

Land to the West of Police Row, Therfield

**Contaminated Land and Geotechnical
Assessment**

Contaminated Land & Geotechnical Assessment

**Land to the West of Police
Row, Therfield**

Client: Wheatley Group
Developments Limited

Reference: 73792/R/001
Status: Draft for Initial Client
Comment
Date: 29th August 2022

Prepared by:
Name Mark Hiatt MSci (Hons) CGeol EurGeol FGS
Signature
Title **Geotechnical Director**

Issued by: **Nott Group**
27 Barton Road
Thurston
Suffolk
IP31 3PA

Checked and Approved by:
Name Ed Bullivant BSc FGS CGeol SiLC
Signature
Title **Director**

Telephone: 01284 799464

www.nottgroup.co.uk

Nott Group has prepared this report with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

CONTENTS

EXECUTIVE SUMMARY

1. BRIEF	1
1.1 Proposed Development	1
2. SITE DESCRIPTION AND RECONNAISSANCE	2
2.1 Site Walkover	2
3. SITE HISTORY	3
3.1 Historical Summary	4
4. GEOLOGY, HYDROLOGY AND HYDROGEOLOGY	5
4.1 General Geology and Ground Conditions	5
4.2 Geological Faulting	6
4.3 Geological Linear Features	6
4.4 Geological Hazards	6
4.5 Radon	7
4.6 Coal Mining Hazards	7
4.7 Non-Coal Mining, Extraction and Natural Cavities	7
4.8 Historical Surface Ground Working Features	8
4.9 Historical Underground Workings	8
4.10 Historical Mineral Planning Areas	8
4.11 BGS Mineral Workings	8
4.12 Landfills and Waste Sites	9
5. REVIEW OF ENVIRONMENTAL DATABASES	10
5.1 Industrial Sites Holding Authorisations, Permits and Licenses	10
5.2 Designated Environmentally Sensitive Sites	10
5.3 Environment Agency (EA) Recorded Pollution Incidents	10
5.4 Sites Determined as Contaminated Land Under Part2A	11
5.5 Records of Recent Potentially Contaminative Industrial Sites	11
5.6 Records of Historical Potentially Contaminative Industrial Sites	11
5.7 Records of Historical Tanks	11
5.8 Historical Garage Sites	11
5.9 Historical Petrol Stations	11
5.10 Current or Recent Petrol Stations	11
6. DEVELOPMENT OF PRELIMINARY CONCEPTUAL MODEL	12
6.1 Contaminated Land Background Information	12
6.2 Potential Sources	12
6.3 Potential Receptors	13
6.4 Risk Assessment	14
6.5 Findings of Preliminary Conceptual Model	15
7. DESIGN OF SITE INVESTIGATION AND WORKS UNDERTAKEN	16
7.1 On-Site Activities	16
8. GROUND CONDITIONS ENCOUNTERED	17
8.1 Description of Strata – Soils	17
8.2 Topsoil	18
8.3 Made Ground	18
8.4 Natural Superficial Geology – Lowestoft Formation	18
8.5 Solid Geology – Undifferentiated Chalk Formations	18
8.6 Groundwater Encountered	19
8.7 Field Observations and Field Screening	19
9. CHEMICAL TESTING RESULTS – SOIL	20
9.1 Summary of Chemical Analysis – Soils	21
9.2 Asbestos Screening	21
9.3 Waste Acceptance Criteria (WAC) Analysis	22
10. GEOTECHNICAL TESTING RESULTS	22
10.1 Laboratory Test Results	22

10.2	Moisture Content and Index Testing	22
10.3	Dry Density and Saturation Moisture Content of Chalk	24
10.4	Concrete in Aggressive Ground Testing	25
11.	IN –SITU TESTING	26
11.1	Standard Penetration Testing (SPTs)	26
11.2	Dynamic Cone Penetrometer (DCP) Testing.....	27
12.	GEOTECHNICAL MATERIAL PARAMETERS	28
13.	GEOTECHNICAL ASSESSMENT AND DISCUSSION	29
13.1	Ground Conditions Encountered.....	29
13.2	Foundation Design	29
13.3	Ground Bearing Floor Slab Design	31
13.4	Groundwater – Excavations	31
13.5	Excavations	31
13.6	Concrete Classification.....	31
13.7	Roads and Pavement Assessment.....	32
13.8	Shrinkable Clay Soils, Building Near Trees and Desiccation of Existing Site Soils	32
13.9	Radon Assessment	32
13.10	Coal Mining Assessment.....	33
13.11	Dissolution Features.....	33
14.	GEOTECHNICAL RISK REGISTER	34
15.	CONTAMINATED LAND ASSESSMENT	40
15.1	Potentially Significant Pollution Linkages.....	40
15.2	Potential Sources	40
15.3	Risk Assessment.....	40
16.	CONCLUSIONS AND RECOMMENDATIONS.....	42
16.1	Ground Conditions Encountered.....	42
16.2	Contaminated Land Assessment and Recommendations	42
16.3	Geotechnical Assessment and Recommendations.....	43

APPENDICES

APPENDIX A	SITE PLANS AND DRAWINGS
APPENDIX B	HISTORICAL MAPS
APPENDIX C	ENVIRONMENTAL DATABASES
APPENDIX D	ENVIRONMENTAL RECEPTORS
APPENDIX E	RISK RATING MATRIX
APPENDIX F	EXPLORATORY HOLE LOGS
APPENDIX G	CHEMICAL TESTING RESULTS
APPENDIX H	GEOTECHNICAL TESTING RESULTS
APPENDIX I	IN-SITU DYNAMIC CONE PENETROMETER TESTING RESULTS

EXECUTIVE SUMMARY

SCOPE

Purpose of the Report	Contaminated land and geotechnical assessment of site.
Future Site End-Use	The proposed development comprises the construction of residential properties with associated garden and landscaped areas, vehicle parking areas and an access road.

