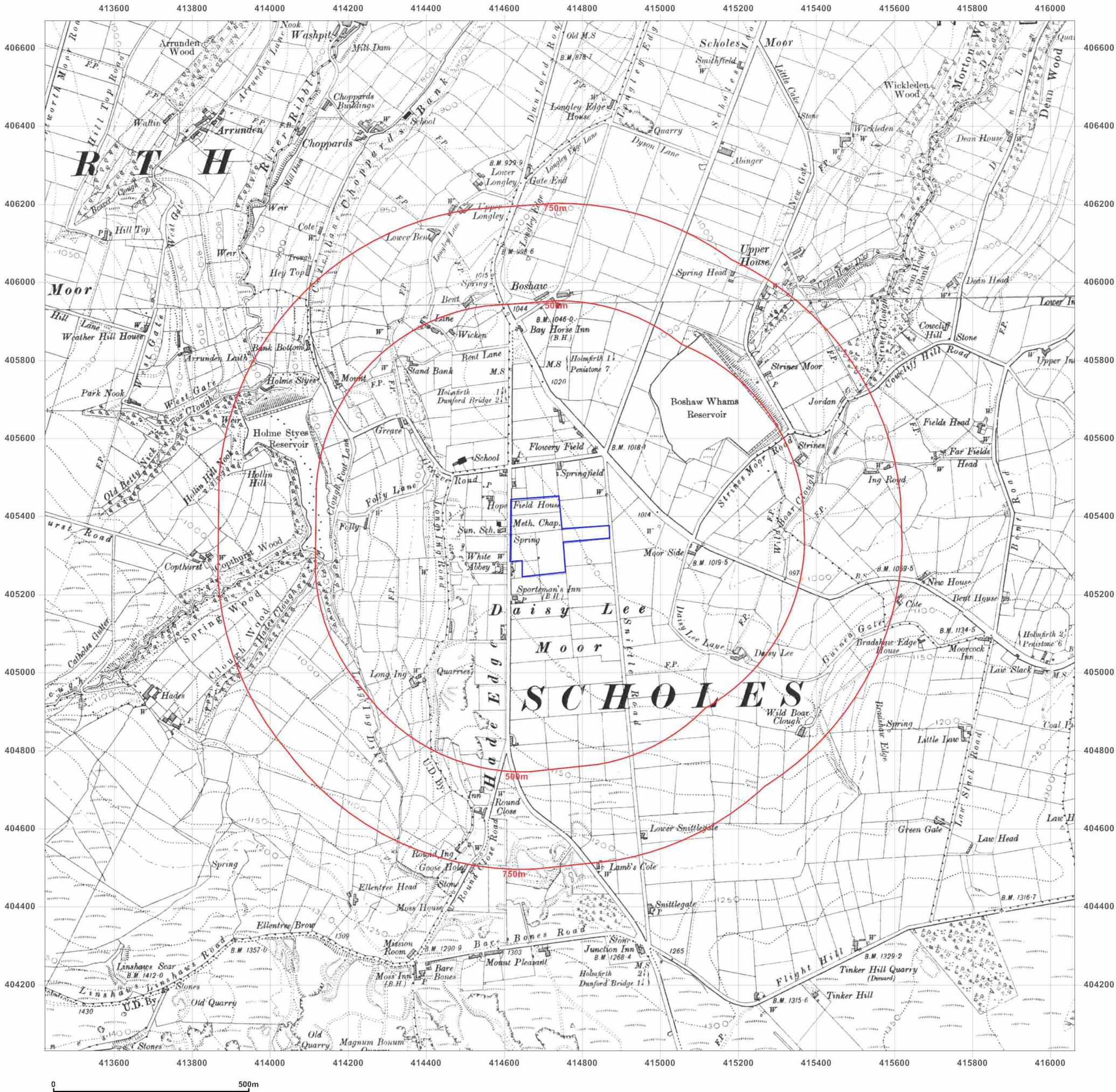


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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: County Series

Map date: 1919

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1878
Revised 1919
Edition N/A
Copyright N/A
Levelled N/A

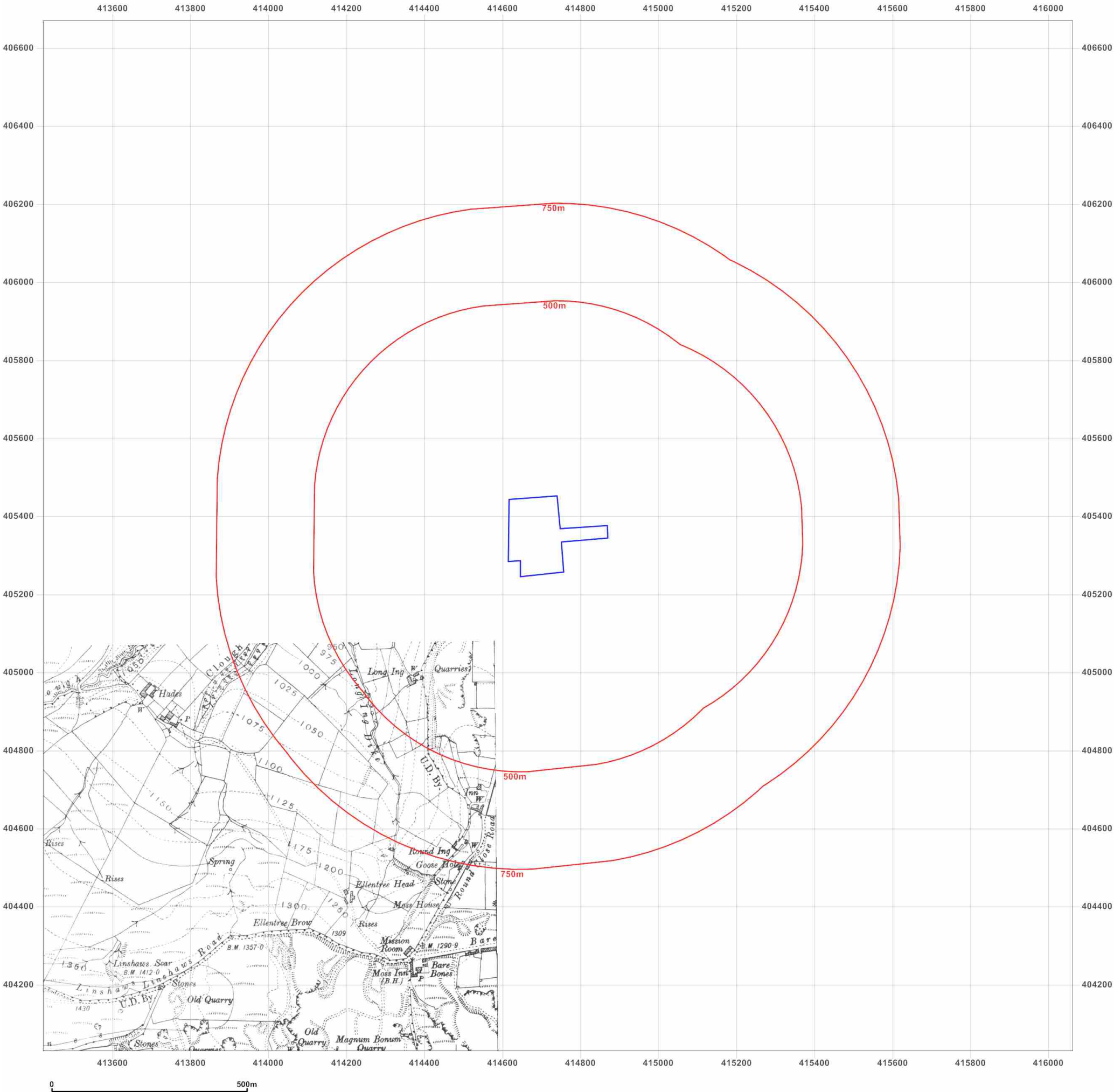


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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: County Series

Map date: 1933

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1851
Revised 1933
Edition 1933
Copyright N/A
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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: County Series

Map date: 1948

Scale: 1:10,560

Printed at: 1:10,560



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

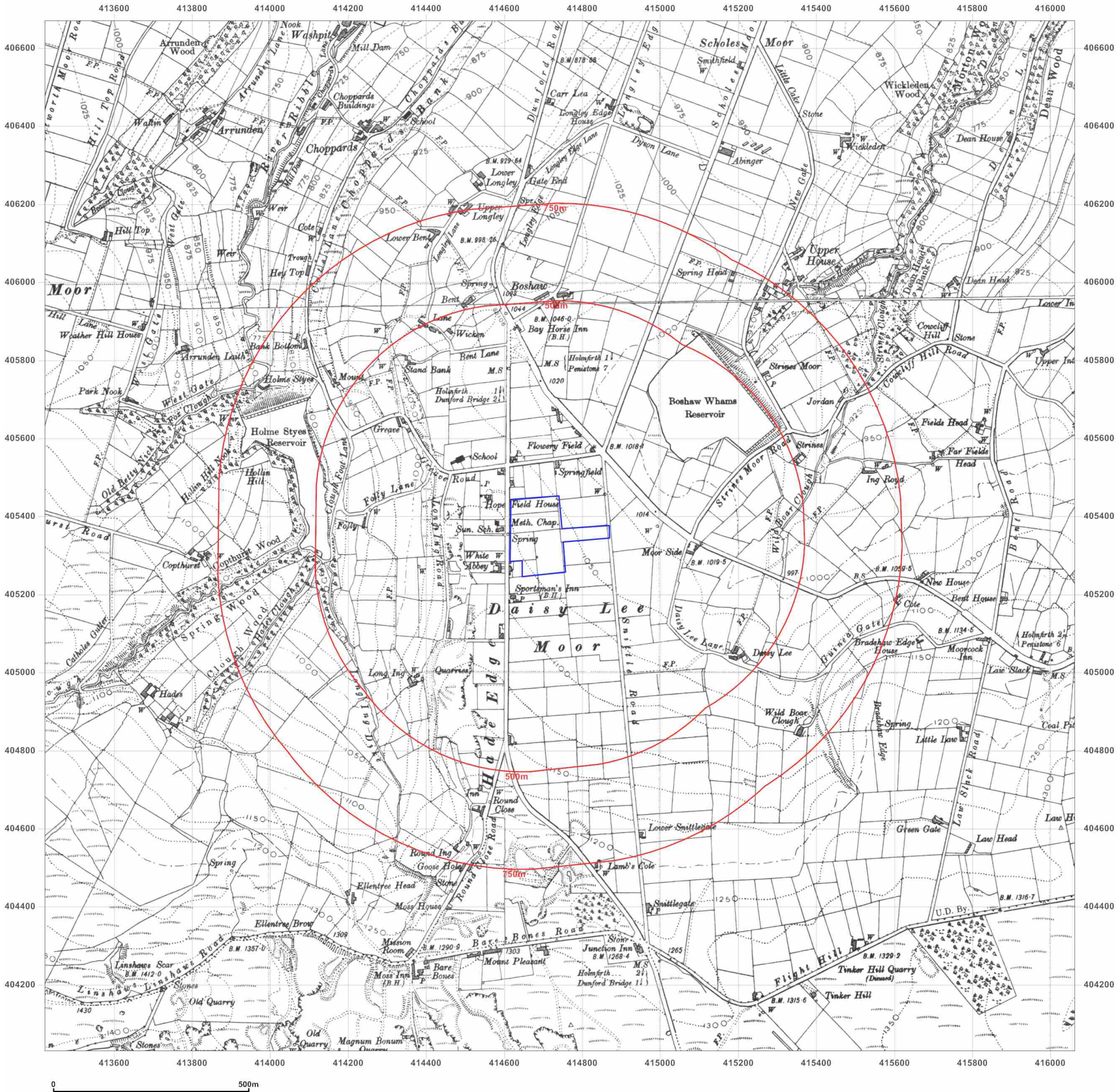


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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: Provisional

Map date: 1951-1955

Scale: 1:10,560

Printed at: 1:10,560



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

Surveyed 1951
Revised 1951
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1951
Revised 1951
Edition N/A
Copyright N/A
Levelled N/A

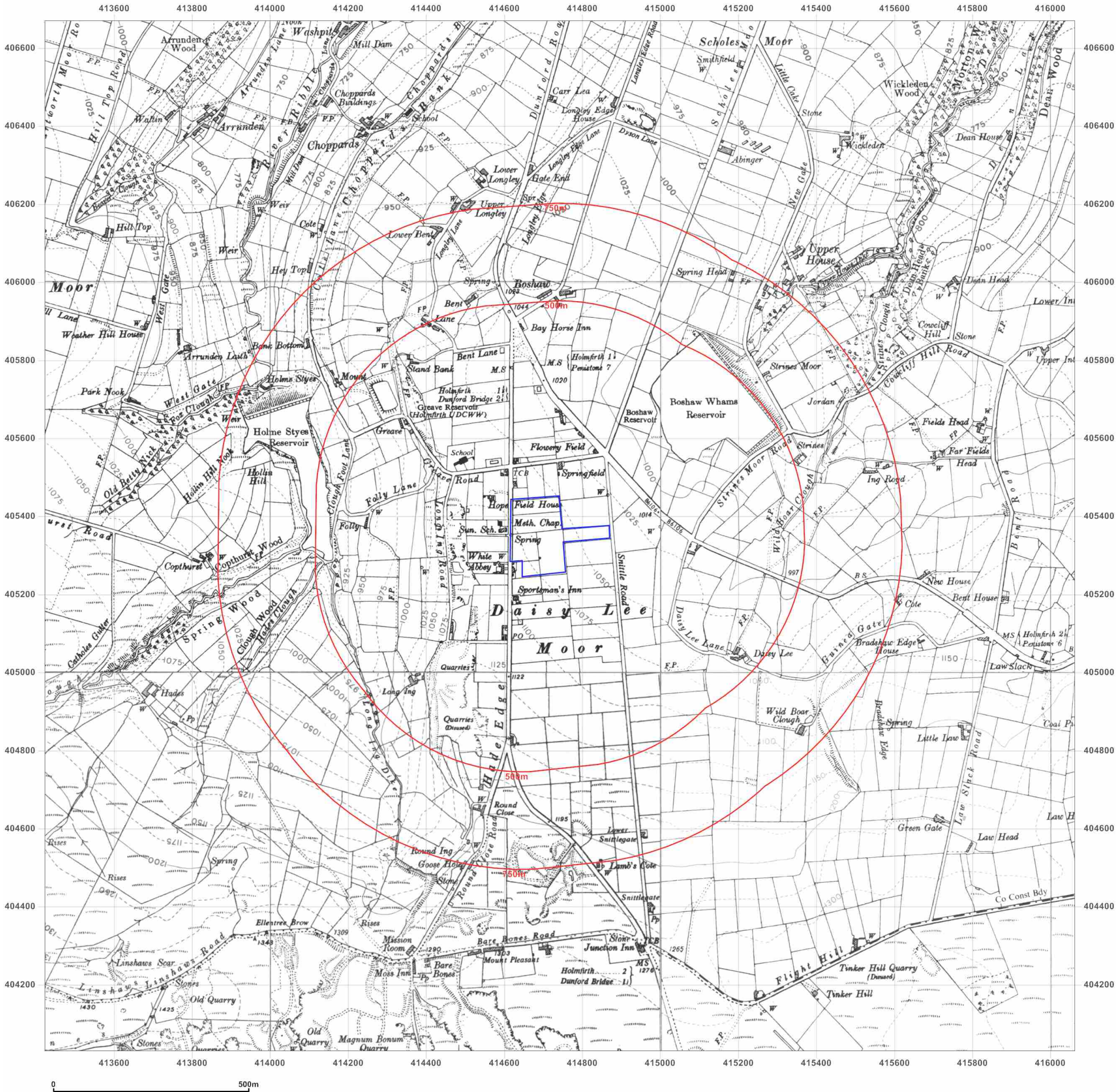


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Production date: 11 April 2016

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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: Provisional

Map date: 1965-1970

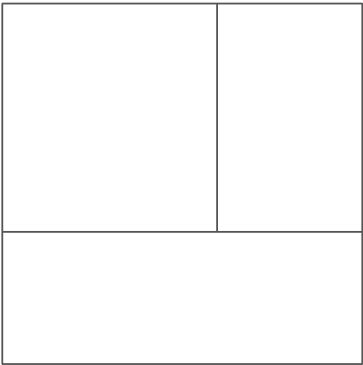
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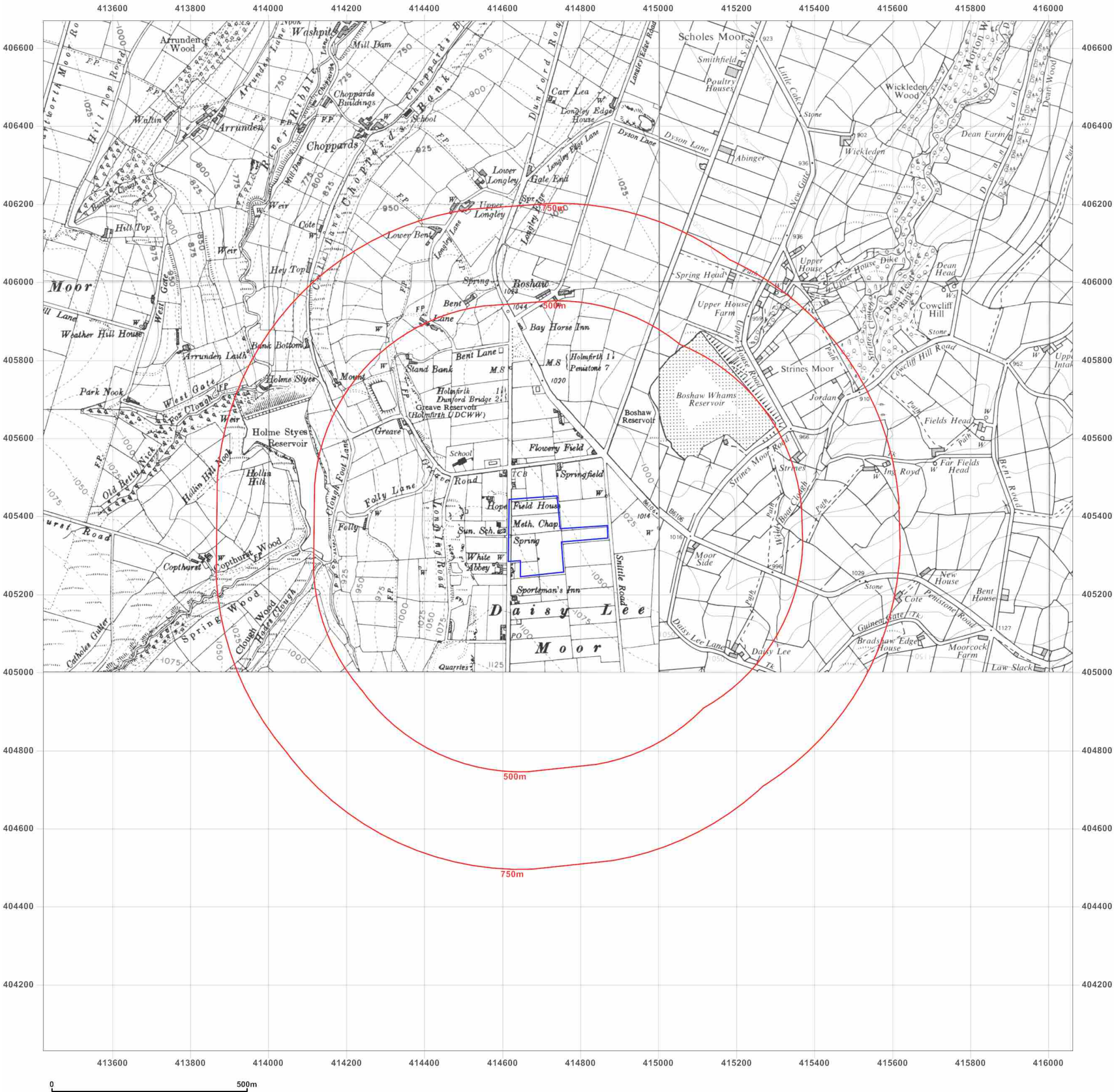


Surveyed N/A
Revised 1965
Edition N/A
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Surveyed 1968
Revised 1970
Edition N/A
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Levelled N/A



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Site Details:

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Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: Provisional