SITE INFORMATION

Grid Reference	533790,236943	Site Area (approx.)	1.35 hectares
Current Site Status	The site is part of a grassed field used for the grazing of cattle.		
History	The historical maps indicate from 1877 until 1976, the north of the site (with minor redevelopment shown from 1896) was occupied by several unspecified buildings and a pond. The remainder of the site is part of a field (agricultural land). From 1976 to the present day, the site is part of a field (agricultural land).		
Published Geology	The natural superficial geology of the Lowestoft Formation (Glacial till, together with outwash sands and gravels, silts and clays) is mapped across the entire site. The solid geology of the undifferentiated Lewes Nodular Chalk Formation and Seaford Chalk Formation (chalk with flints and discrete marl seams) are mapped across the entire site.		
Hydrogeology	The Lowestoft Formation (natural superficial geology) is classed as a secondary undifferentiated aquifer while the undifferentiated Lewes Nodular Chalk Formation and Seaford Chalk Formation (solid geology) are classed as a principal aquifer. The site is located within zone 3 (total catchment) source protection zone.		
Hydrology	There are seven water network entries recorded within a 500m radius of the site at locations ranging from 156m east to 248m west of the site. Entries are recorded as either inland rivers not influenced by normal tidal action, lake, loch or reservoir and containing water all year round under normal circumstances. Six unspecified surface water features are recorded within a 250m radius of the site at unspecified distances from the site boundary.		

GROUND CONDITIONS ENCOUNTERED

Works Undertaken	The site works comprised eleven window sample holes advanced to depths between 2.45m and 5.45m bgl. In-situ dynamic cone penetrometer tests were also undertaken. All exploratory holes were logged and representative soil samples taken for chemical and geotechnical testing.
Ground Conditions	The investigation works encountered clay topsoil to a maximum depth of 0.37m bgl. Stiff to very stiff natural superficial clay deposits of the Lowestoft Formation were encountered below the topsoil horizon from depths ranging from 0.16m to 0.37m and were encountered to a maximum depth of 5.45m bgl (depth of exploratory hole termination). The solid geology of the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) was encountered in a single exploratory hole from a depth of 1.64m to 3.45m bgl (depth of exploratory hole termination) and comprised of a single horizon grade Dc (clast dominated) chalk.

CONTAMINATED LAND ASSESSMENT

Assessment and Recommendations

Several exploratory holes have been advanced and no visual or olfactory evidence of contamination was noted.

No elevated concentrations of the determinants tested have been encountered in the soils sampled. The contaminated land assessment undertaken indicates that the risk of encountering contamination during development has been assessed as low. As a result, no further work is warranted or recommended with respect to soil contamination.

This report should be forwarded to the Local Authority for consultation and agreement.

GEOTECHNICAL ASSESSMENT

Assessment and Recommendations

No final formation levels have been developed and for the purpose of this report the final formation level has been assumed to be at existing site levels. If this changes then further foundation assessment work will be required.

Foundations could be constructed using strip footings, deepened using mass concrete trench fill where made ground or poorer natural soils are encountered. Alternatively, pad bases founded within the natural clay soils of a minimum stiff undrained shear strength and/or structureless grade Dc chalk are feasible.

Due to the presence of near surface shrinkable medium volume change potential soils (associated with the natural superficial geology) it is recommended suspended floor slabs are employed. Precast concrete, timber or in-situ concrete are acceptable design options.

This investigation has encountered clay soils of calculated medium volume change potential in addition to being desiccated. Once the final layout and existing trees are known a detailed plot specific assessment in accordance with the appropriate NHBC guidelines (4.2 'Building near trees') is recommended.

Based on the ground conditions encountered, it is anticipated that excavations should readily be achieved adopting standard excavation plant. It is recommended that full support of all excavations is undertaken during excavation and construction to prevent collapse and provide safe-working conditions particularly should it be necessary for personnel to enter.

Based upon the information obtained groundwater may be encountered during excavation particularly as perched groundwater. If only minor influxes are encountered, then a flexible system of pumping from sumps would be sufficient to deal with groundwater. At best, the use of such a system could be sporadic but may in the worst case necessitate continuous pumping.

For concrete classification purposes a design sulphate class of DS-1 and an ACEC class of AC-1 is deemed appropriate for the site.

It is recommended that a preliminary design California Bearing Ratio of 6% (equivalent estimated design subgrade surface modulus of 55MPa) be used for design of the road and pavement foundations across the site.

The BGS has mapped the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) across the site and our investigation has encountered weathered structureless grade Dc chalk within a single exploratory hole from a depth of 1.64m bgl. Dissolution features are common in chalk and may result in differential or collapse settlement of foundations, if undetected. Development and construction activities may cause potential subsidence either by modifying surface drainage and/or altering loads imposed on ground without adequate support. There was no evidence of dissolution features in our ground investigation works, however, the presence of dissolution features cannot be discounted. Their treatment, if present, can be undertaken by several engineering options which includes foundation bridging or grouting.

It is recommended that an observational approach is adopted during construction. If evidence of dissolution features is encountered during construction, a geotechnical engineer should be consulted. In addition, the suitability of soakaways chalk should also be evaluated.

The site is not located within an area affected by past, current or future coal mining. No further work or assessment is required in respect to coal mining hazards on-site.

The site is not located within a radon-affected area, as less than 1% of properties are above the action level. Therefore, radon protective measures are not necessary.

A geotechnical risk register specific for this project has been prepared for each potential hazard/risk identified. A risk rating is assigned before control, risk consequences and risk control measures identified. The risk register indicates lower risk ratings following adoption of control measures.