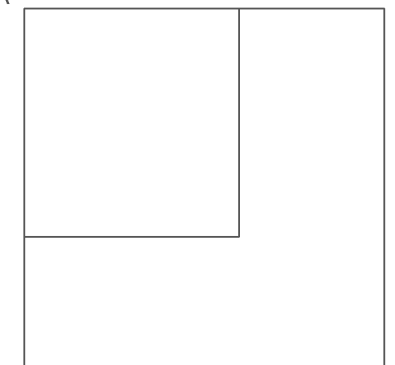
Map date: 1970

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Printed at: 1:10,560



Surveyed 1969
 Revised 1970
 Edition N/A
 Copyright N/A
 Levelled N/A

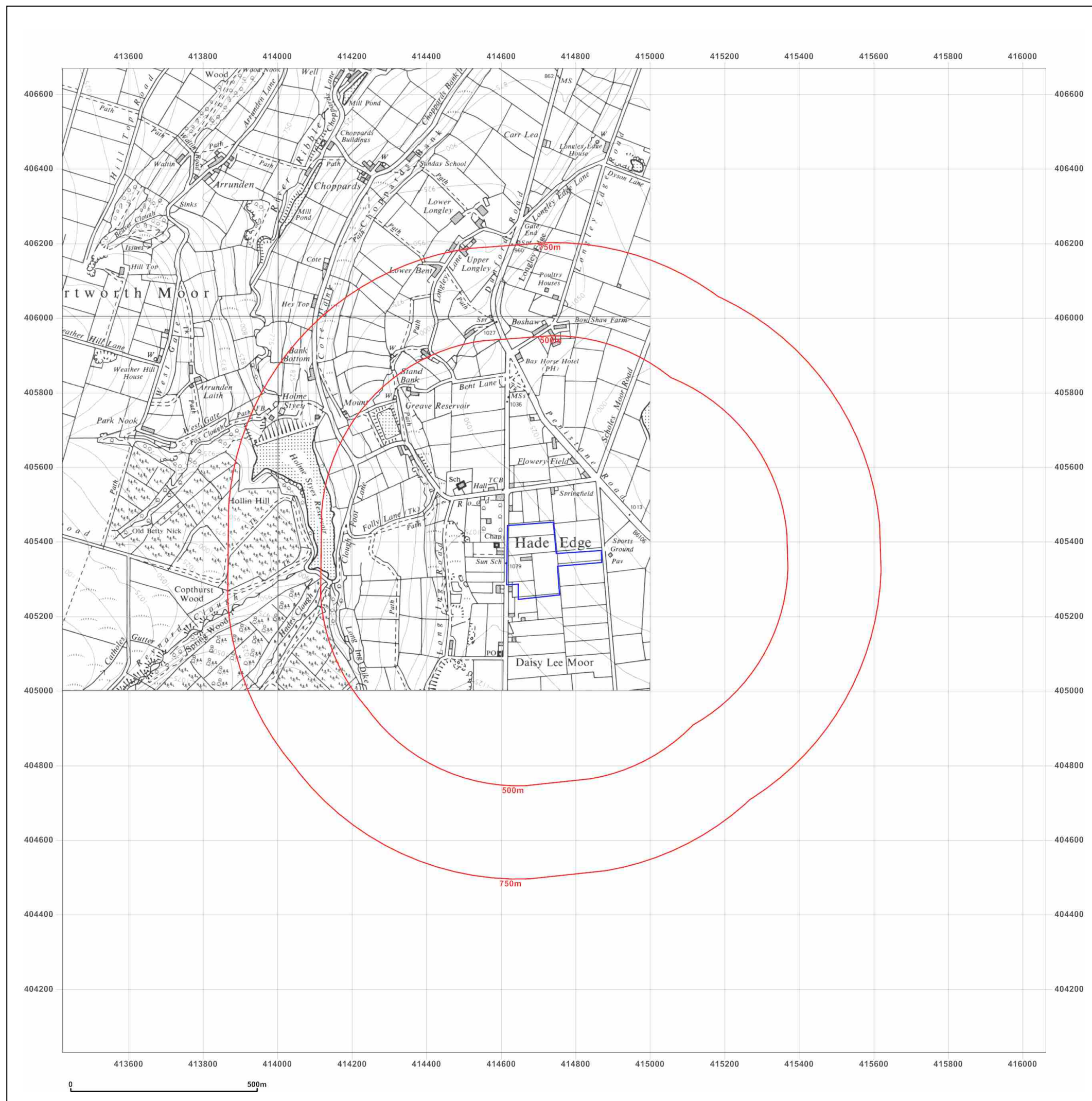


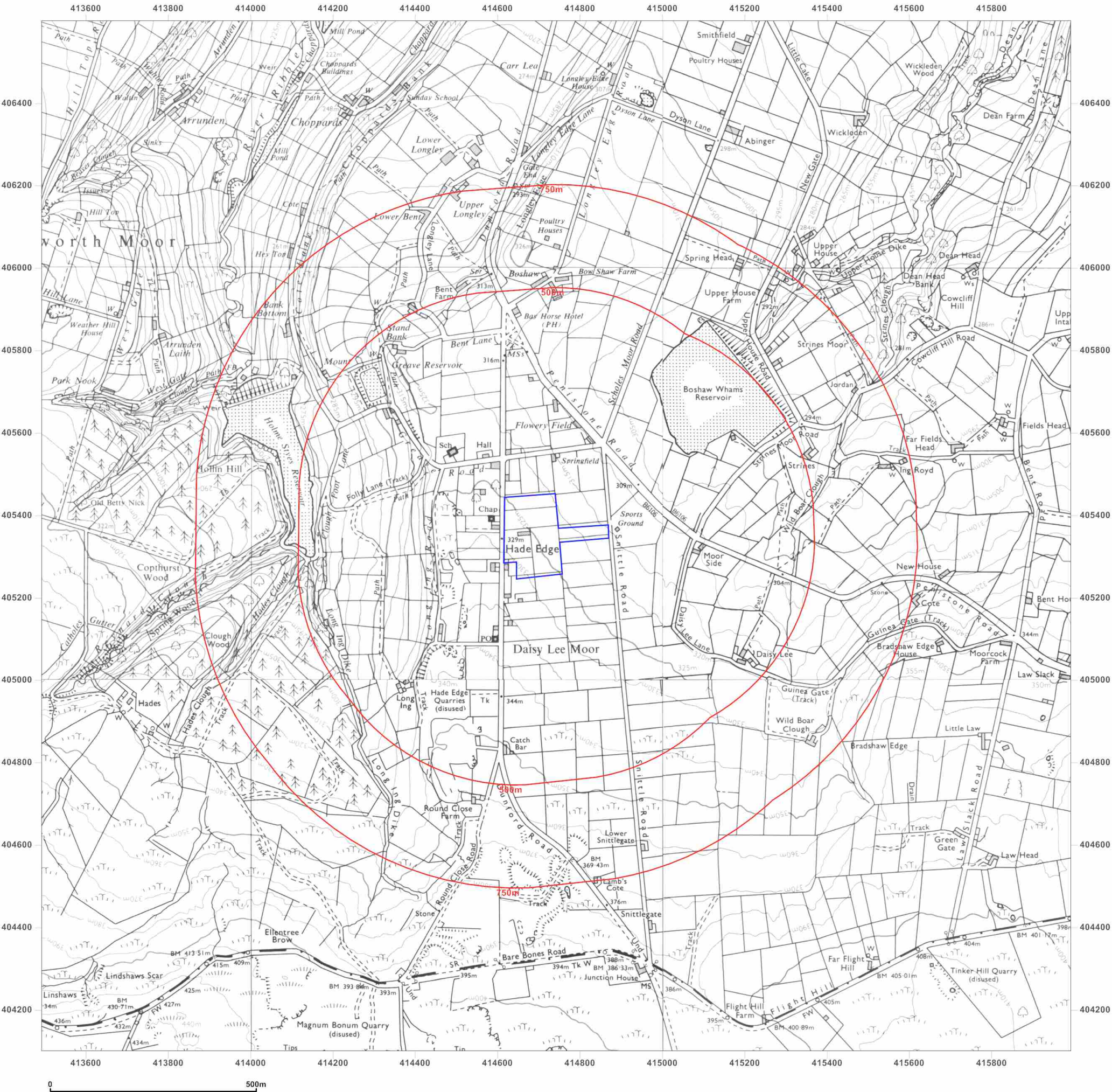
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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: National Grid

Map date: 1979-1980

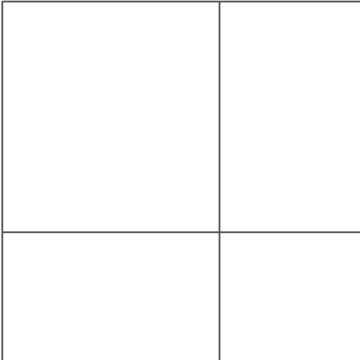
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Printed at: 1:10,000



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



Surveyed 1978
Revised 1979
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1979
Revised 1979
Edition N/A
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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



2002

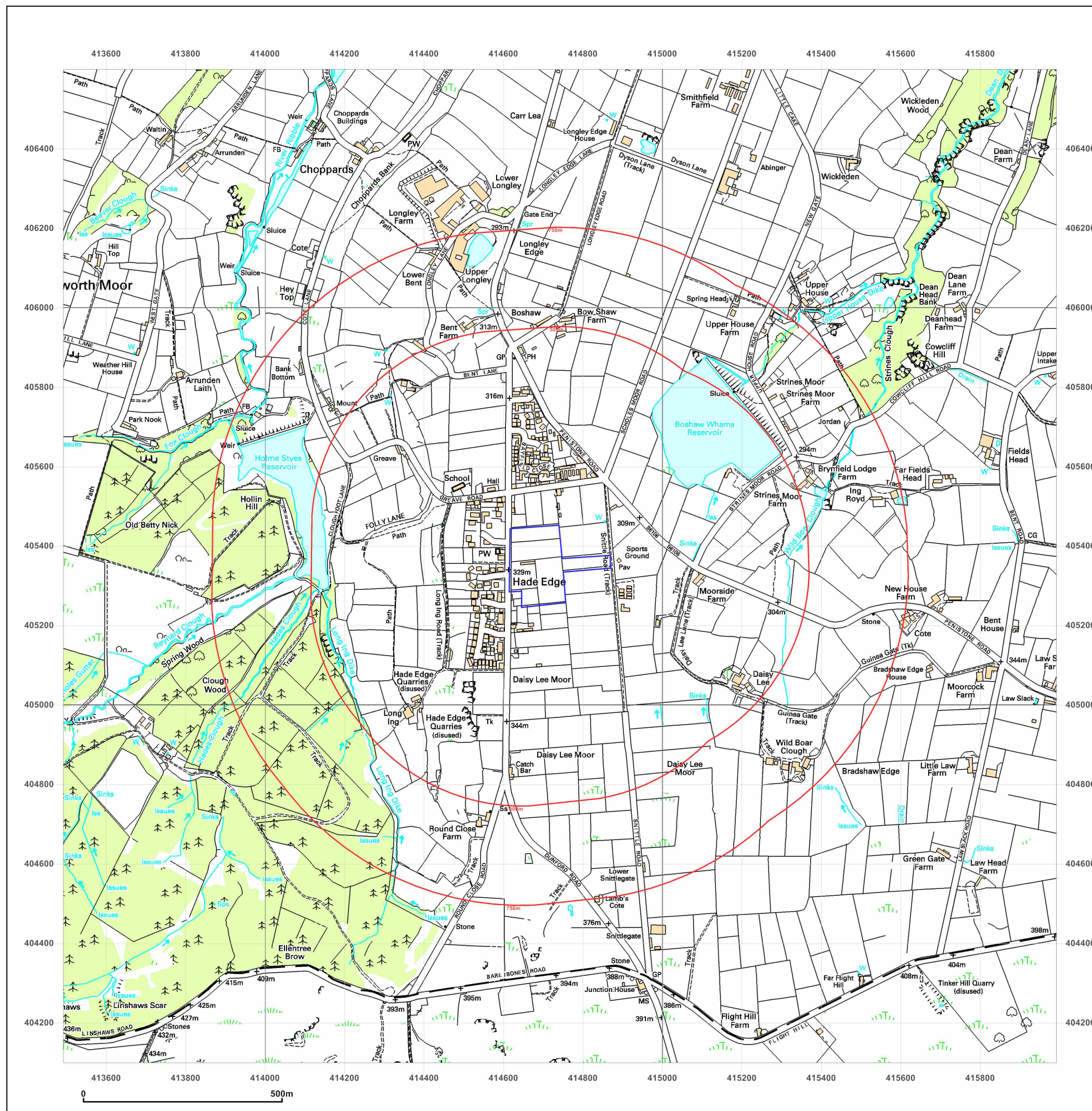


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Site Details:

414710, 405310

Client Ref: Dunford_Road_-_Hade_Edge
Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



2010

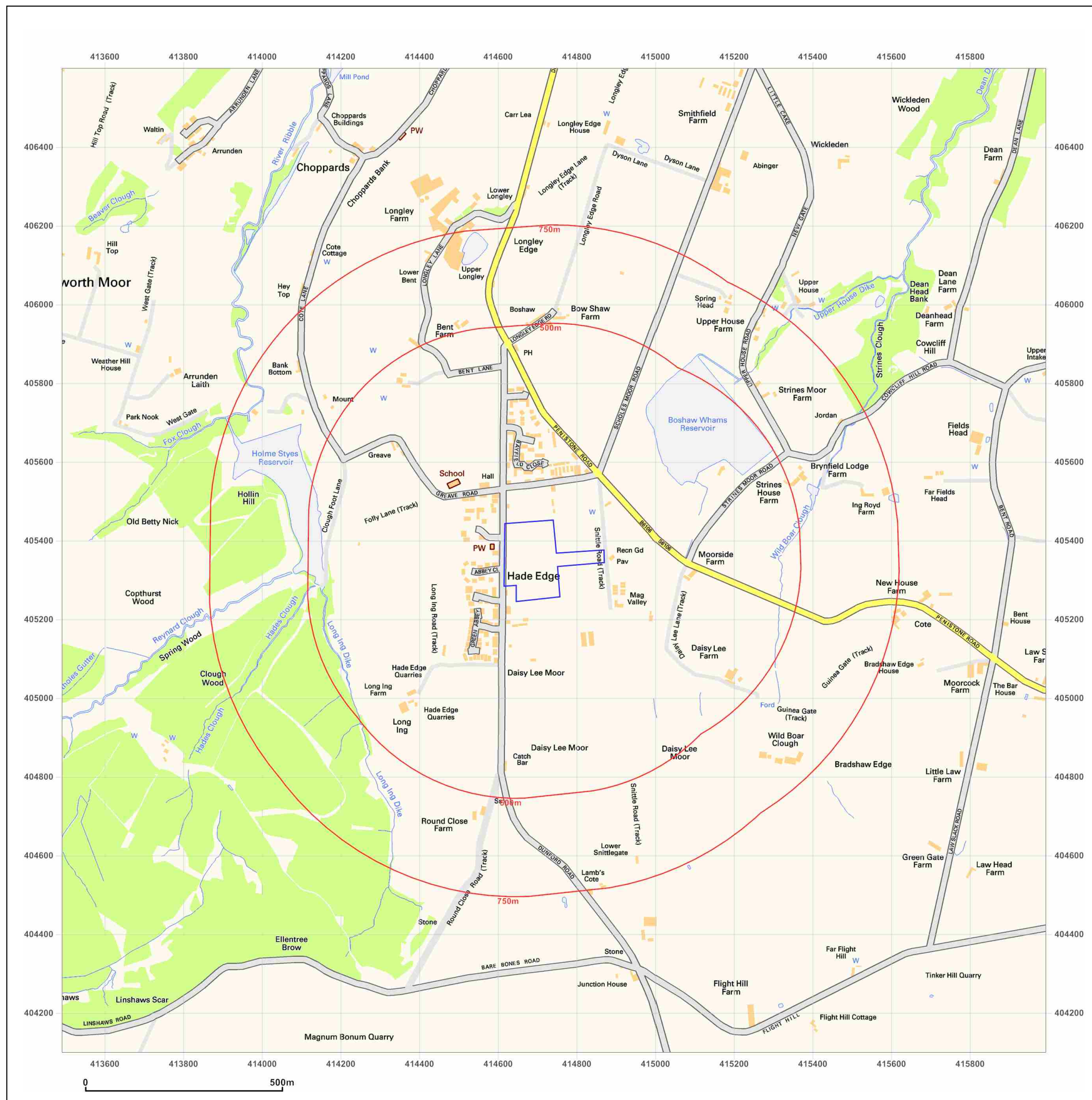


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Site Details:

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Report Ref: HMD-354-2894232
Grid Ref: 414742, 405350

Map Name: National Grid

Map date: 2014

Scale: 1:10,000

Printed at: 1:10,000



2014

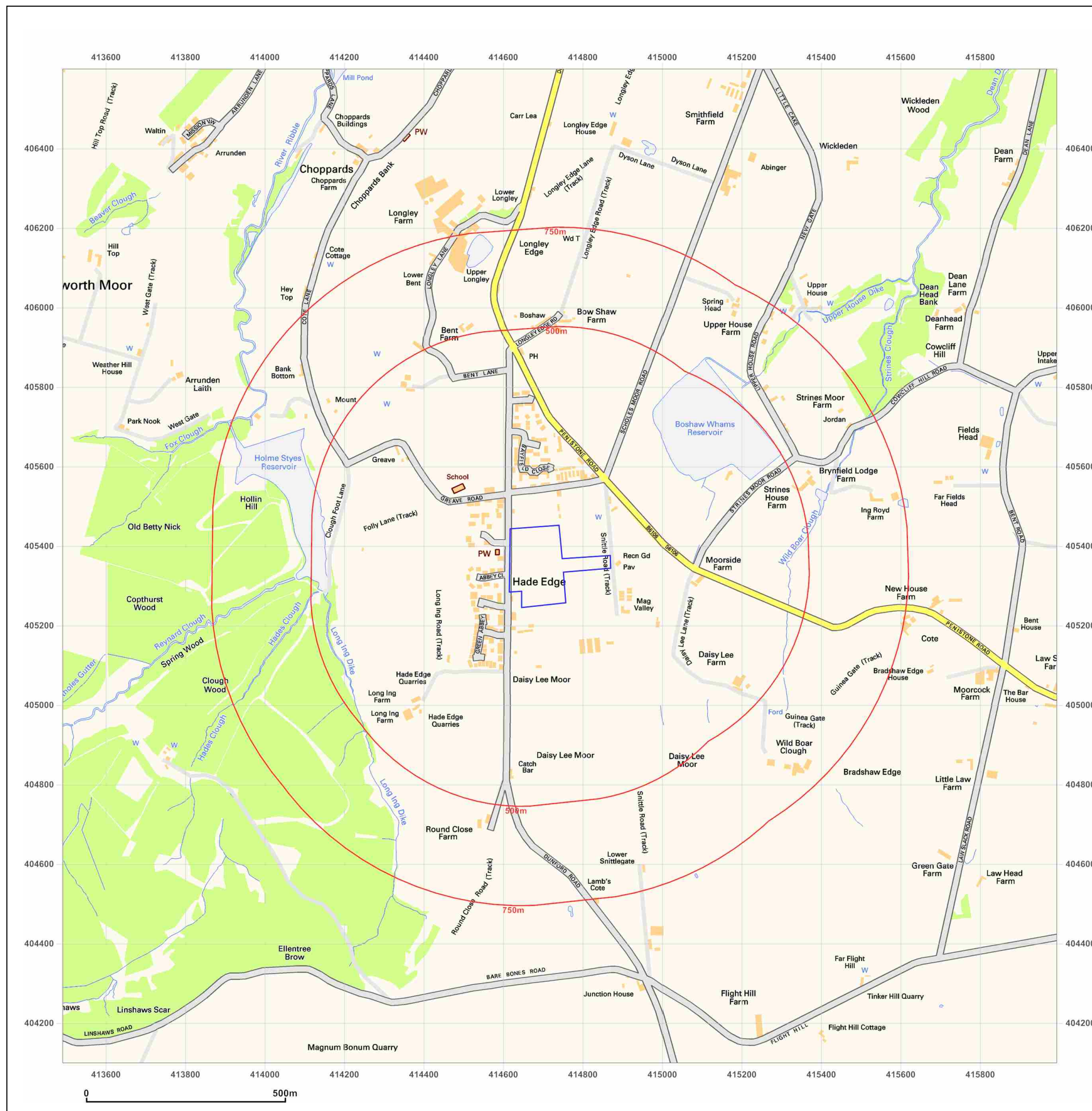


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APPENDIX 6

Coal Authority Mining Report



The Coal
Authority

Resolving the **impacts** of mining

CON29M Non-Residential Mining Report

DUNFORD ROAD
HADE EDGE
HOLMFIRTH
WEST YORKSHIRE

Date of enquiry: 18 April 2016
Date enquiry received: 18 April 2016
Issue date: 18 April 2016

Our reference: 51001142465001
Your reference: HMD-354-2894233



CON29M Non-Residential Mining Report

This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

GROUNDSURE LIMITED

Enquiry address

DUNFORD ROAD, HADE EDGE, HOLMFIRTH, WEST YORKSHIRE

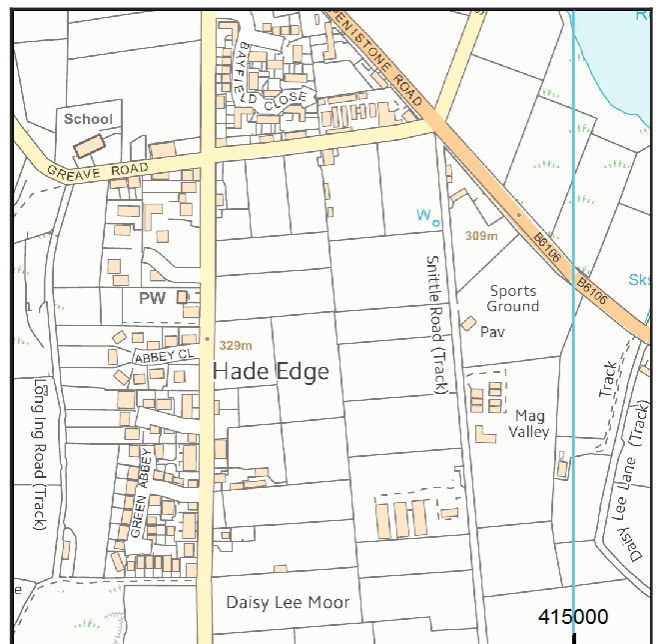
How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.gov.uk/coalauthority

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



Approximate position of property



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Summary

Has the enquiry boundary identified evidence of		
1	Past underground coal mining	No
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is not within a surface area that could be affected by past underground mining.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

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

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

5. Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence

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

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

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

10. Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support

The property is not in an area where a notice to withdraw support has been given.

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

13. Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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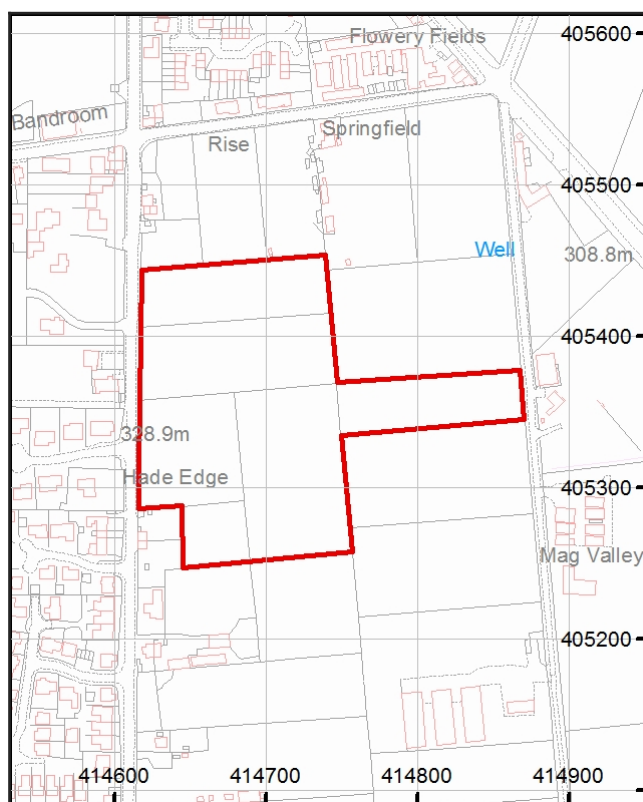
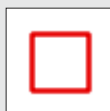
Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



How to contact us

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+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
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Standard Appendices

A and B

NOTES ON SITE INVESTIGATION PROCEDURE

1. **GENERAL.** The ground investigation has been carried out in accordance with the requirements of Eurocode 7, in particular BS EN 1997-2: 2007 Eurocode 7 – Geotechnical Design, Part 1 and BS EN 1997:2004 Eurocode 7 – Geotechnical Design, Part 2. It is also in accordance with British Standards BS EN ISO 14688-1 and 2 “Geotechnical Investigation and testing – Identification and Classification of Soil” Parts 1 and 2 and BS EN ISO 14689-1 “Geotechnical Investigation and Testing – Identification and Classification of Rock”. BS 5930 the Code of Practice for Site Investigation is partly superseded. This appendix briefly describes the nature of the work carried out. It also gives a brief description of the more important tests, which are made for engineering purposes on rocks and soils (see also BS 1377). By its very nature, any ground investigation only samples a small percentage of the ground. Consequently, changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimise such risks but they cannot be eliminated.
2. **GROUND INVESTIGATION.**
 - 2.1 **BOREHOLE AND TRIAL PIT RECORDS.** These illustrate the ground conditions only at the location of the particular borehole or trial pit. Correlation between boreholes is for guidance only and its accuracy cannot be guaranteed.
 - 2.2 **SHELL AND AUGER BORING.** This technique uses a tripod winch and an essentially percussive action using a variety of tools. Disturbed and undisturbed samples can be taken. This is the most suitable method for soft ground investigation, enabling the maximum amount of information to be obtained. However, minor changes in lithology may be overlooked unless continuous undisturbed sampling is used.
 - 2.3 **GROUNDWATER.** Groundwater levels vary seasonally and the details given on the borehole logs relate only to the dates and the conditions described in the borehole records. The rate of boring may not have allowed an equilibrium water level to be established and the use of casing may seal off certain seepages.
 - 2.4 **SAMPLING.** Disturbed samples of soils are taken for identification and classification purposes. In cohesive soils 'undisturbed' samples 100mm in diameter are taken by open drive sampler for laboratory testing of strength, permeability and consolidation characteristics.
 - 2.5 **STANDARD PENETRATION TESTS.** S.P.T tests are used in granular and cohesive materials and in soft or weathered rocks. Difficulties in obtaining true 'N' values mean they must only be used as a guide and not as an absolute value in foundation design.
 - 2.6 **ROTARY DRILLING.** Two main types of rotary drilling are carried out in rock. Rock coring using diamond or tungsten carbide tipped core bits provides samples and information on rock types, fissuring and weathering. Openhole drilling only produces small particles for identification purposes and the information gained is therefore limited. The latter is, however, useful as a quick method for detecting major strata changes and for the location of coal seams and old workings. Water, air, foam or drilling muds may be used as the flushing medium in either case.
 - 2.7 **PERMEABILITY TESTS.** These can be carried out in boreholes or trial pits and gives a good indication of in-situ permeability.
 - 2.8 **TRIAL PITTING.** This enables soil conditions to be closely examined at any specific point and samples taken. It also gives useful information on the stability of excavations and ingress of water.
 - 2.9 **WINDOW SAMPLING.** Window sampling consists of driving a series of 1m-long tubes into the ground using a dropping weight. On completion of each 1m run, the tube is withdrawn. The next tube is then inserted and the process repeated to provide a continuous profile of the ground. On each run the tube diameter is reduced in order to assist in its recovery.
 - 2.10 **GAS MONITORING.** This is routinely carried out in trial pits or probe holes to check for elevated levels of methane and carbon dioxide or oxygen deficiency, particularly since risks can exist from natural gases, landfill sites and rising groundwater levels in mine workings below ground. Longer term monitoring is carried out with gas monitoring standpipes.
3. **SOIL DESCRIPTION.** Samples from borings or trial pits are described as specified in the standard procedure outlined in the British Standards. The description includes colour, consistency, structure, weathering, lithological type, inclusions and origin. All descriptions are based on visual and manual identification.

Fire Soils (Cohesive Soils)

The following field terms are used:

Soil Type	Description
Very soft	Exudes between fingers
Soft	Moulded by light finger pressure
Firm	Cannot be moulded by the fingers but can be rolled in hand to 3mm threads.
Stiff	Crumbles and breaks when rolled to 3mm threads but can be remoulded to a lump.
Very stiff	No longer moulded but crumbles under pressure. Can be indented with thumbs.

The following terms are used in accordance with the results of laboratory and field tests.

Description	Undrained Shear Strength c_u (kPa)
Extremely Low	<10
Very Low	10 - 20
Low	20 - 40
Medium	40 - 75
High	75 - 150
Very High	150 - 300
Extremely High	>300

Fine soils can also be classified according to their sensitivity, which is the ratio between undisturbed and remoulded undrained shear strength.

Sensitivity	Ratio
Low	8
Medium	8 - 30
High	>30
Quick	>50

Granular Soils (Non-Cohesive)

The following descriptions are used for granular soils.

Description	Normalised Blow Count (N_1) 60
Very Loose	0 - 3
Loose	3 - 8
Medium	8 - 25
Dense	25 - 42
Very Dense	42 - 58

4. **NATURAL OR IN-SITU MOISTURE CONTENT.** The natural or in-situ moisture content of a soil is defined as the weight of water contained in the pore space, expressed as a percentage of the dry weight of solid matter present in the soil. Soil properties are greatly affected by the moisture content and the test can help to give an indication of likely engineering behaviour.

5. **LIQUID AND PLASTIC LIMITS.** Two simple classification tests are known as the liquid and plastic limits. If a cohesive soil is remoulded with increasing amounts of water, a point will be reached at which it ceases to behave as a plastic material and becomes essentially a viscous fluid. The moisture content corresponding to this change is arbitrarily determined by the liquid limit test. 'Fat' clays, which have high contents of colloidal particles, have high liquid limits; 'lean' clays, having low colloidal particle contents have correspondingly low liquid limits. An increase in the organic content of a clay is reflected by an increase in the liquid and plastic limits.

If a cohesive soil is allowed to dry progressively, a point is reached at which it ceases to behave as a plastic material, which can be moulded in the fingers, and it becomes friable. The moisture content of the soil at this point is known as the 'plastic limit' of the soil.

The range of water content over which a cohesive soil behaves plastically, i.e. the range lying between the liquid and plastic limits, is defined as the plasticity index.

A cohesive soil with a natural water content towards its liquid limit will, in general, be an extremely soft material whereas a cohesive soil with a natural water content below its plastic limit will tend to be a stiff material.

6. **PARTICLE-SIZE DISTRIBUTION.** A knowledge of particle-size distribution is used to classify soils and to indicate likely engineering behaviour. British Standards define soils in relation to their particle-size as shown below:-

Boulders	>200mm	Coarse Sand	2.0	to	0.63mm
Cobbles	200 to 63mm	Medium Sand	0.63	to	0.2mm
		Fine Sand	0.2	to	0.063mm
Coarse Gravel	63 to 20mm	Coarse Silt	0.063	to	0.02mm
Medium Gravel	20 to 6.3mm	Medium Silt	0.02	to	0.0063mm
Fine Gravel	6.3 to 2mm	Fine Silt	0.0063	to	0.002mm
		Clay	<0.002mm		

7. **BULK DENSITY.** The bulk density of a material is the weight of that material per unit volume and includes the effects of voids whether filled with air or water. The 'dry density' of a soil is defined as the weight of solids contained in a unit volume of the soil.

8. **PERMEABILITY.** The permeability of a material is defined as the rate at which water flows through it per unit area of soil under unit hydraulic gradient.
9. **CONSOLIDATION CHARACTERISTICS.** When subjected to pressure, a soil tends to consolidate as the air or water in the pore space is forced out and the grains assume a denser state of packing. The decrease in volume per unit of pressure is defined as the 'compressibility' of the soil, and a measure of the rate at which consolidation proceeds is given by the 'coefficient of consolidation' of the soil. These two characteristics M_v and C_v are determined in the consolidation test and the results are used to determine settlement of structures or earthworks.
10. **STRENGTH CHARACTERISTICS.** The strength of geological materials is generally expressed as the maximum resistance that they offer to deformation or fracture by applied shear or compressive stress. The strength characteristics of geological materials depend to an important degree on their previous history and on the conditions under which they will be stressed in practice. Consequently, it is necessary to simulate in the laboratory tests the conditions under which the material will be stressed in the field.