1. BRIEF

The Nott Group have been instructed by Wheatley Group Development Limited to undertake a contaminated land and geotechnical assessment at an area of land located to the west of Police Row, Therfield, Hertfordshire.

This report has been prepared for the exclusive use of the client for assisting them in evaluating the potential risks associated with contaminated land and geotechnical issues at the site.

The information presented within this report is based on observations made on site, a review of available historical, geological, geotechnical, hydrogeological sources and other environmental information obtained and site investigation information only.

The Nott Group has endeavoured to assess all information provided to them during this assessment but makes no guarantees or warranties as to the accuracy or completeness of this information obtained and reviewed.

1.1 PROPOSED DEVELOPMENT

The proposed development comprises the construction of nine residential properties with associated garden and landscaped areas, garage blocks, vehicle parking areas and an access road.

A site location plan (drawing no.1) and a proposed site layout (drawing no.2) are included within Appendix A.

2. SITE DESCRIPTION AND RECONNAISSANCE

A description of the site and the surrounding area is summarised in Table 1. A site location plan is included in Appendix A - drawing no. 1.

TABLE 1: SITE DESCRIPTION AND SURROUNDS

Data	Information
Address	Land located to the west of Police Row, Therfield, Hertfordshire, SG8 9FN (nearest postcode to the site).
Current Site Use and Description	The site forms part of a grassed field used for the grazing of cattle.
National Grid Reference	533790,236943
Site Area	Approximately 1.35 hectares
Surrounding Land Use	North Agricultural land (field) with residential beyond
	East Highway (Police Row) with residential and agricultural land (field)
	South Agricultural land (field) with residential beyond
	West Agricultural land (fields)

2.1 SITE WALKOVER

Mark Hiatt of the Nott Group undertook a site walkover on the 25th of July 2022. The weather was hot, cloudy and dry. During the walkover, the following was noted:

Contamination:

No issues were noted during the visit.

Geotechnical:

No issues were noted during the visit.

3. SITE HISTORY

Historical maps dating from 1877 have been obtained and reviewed. The relevant information is summarised in the following table. The historical maps obtained have been included in Appendix B.

TABLE 2: HISTORICAL REVIEW OF SITE AND ADJACENT AREAS

Date	On Site Observations	Off Site Observations
1877	The site is shown to form part of a large field (agricultural land). Unspecified buildings (which extend beyond the sites northern boundary) are shown in the north of the site. A pond feature (which extends beyond the sites northern boundary) is also shown within the north of the site.	The north of the site is shown to be bounded by a pond and several unspecified buildings of varying shape and size, while the east is bounded by a highway (present day Police Row) and to the south and west by agricultural land (fields). Pond features of varying shape and size are shown approximately 50m east, 50m north, 50m northeast, 80m north, 100m south, 110m southeast, 110m north, 140m north, 150m north, 160m northwest, 170m west, 180m southeast, 200m northwest, 210m north, 240m southwest, 240m northwest and 270m northwest of the site. 'Hay Farm', which comprises of several buildings of varying shape and size, is shown approximately 95m north of the site. The surrounding land use is a combination of agricultural land (fields) and residential and commercial end use with associated infrastructure associated with the village of Therfield.
1883	No significant changes from previous mapping.	A 'graveyard' is shown approximately 250m west of the site while a 'burial ground' is also shown approximately 280m north of the site. Pond features are shown approximately 390m northwest, 400m southwest, 410m west and 500m southwest of the site.
1896 – 1898	One of the unspecified buildings within the north of the site is now shown to be absent.	A 'smithy' is now shown approximately 275m northwest of the site.
1922 - 1924	No significant changes from previous mapping.	The 'smithy' approximately 275m northwest of the site is now shown to be absent.
1947	No significant changes from previous mapping.	The 'allotments' are now shown approximately 380m northwest of the site.
1960	No significant changes from previous mapping.	No significant changes from previous mapping.
1976	The pond feature within the north of the site is now shown to be absent indicating it may have been infilled. In addition, the unspecified building within the north of the site is also now shown to be absent.	The pond features immediately north, approximately 50m east, 50m north, 50m northeast, 80m north, 110m southeast, 110m north, 150m north, 200m northwest, 210m north, 240m southwest and 240m northwest of the site are now shown to be absent indicating they may have been infilled. In addition, the pond feature approximately 100m south of the site is shown to have reduced in size indicating it may have been partly infilled.
1982	No significant changes from previous mapping.	The pond features approximately 270m northwest and 410m west of the site are now shown to be absent indicating they may have been infilled. 'Hay Green Farm', which comprises of several buildings of varying shape and size, is now shown approximately 300m southeast of the site.

Date	On Site Observations	Off Site Observations
1994	No significant changes from previous mapping.	No significant changes from previous mapping.
2001 - 2003	No significant changes from previous mapping.	No significant changes from previous mapping.
2010	No significant changes from previous mapping.	Pond features are now shown approximately 500m east of the site.
2022	No significant changes from previous mapping.	No significant changes from previous mapping.

3.1 HISTORICAL SUMMARY

The historical maps indicate from 1877 until 1976, the north of the site (with minor redevelopment shown from 1896) was occupied by several unspecified buildings and a pond. The remainder of the site formed part of a field (agricultural land). From 1976 to the present day, the site is part of a field (agricultural land).

From the historical map review the significant on-site sources of contamination identified is possible made ground (unknown thickness and composition) associated with previously developed areas of the site and potential infilled ground (associated with the infilling of a pond with unknown material).

Several potential off-site sources of contamination have been identified within a 500m radius of the site and these include infilled ground (associated with the infilling of various pond features with unknown material), former allotments, a former smithy, a graveyard and burial ground and agricultural activities.

4. GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

4.1 GENERAL GEOLOGY AND GROUND CONDITIONS

The geology beneath the site has been established from the British Geological Survey (BGS) 1: 50,000 digital geological map of Great Britain. In addition, the hydrology and hydrogeology are summarised in the following tables.

TABLE 3: SITE GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

Data	Information
Solid Geology	Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) are mapped across the entire site and are described by the BGS as comprising of chalk with flints and discrete marl seams.
Superficial Geology	The Lowestoft Formation is mapped across the entire site and is described by the BGS as comprising of Glacial till, together with outwash sands and gravels, silts and clays. The till is characterised by its chalk and flint content.
Artificial and Made Ground	None mapped by the BGS.
Landslip Deposits	Mass movement deposits which are primarily superficial deposits that have moved down slope under gravity to form landslips are not mapped on-site or within a 500m radius of the site boundary by the BGS.
Closest Surface Waters	There are seven water network entries recorded within a 500m radius of the site at locations ranging from 156m east to 248m west of the site. Entries are recorded as either inland rivers not influenced by normal tidal action, lake, loch or reservoir and containing water all year round under normal circumstances. Six unspecified surface water features are recorded within a 250m radius of the site at unspecified distances from the site boundary.
Surface Water Abstractions within 1000m	There are no surface water abstractions recorded
Groundwater Vulnerability	Lowestoft Formation (superficial geology): Secondary undifferentiated aquifer Undifferentiated Chalk Formations (solid geology): Principal aquifer
Groundwater Abstractions within 1000m	There are no groundwater abstractions recorded.
Potable Water Abstractions within 1000m	There are no potable water abstractions recorded.
Source Protection Zones (SPZs)	The site is located within a zone 3 (total catchment) source protection zone.

TABLE 4: SUMMARY OF HYDROGEOLOGICAL PROPERTIES OF THE MAIN GEOLOGICAL STRATA

Strata	Hydrogeological Significance	Classification (Environment Agency)
Lowestoft Formation (superficial geology)	Assigned where it is not possible to attribute either category A or B to a rock type.	Secondary undifferentiated aquifer
Undifferentiated chalk Formations (solid geology)	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale.	Principal aquifer

4.2 GEOLOGICAL FAULTING

Geological faulting is not recorded on-site or within a 500m radius of the site boundary by the BGS.

4.3 GEOLOGICAL LINEAR FEATURES

Geological linear features such as fold axis and mineral veins are not recorded on-site or within a 500m radius of the site boundary by the BGS.

4.4 GEOLOGICAL HAZARDS

The available geological information indicates the following in respect to potential geological hazards within the site boundary as summarised in the following table.

TABLE 5: SUMMARY OF POTENTIAL GEOLOGICAL HAZARDS

Hazard	Hazard Rating	Details
Shrink Swell Clays	Low	Ground conditions medium plasticity. For new builds, consideration should be given to advice published by the National House Building Council (NHBC) and Building Research Establishment (BRE).
Landslides	Very Low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
Ground Dissolution	Very Low	Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.
Compressible Deposits	Negligible	Compressible strata are not thought to occur.
Collapsible Deposits	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.
Running Sands	Very Low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

4.5 RADON

A radon report obtained from the British Geological Survey and Health Protection Agency indicates that the site is not located within a radon-affected area, as less than 1% of properties are above the action level therefore protective measures are not necessary. No further work or assessment is required in respect to radon on site.

4.6 COAL MINING HAZARDS

The site is not located within an area affected by past, current or future coal mining. No further work or assessment is required in respect to coal mining hazards on-site.

4.7 NON-COAL MINING, EXTRACTION AND NATURAL CAVITIES

A review of the available information obtained indicates the following in respect to non-coal mining activities, mineral extraction, natural cavities and mining cavities within specified search distances from the site boundary:

- There are no recorded brine or gypsum extraction areas recorded on-site.
- There are no recorded tin or clay mining areas on-site.
- There are no recorded natural cavities within a 500m radius of the site.
- There are recorded mining cavities within a 1000m radius of the site.

There is a single recorded non-coal mining area within a 1000m of the site as summarised in the following table.

TABLE 6: RECORDS OF NON-COAL MINING AREAS

Distance	Direction	Details
0.0m	On-site	Name: N/A Commodity: Chalk Class: A Likelihood: Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions is unlikely and localised and are at a level where they need not be considered

4.8 HISTORICAL SURFACE GROUND WORKING FEATURES

There are several recorded historical surface ground working features recorded within a 250m radius of the site as summarised in the following table.

TABLE 7: RECORDS OF HISTORICAL SURFACE GROUND WORKING FEATURES

Distance	Direction	Details
83m	Southeast	Ponds
102m – 108m	North	Pond
135m – 137m	Northwest	Ponds
145m – 146m	Northwest	Ponds
171m – 201m	West	Fishpond/Pond
220m	West	Pond
248m	West	Graveyard

4.9 HISTORICAL UNDERGROUND WORKINGS

There are no recorded historical underground workings within a 1000m radius of the site.

4.10 HISTORICAL MINERAL PLANNING AREAS

There are no recorded historical mineral planning areas recorded within a 500m radius of the site.

4.11 BGS MINERAL WORKINGS

There are no British Geological Survey (BGS) mineral working features (referred to as BritPits) recorded within a 500m radius of the site.

4.12 LANDFILLS AND WASTE SITES

A review of the available information obtained indicates the following in respect to landfill and waste sites located within a 500m radius of the site boundary as summarised below:

- There are no recorded active or recently closed Environment Agency landfill sites.
- There are no recorded historical BGS landfill sites.
- There are no recorded historical Local Authority (LA) landfill sites.
- There are no recorded historical Environment Agency (EA) landfill sites.
- There are no recorded historical waste sites.
- There are no recorded licensed waste sites.