In general, the only test carried out on hard rocks is the determination of their compressive strength but consideration must be given to fissuring, jointing and bedding planes.

The tests at present in use for soils and soft rocks fall into two main categories. Firstly, those in which the material is stressed under conditions of no moisture content change, and secondly those in which full opportunity is permitted for moisture content changes under the applied stresses. Tests in the first category are known as undrained (immediate or quick) tests, while those in the second category are known as drained (slow or equilibrium) tests. The tests are normally carried out in the triaxial compression apparatus but granular materials may be tested in the shear box apparatus.

The undrained triaxial test gives the apparent cohesion C_u and the angle of shearing resistance ϕ_u . In dry sands, $C_u = 0$ and ϕ_u is equal to the angle of internal friction whereas with saturated non-fissured clays ϕ_u tends to 0 and the apparent cohesion C_u is equal to one-half the unconfined compression strength q_u . On site the vane test gives an approximate measure of shear strength.

For some stability problems use is made of a variant of the undrained triaxial test in which the specimen is allowed to consolidate fully under the hydrostatic pressure and is then tested to failure under conditions of no moisture content change. This is known as the consolidated undrained triaxial test. Pore water pressures may be measured during this test or a fully drained test may be carried out. In either case the effective shear strength parameters C' and ϕ' can be obtained which can be used to calculate shear strength at any given pore water pressure.

11. **COMPACTION.** The density at which any soil can be placed in an earth dam, embankment or road depends on its moisture content and on the amount of work which is used in compaction. The influence of these two factors can be studied in compaction tests, which can determine the maximum dry density (MDD) achievable at a certain optimum moisture content (OMC).
12. **CALIFORNIA BEARING RATIO TEST.** In flexible pavement design a knowledge of the bearing capacity of the subgrade is necessary to enable the thickness of pavement for any particular combination of traffic and site conditions to be determined. The quality of the subgrade can be assessed by means of the California Bearing Ratio Test or approximately by the MEXE cone penetrometer.
13. **ROCK DESCRIPTION.** This is based on;
 - i. Colour (minor then principal colour).
 - ii. Grain Size.

Description	Predominate Grain Size (mm)
Very Coarse - grained	>63
Coarse - grained	63 - 2
Medium - grained	2 - 0.063
Fine - grained	0.063 - 0.002
Very Fine - grained	<0.002

- iii. Matrix.
- iv. Weathering.

Term	Description
Fresh	No visible sign of weathering/alteration of the rock material.
Discoloured	The colour of the original fresh rock material is changed and is evidence of weathering/alteration. The degree of change from the original colour should be indicated. If the colour change is confined to particular mineral constituents, this should be mentioned.
Disintegrated	The rock material is broken up by physical weathering, so that bonding between grains is lost and the rock is weathered/alterd towards the condition of a soil in which the original material fabric is still intact. The rock material is friable but the grains are not decomposed.
Decomposed	The rock material is weathered by the chemical alteration of the mineral grains to the condition of a sol in which the original material fabric is still intact; some or all of the grains are decomposed.

- v. Carbonate Content.
- vi. Stability of Rock Material.

Stable indicates no changes when sample left in water for 24 hours. Fairly stable indicates fissuring and crumbling of surfaces. Unstable indicates complete disintegration of the sample.
- vii. Unconfined Compressive Strength.

Term	Field Identification	Unconfined Compressive Strength (MPa)
Extremely Weak ^a	Indented by thumbnail.	Less than 1
Very Weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife.	1 to 5
Weak	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.	5 to 25
Medium Strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer.	25 to 50
Strong	Specimen required more than one blow of geological hammer to fracture it.	50 to 100
Very Strong	Specimen requires many blows of geological hammer to fracture it.	100 to 250
Extremely Strong	Specimen can only be chipped with geological hammer.	Greater than 250
^a Some extremely weak rocks will behave as soils and should be described as soils.		

viii. Structure.

Sedimentary	Metamorphic	Igneous
Bedded	Cleaved	Massive
Interbedded	Foliated	Flowbanded
Laminated	Schistose	Folded
Folded	Banded	Lineated
Massive	Lineated	
Graded	Gneissose	
	Folded	

ix. Discontinuities.

x. Discontinuity Spacing, persistence and roughness, infilling and seepage.

xi. Weathering of the Rock Mass.

Term	Description	Grades
Fresh	No visible sign of rock material weathering; perhaps slight discolouration on major discontinuity surfaces.	0
Slightly weathered	Discolouration indicates weathering of rock material and discontinuity surfaces.	1
Moderately weathered	Less than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	2
Highly weathered	More than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	3
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	4
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soils has not been significantly transported.	5

xii. Rock Mass Permeability

14. **CHEMICAL TESTS.** A knowledge of total soluble sulphate content and pH of soils and groundwater is important in determining the protection required for concrete or steel in contact with the ground. Other specialist tests may be carried out on sites suspected of being contaminated by toxic materials (see standard appendix B).

15. **REFERENCES**

CIRIA: Asbestos in Soil and Made Ground: a guidance to understanding and managing risks, 2014
The Coal Authority: Guidance on Managing the Risk of Hazardous Gases when Drilling or Piling Near Coal, 2013
Site Investigation Practice by Michael D Joyce; E & F N Spon 1982.

BRITISH STANDARDS

BS EN 1997-1: 2004 "Eurocode 7 – Geotechnical Design – Part 1: General Rules"
BS EN 1997-2: 2007 "Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and Testing"
BS ISO 14688-1:2002 "Geotechnical Investigation and Testing – Identification and Classification of Soil – Part 1"
BS ISO 14688-2:2004 "Geotechnical Investigation and Testing – Identification and Classification of Soil – Part 2"
BS ISO 14689-1:2003 "Geotechnical Investigation and Testing – Identification and Classification of Rock – Part 1"
BS 5930 Codes of Practice for Site Investigation 1999 (partly superseded)
BS 1377 Methods of Test for Soils for Civil Engineering Purposes 1990 (Parts 1 to 8)

1. **GENERAL.** The desk study and/or intrusive ground investigation is typically carried out in accordance with the requirements of BS5930 and BS10175. In relation to contamination the desk study is referred to as the preliminary investigation in BS10175 and the intrusive ground investigation is referred to as the Exploratory Investigation. This appendix briefly describes the nature of the work carried out and explains the standards against which contamination data has been assessed. The nature of any contamination investigation is such that only a small percentage of the ground, and therefore potential contamination, is sampled. Consequently variations in both ground conditions and contaminant levels can occur between any two sampling positions. The contamination investigation is designed to minimise such risks, but they cannot be eliminated.
2. **REVIEW OF CONTAMINATION ISSUES.** Part 2A of the Environmental Protection Act 1990 created a new regime for the identification and remediation of contaminated land. It introduced a definition of contaminated land described in Section 78A(2) of the Act of:

"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that

- (a) significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused:

Both Part 2A and the planning regime embrace the "suitable for use" approach. In the context of Part IIA, action is necessary only where there are unacceptable risks to health or to the environment, taking into account the current use of the land and its environmental setting.

For humans, significant harm is defined as "death, disease, serious injury". Specifically, disease is taken to mean an unhealthy condition of the body or part of it. "Significant possibility of significant harm" is described as health effects arising from the intake of a contaminant or other direct bodily contact with the contaminant where the intake or exposure is unacceptable. The assessment should also take into account the total intake from all sources, the relative contribution of the pollutant linkage in question, and the duration of intake or exposure. The various statutory definitions are given overleaf.

The presence of unnatural substances does not automatically constitute a risk unless there is a link or pathway between the contamination (the hazard) and the receptor (the target) be it humans, the environment or property. Therefore the assessment needs to determine whether a hazard is present and whether the necessary pathway exists the so-called "pollution linkage" or "conceptual site model".

The effect of any hazard on a site depends primarily on the site use and groundwater conditions since these determine who and what may be at risk and the routes by which they may be exposed to the hazard. Site uses can include allotments, domestic gardens on residential developments, amenity and recreational areas, public open space and industrial and commercial buildings. On any site, the potential contaminants have to be identified together with the potential receptors. The pathway for that contaminant to reach its target has then to be considered.

3. **PRELIMINARY INVESTIGATION.** The preliminary Phase I Geoenvironmental Assessment (desk study) report normally considers the following key sections:

Introduction	
The Site	Contaminated Land
Site History	Radon
Geology and Mining	Geoenvironmental Risk Assessment
Hydrogeology	Geotechnical Assessment
Landmark Envirocheck	Ground Investigation (Recommendations)

The report will summarise the findings and also relate our opinions to the potential for a site to be geoenvironmentally impaired, at levels likely to warrant mitigation or further consideration appropriate to the current or future use.

Findings are based on information obtained and described during the desk study and site inspection without intrusive ground investigation. It is possible that further information exists. The absence of indicators of impairment does not mean that such impairment does not exist. Additional investigation including intrusive methods can reduce the risks but cannot eliminate them and may not be cost effective. We can advise on the additional research opportunities, their cost and their possible impact on mitigating risk. Recommendations are normally given based on the redevelopment proposals for the site.

Type of Receptor	Description of harm that is to be regarded as significant harm	Conditions For There Being A Significant Possibility Of Significant Harm
1. Human beings	Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.	If the amount of the pollutant in the pollutant linkage represents an unacceptable intake or direct bodily contact, assessed on the basis of relevant information on the toxicological properties of that pollutant. Such an assessment should take into account: - the likely total intake of, or exposure to, the substance or substances which form the pollutant, from all sources including that from the pollutant linkage in question; - the relative contribution of the pollutant linkage in question to the likely aggregate intake of, or exposure to, the relevant substance or substances; and - the duration of intake or exposure resulting from the pollutant linkage in question. The question of whether an intake or exposure is unacceptable is independent of the number of people who might experience or be affected by that intake or exposure. Toxicological properties should be taken to include carcinogenic, mutagenic, teratogenic, pathogenic, endocrine-disrupting and other similar properties.
2. All other human health effects (particularly by way of explosion or fire)		If the probability, or frequency, of significant harm of that description is unacceptable. The pollutant linkage might cause "significant harm which" - would be irreversible or incapable of being treated; - would affect a substantial number of people; - would result from a single incident such as a fire or an explosion; or - would be likely to result from a short-term (less than 24-hour) exposure to the pollutant.
3. Any ecological system, or living organism forming part of such a system, within a location which is protected.	For any protected location: - harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or - harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.	If either: - significant harm of that description is more likely than not to result from the pollutant linkage; or - there is a reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of damage to features of special interest at the location in question that they would be beyond any practicable possibility of restoration.
4. Property in the form of: - crops, including timber; - produce grown domestically, or on allotments, for consumption; - livestock; - other owned or domesticated animals; - wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in the value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.	If significant harm of that description is more likely than not to result from the pollutant linkage in question.
5. Property in the form of buildings.	Structural failure, substantial damage or substantial interference with any right of occupation.	If significant harm of that description is more likely than not to result from the pollutant linkage in question during the expected economic life of the building.
6. Controlled waters.		

4. **INTRUSIVE INVESTIGATION.** BS10175 describes this as an exploratory investigation. Intrusive ground investigation is described in Standard Appendix A. During the investigation representative or indicative samples are obtained for testing by an accredited laboratory. The aim is to determine (with a degree of confidence appropriate to the objectives), the presence, concentration and distribution of contaminants in respect of those points investigated. The extent of any necessary intrusive investigation will depend on the size of the site and any hazards, either known or suspected.

5. **ASSESSMENT OF CONTAMINATION.** The assessment of contaminated land under the terms of Part II A of the Environmental Protection Act 1990 is based upon pollution linkage (source - pathway - receptor model).

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

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

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

To date only selective SGVs have been issued for the following land-uses

- Residential with and without plant uptake
- Allotments
- Commercial/Industrial

Soil Guideline Values (mg/kg)			
Analyte	Residential	Allotments	Commercial
Arsenic	32 (37)	43	640
Cadmium	10 (17)	1.8	230
Chromium (total)	130		5000
Mercury	170	80	3600
Nickel	130	230	1800
Selenium	350	120	13000
Lead (2)	450 (82)		750
Toluene	610	120	4400
Ethylbenzene	350	90	2800
Phenol	420	280	3200
Benzene	0.33 (0.42)	0.07	95
o-xylene	250	160	2600
m-xylene	240	180	3500
p-xylene	230	160	3200
Copper (1)	2330	524	71,700
Zinc (1)	3750	618	665,000
Benzo(a)pyrene (1)	1.0 (2.4)	2.1	14
Naphthalene (1)	8.7	23	1100
Flourene (1)	780	160	71,000

(1) Generic Assessment Criteria (mg/kg) derived by LQM / CIEH

(2) Geometric mean value across site

(3) The figures in brackets are the latest C4SLs (see later in text)

DEFRA previously issued “Outcome of the Way Forward Exercise on Soil Guideline Values”. This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

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

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

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

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

Since the regime was introduced in 2000 there has been considerable uncertainty over how to decide when land is, and is not contaminated land on grounds of the legal test of *significant possibility of significant harm to human health or the environment*.

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

- Category 1 describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.
- Categories 2 and 3 cover less straightforward land where more detailed consideration is needed before the regulator can decide either: (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or (b) that such a case does not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.
- Category 4 describes land that is clearly not contaminated land, as discussed below.

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

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

The new Statutory Guidance makes clear what land should be placed into Category 4, for example:

- (a) Land where no relevant contaminant linkage has been established.
- (b) Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise. In other words land with normal background concentrations in the soil.
- (c) Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.
- (d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed to in the normal course of their lives).

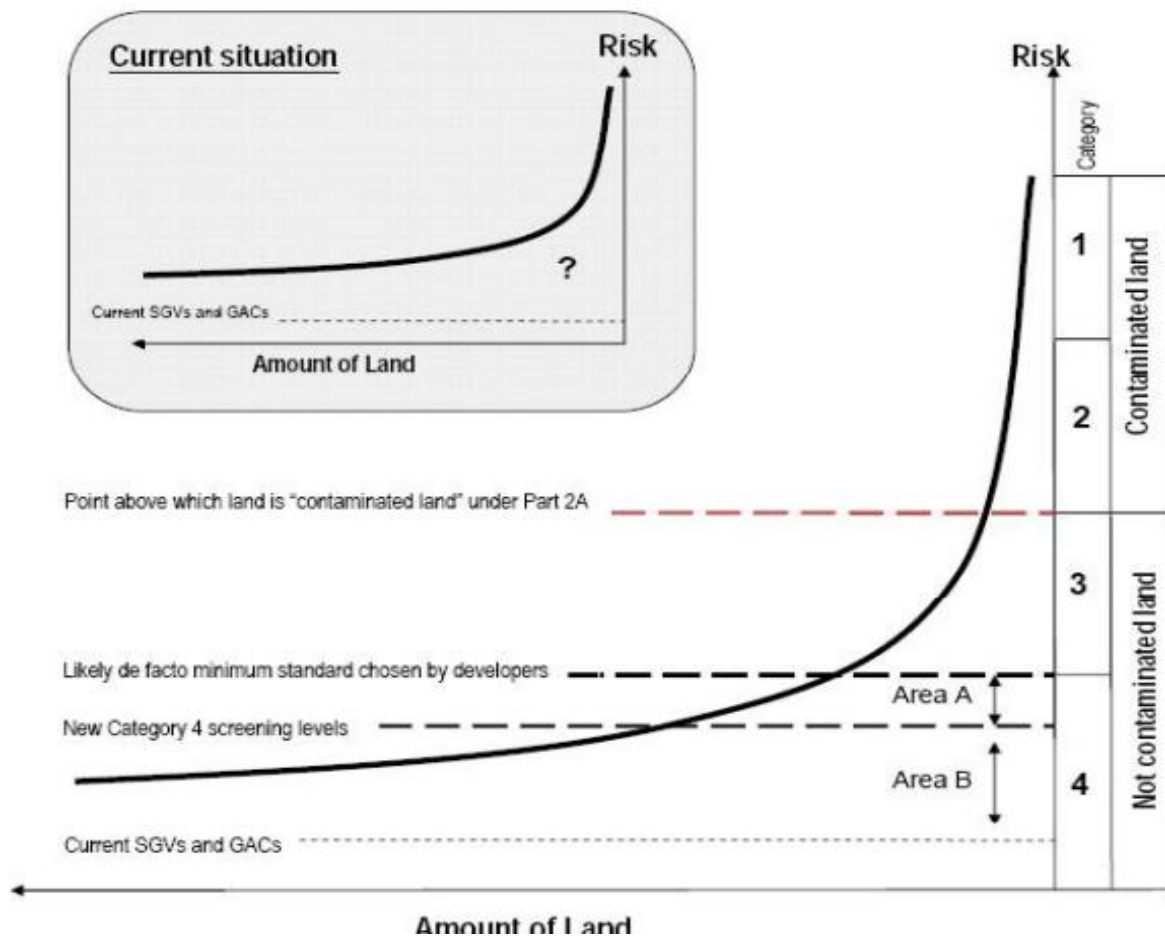
The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

- 3.27 *It is common practice in contaminated land risk assessment to use “generic assessment criteria” (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work may be warranted.*
- 3.28 *Local authorities may use GACs and other technical tools to inform certain decisions under the Part 2A regime, provided: (i) they understand how they were derived and how they can be used appropriately; (ii) they have been produced in an objective, scientifically robust and expert manner by reputable organizations; and (iii) they are only used in a manner that is in accordance with Part 2A and this Guidance.*
- 3.29 *GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regard to such GACs:*
- (a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.
 - (b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.
 - (c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.
 - (d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.
 - (e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

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

Paragraph 47 of the Impact Assessment describes the diagram in detail. Of particular relevance to this project is the description of the overall diagram (sub-paragraph a), description of category 4 (sub-paragraphs c (part iv) and h) and the description of how the monetised benefits of the new system will be realised (sub-paragraph h). These sub-paragraphs are reproduced below.

Diagram showing the new Category 1-4 system (compared to current situation)



The diagram above seeks to illustrate, in a simplified manner, broadly what the changes to the statutory guidance on significant possibility of significant harm to human health are intended to achieve. To explain:

- The curved line and axes illustrate the spectrum of risk presented by land contamination. The idea is to show that a very large amount of land is low risk, and only a small amount of land would pose sufficient risk to be contaminated land in the legal sense. The axes and lines in the diagrams are not to scale, and they have been compressed for the purposes of illustration (in reality the risks on Category 1 land would probably be orders of magnitude above Category 4 risks, and vastly more land would be in Category 4 compared to the other Categories).
- The smaller diagram summarizes the current situation. In the area below the SGV/GACs there is near certainty that land is not contaminated land, however, above the line there is increasing uncertainty. As explained above, currently remediation usually occurs to just below the SGV/GAC level because they are perceived as offering the only cast-iron guarantee of when land is definitely not contaminated land. Sometimes consultants are employed to justify remediating to levels above the SGV/GACs, however the further they go away from the SGV/GACs the more legal risk they and their clients are exposed to.
- The new statutory guidance will end the current situation, and it would not be legally possible e.g. for individual regulators to ignore the changes being made. For example, as explained above, the new statutory guidance will specifically say:
 - that Part 2A cannot be used to force remediation to below a point where it ceases to be contaminated land in the legal sense i.e. the Category 2/3 border in terms of the diagram), although responsible parties can choose to go further;
 - that SGV/GACs cannot be used as one size fits all remediation thresholds under either Part 2A of the planning system;
 - that normal background levels of contamination are not caught by Part 2A; and
 - that SGV/GACs are well into Category 4, sometimes by only a few times and sometimes by orders of magnitude. These changes and others also provide the legal backing for the development e.g. of Category 4 screening levels, as discussed below.