There are several sites involving the storage, treatment, use or disposal of waste that are exempt from needing a permit (referred to as waste exemption sites) as summarised in the following table.

TABLE 8: RECORDS OF WASTE EXEMPTION SITES

Distance	Direction	Details
103m – 133m	North	Site Address: Hay Farm, Police Row, Royston, Hertfordshire, SG8 9QE Category: Using/storing/disposing of waste exemption Description: Spreading of plant matter to confer benefit, storage of waste in a secure place, spreading waste on agricultural land to confer benefit, incorporation of ash into soil, deposit of waste from dredging of inland waters, burning waste in the open, storage of waste in secure containers, deposit of agricultural waste consisting of plant tissue under a plant health notice and use of waste in construction
246m	Southeast	Site Address: Hay Farm, Police Row, Royston, Hertfordshire, SG8 9QE Category: Disposing of waste exemption Description: Burning waste in the open
320m – 324m	Southeast	Site Address: Hay Green Farm, Hay Green, Therfield, Royston, SG8 9QN Category: Disposing of waste exemption Description: Burning waste in the open

5. REVIEW OF ENVIRONMENTAL DATABASES

Environmental information has been obtained from Groundsure. This information comprises data provided by the British Geological Survey, Environment Agency, Health Protection Agency and the Coal Authority and has been reviewed and summarised below. A full copy of this report has been enclosed in Appendix C.

5.1 INDUSTRIAL SITES HOLDING AUTHORISATIONS, PERMITS AND LICENSES

Information obtained from the Environment Agency and Local Authority indicates there are no recorded Part A(1) and IPPC Authorised Activities within a 500m radius of the site.

5.2 DESIGNATED ENVIRONMENTALLY SENSITIVE SITES

The following designated sites have been identified within a 500m radius of the site as summarised in the following table.

TABLE 9: RECORDS OF DESIGNATED ENVIRONMENTALLY SENSITIVE SITES

Distance	Direction	Details
0.0m	On-site	Nitrate vulnerable zone (NVZ)
0.0m	On-site	SSSI impact risk zone
225m	East	Nitrate vulnerable zone (NVZ)
225m	Northeast	Nitrate vulnerable zone (NVZ)
367m	Northwest	Nitrate vulnerable zone (NVZ)

5.3 ENVIRONMENT AGENCY (EA) RECORDED POLLUTION INCIDENTS

There is a single recorded EA pollution incidents within a 500m radius of the site as summarised in the following table.

TABLE 10: RECORDS OF EA RECORDED POLLUTION INCIDENTS

Distance	Direction	Details
117m	Southeast	Incident Date: 13/02/2002 Pollutant: Sewage Materials (final effluent) Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

5.4 SITES DETERMINED AS CONTAMINATED LAND UNDER PART 2A

No designated contaminated sites have been identified within a 500m radius of the site.

5.5 RECORDS OF RECENT POTENTIALLY CONTAMINATIVE INDUSTRIAL SITES

There are no recorded recent potentially contaminative industrial sites within a 250m radius of the site.

5.6 RECORDS OF HISTORICAL POTENTIALLY CONTAMINATIVE INDUSTRIAL SITES

There are several recorded sites with a potentially contaminative past land use within a 500m radius of the site as summarised in the following table.

TABLE 11: RECORDS OF HISTORICAL POTENTIALLY CONTAMINATED LAND

Distance	Direction	Details
248m	West	Graveyard
271m	Northwest	Smithy
280m – 284m	North	Burial Ground
371m	Northwest	Refuse Heap
418m	Southeast	Unspecified Yards
488m	Southeast	Unspecified Yard

5.7 RECORDS OF HISTORICAL TANKS

There are no recorded historical tank features within a 500m radius of the site.

5.8 HISTORICAL GARAGE SITES

There are no historical garage sites recorded within a 500m radius of the site.

5.9 HISTORICAL PETROL STATIONS

There are no recorded historical petrol stations within a 500m radius of the site.

5.10 CURRENT OR RECENT PETROL STATIONS

There are no recorded open, closed, under development and obsolete petrol stations within a 500m radius of the site.

6. DEVELOPMENT OF PRELIMINARY CONCEPTUAL MODEL

6.1 CONTAMINATED LAND BACKGROUND INFORMATION

The Environmental Protection Act 1990 Part IIA, as amended, provides a statutory definition of contaminated land. To fall within this definition, it is necessary that, as a result of the condition of the land, substances may be present in, on or under the land such 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.

Risk from contamination is assessed by consideration of possible linkages between contaminant sources and potential receptors via pathways, which is usually termed a conceptual model.

6.2 POTENTIAL SOURCES

TABLE 12: POTENTIAL CONTAMINATION SOURCES AT OR ADJACENT TO THE SUBJECT SITE

Source	Location	Activity	Potential Contaminants
On-Site			
Potential localised infilled ground	North of the site	Associated with the infilling of a former pond feature with unknown material	Gas, hydrocarbons, metals and leachate
Possible localised made ground	North of the site	Associated with previously developed areas of the site (construction and demolition of unspecified buildings)	Metals, inorganic chemicals, asbestos and hydrocarbons
Off-Site			
Infilled ground	Various locations from immediately north to approximately 410m west of the site.	Associated with the infilling of various pond features with unknown material	Gas, hydrocarbons, metals and leachate
Agricultural activities	Approximately 95m north and 300m southeast of the site	Agricultural activities with 'Hay Farm' and 'Hay Green Farm'	Metals, inorganic and organic chemicals, asbestos, pesticides, herbicides, SVOCs, VOCs and hydrocarbons
Recorded waste exemption site	Various locations from 103m north to 320m southeast of the site	Recorded activities involving storage, treatment, use or disposal of waste	Metals, inorganic and organic chemicals and hydrocarbons
Graveyard and burial ground	248m west and 280m north of the site	Graveyard and burial ground	Gas, hydrocarbons, metals and leachate
Former smithy	271m northwest of the site	Former smithy	Metals, inorganic chemicals and hydrocarbons
Former allotments	Approximately 380m northwest of the site	Former allotments	Metals, inorganic and organic chemicals, asbestos, pesticides, herbicides and hydrocarbons
Former unspecified yards	418m southeast and 488m southeast of the site respectively	Former unspecified yards	Metals, inorganic chemicals, asbestos, VOCs, SVOCs and hydrocarbons