- (d) The new Category 1-4 system divides the spectrum of risk posed by contaminated land into four different categories, and the statutory guidance will explain how to decide when land falls into each Category. This is more sophisticated than the current statutory guidance, which in effect has only two categories (contaminated land or not) and does not explain how to decide which category land falls into. The new Category 1-4 system reflects what assessors find when they investigate real sites i.e. some are clearly contaminated land (Category 1); some clearly are not (Category 4) and some are less-straightforward and need some level of detailed assessment before a decision can be taken as to whether or not they are contaminated land (Categories 2 and 3).
- (e) In the case of Category 2 and 3 sites, the regulator will have flexibility to take decisions within the parameters set by the new Guidance. There would be less flexibility for Category 2 and 3 sites that clearly pose either a high or low risk. However, the regulator will have considerable flexibility for sites closer to the Category 2/3 border to judge which side of the border a site would fall (e.g. taking account of their understanding of the risks, uncertainties and the interests of the local community). These are often complex decisions which need to be taken case-by-case given the many factors involved.
- (f) In the case of Categories 1 and 4 the regulator will have far less flexibility. For example, if a regulator claimed that a site matching the Category 1 description was not contaminated land, or that a site matching the Category 4 description was contaminated land, they would be acting directly against the statutory guidance which the Act requires that they follow, and decisions could be challenged (e.g. in a law court) with a high chance that the challenge would be successful. Among other things, the intention of doing this is to create far more legal certainty around when land is definitely not contaminated land in the legal sense. With the specific wording of the new statutory guidance, and the supporting tools such as the new Category 4 screening levels, it would be very difficult for a regulator e.g. to threaten landowners with the Part 2A regime, and if they tried to determine land as contaminated land they would be operating in direct opposition to the statutory guidance.
- (g) In the many consultation meetings held in developing the Category 1-4 system, all the developers, landowners and consultants we spoke to were strongly of the view that they would want to ensure their land is safely within Category 4 (even though in theory they could remediate to a level within Category 3 and still satisfy Part 2A and planning rules). They would do this for various reasons, including the fact that the flexibility granted to regulators in Categories 2 and 3 means that the further into Category 3 a site gets, the greater the risk that the regulator might decide it is in Category 2. Also they would want to be in Category 4 for reasons of marketability, future proofing etc. So developers and others would have a strong incentive to seek the regulatory certainty of being safely within Category 4. Thus, as far as development taking place under the planning system is concerned, Category 3 would, in effect, normally be a buffer which provides added reassurance that development falling within Category 4 will not be caught by the Part 2A regime.
- (h) The new statutory guidance will bring about a situation where the current SGV/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land. Above the C4SLs, in Area A on the diagram, there will be much stronger legal backing for experts to use their judgement to make sensible and precautionary decisions on when land should be considered to be towards the top end of Category 4, without fear that land may be caught as contaminated land. This recognizes that the generic C4SLs will not be able to describe the Category 3/4 border itself because they are generic and would therefore have to err on the side of caution whilst a detailed site specific assessment would be able to push further by looking at specific circumstances relating to a specific site.
- (i) The very large majority of the monetized benefits of the changes to the regime discussed in this Impact Assessment manifest themselves in Category 4, and in particular in Areas A and B on the diagram. The main effects of moving to the new system would include Low risk land falling within Area B (pre-development) on the diagram would no longer have to be remediated because it would fall below the new C4SLs. Similarly land which is in Area A pre-development would no longer need to be remediated if justified by a detailed site-specific assessment. For these sites the cost of remediation would be removed altogether. The cost of remediating land which is initially in Categories 3, 2 or 1 would fall because it would be remediated to the new C4SL levels (or somewhere within Area A if there has been a detailed assessment) rather than the SGV/GAC level. This will have the overall effect of reducing the cost of remediation, with the effect varying according to specific site circumstances, the type of remediation etc. Generally the cost of remediation would fall for many affected brownfield land sites. This would have the general effect of making such land more economically viable for development. It would also mean that some land that is not currently economically viable to develop becomes reduce pressure to develop Greenfield land in some cases. The C4SLs will also speed up regulatory decisions on the reuse of brownfield land by providing a simple remediation standard.

The C4SLs are intended as “*relevant technical tools*” (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

“The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land”.

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

“SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health”.

C4SLs, therefore, should not be viewed as “SPOSH levels” and they should not be used as a legal trigger for the determination of land under Part 2A.

In 2014 CL:AIRE (Contaminated Land: Application in Real Environments) published *“Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination”*. In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	PoS Residential (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.42	1.40	0.09	90	72
Benzo(a)Pyrene	2.40	2.50	2.70	36	4.90
Cadmium	17	87	3.1	220	120
Chromium (vi)	6.1	6.1	120	33	7.7
Lead	82	130	30	1100	270

6. GEOENVIRONMENTAL RISK ASSESSMENT

- 6.1 **Potential Hazard Sources.** Ground contamination can occur through several causes, particularly from historical use of the site and is often linked to the processes of waste disposal, underground storage, open storage, process pipework, leaks, spillages, tanks, site filling and various other reasons. The contamination can either arise from site sources or be the result of migration from other sources off site.
- 6.2 **Potential Migratory Pathways.** The primary pathways are considered to be laterally or vertically downward through underlying strata or upward to the ground surface. Such pathways also provide the potential for contaminants to migrate towards local watercourses and groundwater.
- 6.3 **Potential Targets At Risk.** Potential environmental liabilities related to current legislation associated with contaminated land with regard to existing ownership and redevelopment are summarised.

The probability of a hazard, linked with its consequences, can be used to assess risk in accordance with the tables below for use in decision making.

Consequence of Pollution Linkage

Severe	Damage to human health. Substantial pollution of controlled waters. Significant change in ecosystem population. Irreparable damage to property.
Moderate	Non-permanent damage to human health. Minor pollution of controlled waters. Change in ecosystem. Damage to property.
Mild	Short term health effects. Slight pollution of controlled waters. Slight effect on ecosystem. Minor repairable damage to property.
Near Zero	No noticeable effect on human health. No significant pollution to controlled waters. No measurable effect on ecosystem densities. Non-structural cosmetic damage to property.

Decision Making

Probability of a hazard and an associated linkage	Consequences of a pollution linkage (hazard-pathway-target)			
	Severe	Moderate	Mild	Near Zero
High	High	High	Medium/low	Negligible
Medium	High	Medium	Low	Negligible
Low	High/medium	Medium/low	Low	Negligible
Unlikely	High/medium/low	Medium/low	Low	Negligible

Final overall risk is based on an assessment of probability of a hazard and its consequences. Risk categories are shown shaded in the table above and defined below.

Risk	Description
High	Site probably or certainly unsuitable for present use or environmental setting. Contamination probably or certainly present and likely to have an unacceptable impact on key targets. Urgent action needed.
Medium/ Moderate	Site may not be suitable for present use or environmental setting. Contamination may be present, and likely to have unacceptable impact on key targets. Action may be needed on the medium term.
Low	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. Action unlikely to be needed in present use.
Negligible	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. No action needed while site remains in present use.

The review of the information from the exploratory investigation may be such that a decision is made that there is no need for further investigation. Alternatively, it may be necessary to carry out a further main investigation.

7. SITE WASTE MANAGEMENT PLANS (SWMPs)

In England, the SWMP Regulations 2008 came into force on 6th April 2008. They apply to 'construction projects', and to the whole life of a construction project, from design all the way through to completion. As well as including actual construction works, they include renovation projects, site preparation works, the installation of services, and all kinds of demolition. If you carry out a construction project where the value of the materials plus labour exceeds £300,000, it becomes a criminal offence (for both the project manager and the main contractor) not to produce a SWMP.

The Plans must include basic elements like who prepared it, who's in charge of the project, who's the main contractor, what's the location, and what's the estimated value. But it must also include details of the decisions taken at the outset on (1) the design of the project, (2) the methods employed and (3) the materials employed in order to MINIMISE the quantity of waste produced on site. It will therefore be crucial to have evidence of that thought process. The SWMP must describe each type of waste that will be produced, and estimate the volume. Then, you must identify the particular waste management 'action' that will apply to the waste. Is it to be dumped, sent for recycling, or perhaps recovered through use for land treatment under an exemption?

8. WASTE MANAGEMENT LICENSING

The Environment Agency has set out guidance as to the classification of waste arising from construction sites in its document "The Definition of Waste" dated April 2006. This document outlines how waste is to be handled

The following activities are not regarded as a waste management activity requiring licensing.

- 1) Construction activities carried out for the purpose of producing a suitably engineered soil e.g. lime stabilisation, vibro-replacement and piling.
- 2) Uncontaminated materials produced on site (including excavated soils and materials from demolition) which can be reused without further treatment. Examples include site regrading and footing excavations.

These must be done in accordance with the Planning Permission. Demolition material must be used in accordance with the quality protocols for the production of aggregates from inert waste, subject to appropriate testing and the lack of any harmful constituents. Uses include pipe bedding, backfill and sub-base.
- 3) Contaminated soils can be moved on-site providing they do not require treatment or containment. There should be no risk to the environment i.e. non-leachable and in accordance with Planning Permission. Relevant activities can include site regrading and use of materials below clean cover systems, capping, buildings and hardstanding.

Where contaminated materials have to be placed in an engineered cell to prevent pollution, then this would be classed as landfilling and require PPC permits. Any material taken off site is considered to be waste. However, this is under review. If material is waste, then there is a duty of care including ensuring material is transported by a registered carrier. The destination of material leaving the site should be regularly checked and Waste Transfer Notes kept.

Clean Covers Systems

According to the Environment Agency's Remediation Position Statements of May 2006, the placement of a cover system using "clean" material is not treatment of waste. Consequently, no licensing/permitting position statements are applicable to this type of remediation. If the cover system uses 'waste materials' in its construction, waste management licensing exemption paragraph 9A may be applicable to its installation. If the installation of the proposed cover system does not meet the criteria for registration of this exemption, the activity may be regulated through a waste management site licence.

9. WASTE ACCEPTANCE CRITERIA (WAC)

The main objective of the Landfill Directive is to prevent or reduce as far as possible the negative effects of landfilling waste on the environment and on human health. It is intended to reduce the disposal of waste materials to landfills and to encourage more sustainable approaches to dealing with wastes. It bans the landfill of liquids and certain solid wastes, introduces requirements for the treatment of wastes prior to landfill and provides for the classification of landfills as sites for inert, hazardous or non-hazardous waste and prohibits co-disposal.

It sets out procedures for waste acceptance at landfills and the types of waste for each class of landfill as specified by Waste Acceptance Criteria (WAC). The WAC are predominantly lists of "limit values" for certain parameters obtained from standard leaching tests of wastes going to landfills. WAC are set out in the Landfill Directive itself. Full details can be found in the Environment Agency document "Guidance for waste destined for disposal in landfills" Version 2 June 2006.

10. GAS MONITORING

In March 2007, the NHBC issued a report entitled "Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present".

The document recommends that a Conceptual Site Model is produced at the desk study stage. This can be used to produce a Preliminary Risk Assessment (PRA), with a view to assessing whether a ground gas investigation is necessary. The NHBC guidance suggests that the production of a PRA is a preliminary tool only and "cannot remove

the need entirely for ground gas monitoring data ..". This suggests that gas monitoring is needed in all circumstances. This would normally comprise the use of gas monitoring wells over a suitable time period in order to establish maximum gas concentrations and flow rates.

Our view however, and it may not be the view of the NHBC or the Local Authority, is that if there is no evidence of any gas producing source and if spike testing or on-site testing shows no evidence of landfill gases, then we regard the risk of hazardous gas production to be minimal such that further on-going monitoring would not be required. This is in line with the concept of there being no significant risk of significant harm i.e. no contamination. If there is any element of doubt, basic gas protection measures can be installed at minimal cost and each site dealt with individually.

11. MAIN REFERENCES

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BRE	Radon: Guidance on protective measures for new dwellings, BR211 Protective measures for housing on gas-contaminated land, BR414, 2001 Cover systems for land regeneration, 2004 Concrete in aggressive ground. Special Digest SD1, 3 rd Edition, 2005
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Institution of Civil Engineers	Contaminated Land: Investigation, Assessment and Remediation, 2 nd Edition
Joyce M D	Site Investigation Practice, 1982
NHBC	Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present, 2007
OPDM	Planning Policy Statement 23: Planning and Pollution Control Annex 2: Development on Land Affected by Contamination

This list is not intended to be exhaustive.



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