6.3 POTENTIAL RECEPTORS

Receptors that are required to be considered under Part IIA of the Environmental Protection Act 1990 are summarised in Appendix D.

The potential environmental receptors identified during this study are summarised in the following table.

TABLE 13: POTENTIAL RECEPTORS IDENTIFIED FOR THE SITE AND SURROUNDING AREAS

Category	Receptor	Location	Comments
Humans	Existing site users	On-site	Site is currently occupied by agricultural land (forms part of a large field) with no public access
	Site end users	On-site	Residential - areas of the site will have new garden and landscaped areas (potential future receptor)
	Construction workers	On-site	Identified receptor
Property (materials)	Site structures and buildings	On-site	Primarily foundations and services (proposed)
Property (crops)	None Identified		
Ecological systems	None Identified		
Controlled waters	Secondary undifferentiated aquifer	Under the site	Natural superficial geology – Lowestoft Formation
	Principal aquifer	Under the site	Solid geology - Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated)
	Source protection zone	Under the site	Zone 3 (total catchment).
	Water network entries	Various locations ranging from 56m east to 248m west of the site.	Entries are recorded as either inland rivers not influenced by normal tidal action, lake, loch or reservoir and containing water all year round under normal circumstances.
	Unspecified surface water features	Six unspecified surface water features are recorded within a 250m radius of the site at unspecified distances from the site boundary.	

6.4 RISK ASSESSMENT

The risk of significant harm or pollution of controlled waters has been assessed qualitatively as low, medium or high using the criteria shown in Appendix E.

A risk estimation matrix for all pollutant linkages identified is shown below.

TABLE 14: PRELIMINARY CONTAMINATION RISK ASSESSMENT

Receptor	Sources	Risk	Justification
Human Health			
Existing site users	On-site: Potential localised infilled ground and possible localised made ground	Low	No feasible human health receptor identified
	Off-site: Infilled ground, agricultural activities, recorded waste exemption site, graveyard and burial ground, a former smithy, former allotments and former unspecified yards	Low	No feasible human health receptor identified
Future site users	On-site: Potential localised infilled ground and possible localised made ground	Low to medium	Further work warranted to confirm risk
	Off-site: Infilled ground, agricultural activities, recorded waste exemption site, graveyard and burial ground, a former smithy, former allotments and former unspecified yards	Low to medium	Further work warranted to confirm low risk
Construction workers	On-site: Potential localised infilled ground and possible localised made ground	Low to medium	Further work warranted to confirm risk
	Off-site: Infilled ground, agricultural activities, recorded waste exemption site, graveyard and burial ground, a former smithy, former allotments and former unspecified yards	Low	Further work warranted to confirm low risk
Property			
Site structures (dangerous gas migration)	Potential on-site and off-site infilled ground of unknown thickness and composition	Low to medium	Further work warranted based on ground investigation findings.
Site structures (concrete structures)	Concrete aggressive ground conditions	Low	Further work warranted to confirm low risk
Potable water plastic pipes	Hydrocarbon contamination	Low	Further work warranted to confirm risk
Controlled Waters			
Secondary undifferentiated aquifer (superficial geology)	On-site: Potential localised infilled ground and possible localised made ground	Low	Further work warranted to confirm low risk

Receptor	Sources	Risk	Justification
Principal aquifer (solid geology)	Off-site: Infilled ground, agricultural activities, recorded waste exemption site, graveyard and burial ground, a former smithy, former allotments and former unspecified yards	Low	Further work warranted to confirm low risk
	On-site: Potential localised infilled ground and possible localised made ground	Low	Further work warranted to confirm low risk
Source protection zone	Off-site: Infilled ground, agricultural activities, recorded waste exemption site, graveyard and burial ground, a former smithy, former allotments and former unspecified yards	Low	Further work warranted to confirm low risk
	On-site: Potential localised infilled ground and possible localised made ground	Low	Further work warranted to confirm low risk
Water network entries	Off-site: Infilled ground, agricultural activities, recorded waste exemption site, graveyard and burial ground, a former smithy, former allotments and former unspecified yards	Low	Further work warranted to confirm low risk
	On-site: Potential localised infilled ground and possible localised made ground	Low	Further work warranted to confirm low risk
Unspecified surface water features	Off-site: Infilled ground, agricultural activities, recorded waste exemption site, graveyard and burial ground, a former smithy, former allotments and former unspecified yards	Low	Further work warranted to confirm low risk
	On-site: Potential localised infilled ground and possible localised made ground	Low	Further work warranted to confirm low risk

6.5 FINDINGS OF PRELIMINARY CONCEPTUAL MODEL

Based upon the development of the preliminary conceptual site model a site investigation was undertaken with subsequent chemical testing of soil samples.

7. DESIGN OF SITE INVESTIGATION AND WORKS UNDERTAKEN

The site investigation works were undertaken, where access was possible, to confirm the preliminary contaminated land risk assessment outlined above and to assess foundations for the proposed development. This was based on the findings of the information review and the development of preliminary conceptual model. It is not possible to cover all areas of the site and contamination may exist in other areas of the site not covered by the sampling regime.

7.1 ON-SITE ACTIVITIES

The fieldwork was undertaken on the 25th of July 2022 and comprised the following works:

- 11 window sample holes (WS1 to WS11) advanced to depths between 2.45m and 5.45m bgl.
- 9 in situ dynamic cone penetrometer tests (DCP1 to DCP9).
- All exploratory holes were logged and sampled for chemical and geotechnical purposes by a Chartered Geologist.
- Geotechnical and chemical soil testing on recovered soil samples.

During drilling, representative soil samples were obtained from the exposed strata and sealed in 1 litre plastic tubs and glass brown jars and vials with airtight lids. The samples were then despatched under a 'Chain of Custody' procedure to a NAMAS (UKAS) and MCERTS accredited laboratory, for subsequent chemical testing.

During drilling, representative soil samples were obtained from the exposed strata and sealed in 1 litre plastic tubs. The samples were then despatched to a NAMAS (UKAS) and MCERTS accredited laboratory, for subsequent geotechnical testing.

Exploratory holes were located to achieve good spatial coverage across the area of proposed development, investigate and assess the conceptual site model outlined within the desk study. This was to include identified on-site and off-site potential sources of contamination and identified receptors (proposed residential occupants and construction workers) as summarised in the following table.

Exploratory hole and test location plans (drawing no. 3 and 4) are included in Appendix A.

TABLE 15: DETAILS OF RATIONALE OF EXPLORATORY HOLE LOCATIONS

Exploratory Hole ID	Details and Rationale
WS1	Assess the presence and associated potential contamination associated with a possible infilled pond feature
	Assess potential contamination associated with possible made ground associated with previously developed area of the site
	Assess potential contamination within the footprint of a proposed structure (construction workers identified short term receptor)
WS2, WS4, WS6, WS7 and WS11	Assess potential contamination in proposed garden/landscaped areas (identified future receptor)
WS9	Assess potential contamination associated with possible made ground associated with previously developed area of the site
	Assess potential contamination in proposed garden/landscaped areas (identified future receptor)
WS3, WS5, WS8 and WS10	Assess potential contamination within the footprint of a proposed structure (construction workers identified short term receptor)

8. GROUND CONDITIONS ENCOUNTERED

8.1 DESCRIPTION OF STRATA – SOILS

The description of strata encountered is summarised in the following table. Detailed logs of the strata encountered are provided in Appendix F.

TABLE 16: GROUND CONDITIONS ENCOUNTERED SUMMARY

Strata Encountered	Description	Depth in metres below ground level (m bgl)
Topsoil	Sandy gravelly CLAY with occasional roots and rootlets	WS1: 0.00m – 0.26m
		WS2: 0.00m – 0.37m
		WS3: 0.00m – 0.21m
		WS4: 0.00m – 0.21m
		WS5: 0.00m – 0.19m
		WS6: 0.00m – 0.20m
		WS7: 0.00m – 0.22m
		WS8: 0.00m – 0.18m
		WS9: 0.00m – 0.16m
		WS10: 0.00m – 0.22m
		WS11: 0.00m – 0.17m
Natural Superficial Geology – Lowestoft Formation	Slightly sandy to sandy slightly gravelly to gravelly silty CLAY	WS1: 0.26m – 3.05m
		WS2: 0.37m – 2.45m (depth of hole termination)
		WS3: 0.21m – 3.29m (depth of hole termination)
		WS4: 0.21m – 2.45m (depth of hole termination)
		WS5: 0.19m – 4.45m (depth of hole termination)
		WS6: 0.20m – 2.45m (depth of hole termination)
		WS7: 0.22m – 2.45m (depth of hole termination)
		WS8: 0.18m – 3.61m
		WS9: 0.16m – 1.64m
		WS10: 0.22m – 4.45m (depth of hole termination)
		WS11: 0.17m – 2.45m (depth of hole termination)
Natural Superficial Geology – Lowestoft Formation	Gravelly silty CLAY	WS1: 3.05m – 4.45m (depth of hole termination)
		WS8: 3.61m – 5.45m (depth of hole termination)
Solid Geology - Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated)	Structureless CHALK composed of slightly sandy silty angular to sub angular GRAVEL. (Grade Dc)	WS9: 1.64m – 3.45m (depth of hole termination)

8.2 TOPSOIL

Topsoil was encountered within all exploratory holes from ground level to a maximum depth of 0.37m (WS2) bgl and comprised of a single horizon of sandy gravelly clay with occasional roots and rootlets.

The gravel content of the topsoil typically comprised of fine to coarse angular to sub angular flint and fine to medium angular to sub angular chalk.

8.3 MADE GROUND

Made ground was not encountered during this investigation.

8.4 NATURAL SUPERFICIAL GEOLOGY – LOWESTOFT FORMATION

Natural superficial deposits of the Lowestoft Formation were encountered within all exploratory holes below the topsoil horizon from depths ranging from 0.16m (WS9) to 0.37m (WS2) and were encountered to a maximum depth of 5.45m bgl (WS8 – depth of exploratory hole termination).

Within exploratory holes WS1 and WS8, the natural superficial deposits comprised of sandy gravelly silty clay overlying gravelly silty clay.

Within exploratory holes WS2 to WS5 and WS7, the natural superficial deposits comprised of a single horizon of slightly sandy to sandy gravelly silty clay.

Within exploratory holes WS6, WS9 to WS11, the natural superficial deposits comprised of a variable succession of slightly sandy slightly gravelly to gravelly silty clays.

The gravel content of the natural superficial deposits typically comprised of fine to coarse angular to sub rounded chalk and flint.

8.5 SOLID GEOLOGY – UNDIFFERENTIATED CHALK FORMATIONS

The solid geology of the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) was encountered within exploratory hole WS9 only below the natural superficial deposits from a depth of 1.64m and was encountered to a depth of 3.45m bgl (depth of exploratory hole termination). The solid geology was encountered as structureless grade Dc (clast dominated) chalk.

Where the chalk is graded Dm the material will act as a cohesive fine soil while where the soil grade is graded as Dc it will act as a coarse granular soil. The point at which chalk material ceases to act as a cohesive soil and starts to behave as a granular soil can vary. The approximate soil compositions are summarised in the following table.

TABLE 17: SUBDIVISIONS OF GRADE D CHALK BY ENGINEERING BEHAVIOUR

Suffix	Engineering Behaviour	Dominant Element	Percentage of Chalk Matrix	Coarser Fragments
Dm	Fine soil	Matrix	Approx. >35%	Approx. <65%
Dc	Coarse soil	Clasts	Approx. <35%	Approx. >65%

The structureless grade Dc chalk as encountered during this investigation was noted to comprise of a single horizon of slightly sandy silty gravel and typically comprised of fine to coarse angular to sub angular weak chalk clasts.

8.6 GROUNDWATER ENCOUNTERED

Groundwater was not encountered within any of the exploratory holes during drilling or during the brief time each respective hole remained open.

8.7 FIELD OBSERVATIONS AND FIELD SCREENING

During the investigation, the recovered soils were inspected for visual and olfactory evidence of contamination. No visual or olfactory evidence of contamination was observed within any of the exploratory holes.

9. CHEMICAL TESTING RESULTS – SOIL

A selection of soil samples were submitted for chemical analysis, the results of which are presented in Appendix G. The testing suite included metals, inorganic determinants, speciated petroleum hydrocarbons, polyaromatic hydrocarbons (PAHs), and asbestos as shown in the following tables. All tests were undertaken by a UKAS accredited laboratory, under a 'Chain of Custody' procedure. All tests, where appropriate, were carried out in accordance with MCERTS accreditation.

Soil samples were selected for testing based on the field observations recorded, to allow good spatial coverage across the site and to assess potential sources and receptors outlined within the desk study report. A summary of the testing results is presented in the following table along with a comparison with screening values relevant to a future use of the site (residential).

TABLE 18: CHEMICAL RESULTS SUMMARY – SOIL

Substance		Screening Criteria (residential)		Number of Analyses	Reported Minimum Value	Reported Maximum Value	Statistical Mean	Number of Exceedances
Boron (H2O Soluble)	mg/kg	290	S4UL	12	<0.4	6.5	1.95	0
Arsenic	mg/kg	37	C4SL	12	1.8	11	5.78	0
Cadmium	mg/kg	22	C4SL	12	<0.1	0.22	0.13	0
Chromium (trivalent)	mg/kg	910	S4UL	12	4.3	27	13.3	0
Copper	mg/kg	2400	S4UL	12	3.5	26	11.8	0
Lead	mg/kg	200	C4SL	12	6.5	38	18	0
Mercury (elemental)	mg/kg	1.2	S4UL	12	<0.05	0.15	0.076	0
Nickel	mg/kg	180	S4UL	12	5.6	35	15.7	0
Selenium	mg/kg	250	S4UL	12	<0.25	0.96	0.5	0
Zinc	mg/kg	3700	S4UL	12	14	78	42.7	0
Chromium (hexavalent)	mg/kg	21	C4SL	8	<0.5	<0.5	0.5	0
Vanadium	mg/kg	410	S4UL	8	6.3	38	19.4	0
Beryllium	mg/kg	1.7	S4UL	8	<0.5	1	0.58	0
Barium	mg/kg	1300	EIC-Cl:aire	8	11	58	32	0
Benzene	mg/kg	0.87	C4SL	2	<0.001	<0.001	0.001	0
Toluene	mg/kg	290	S4UL	2	<0.001	<0.001	0.001	0
Ethylbenzene	mg/kg	110	S4UL	2	<0.001	<0.001	0.001	0
m-Xylene	mg/kg	140	S4UL	2	<0.001	<0.001	0.001	0
o-Xylene	mg/kg	140	S4UL	2	<0.001	<0.001	0.001	0
p-Xylene	mg/kg	130	S4UL	2	<0.001	<0.001	0.001	0
Acenaphthene	mg/kg	510	S4UL	3	<0.1	<0.1	0.1	0
Acenaphthylene	mg/kg	420	S4UL	3	<0.1	<0.1	0.1	0
Anthracene	mg/kg	5400	S4UL	3	<0.1	<0.1	0.1	0
Benz(a)anthracene	mg/kg	11	S4UL	3	<0.1	<0.1	0.1	0
Benzo(a)pyrene	mg/kg	5	CS4L	3	<0.1	<0.1	0.1	0
Benzo(b)fluoranthene	mg/kg	3.3	S4UL	3	<0.1	<0.1	0.1	0
Benzo(ghi)perylene	mg/kg	340	S4UL	3	<0.1	<0.1	0.1	0
Benzo(k)fluoranthene	mg/kg	93	S4UL	3	<0.1	<0.1	0.1	0
Chrysene	mg/kg	22	S4UL	3	<0.1	<0.1	0.1	0
Dibenz(ah)anthracene	mg/kg	0.28	S4UL	3	<0.1	<0.1	0.1	0
Fluoranthene	mg/kg	560	S4UL	3	<0.1	0.67	0.29	0

Substance		Screening Criteria (residential)		Number of Analyses	Reported Minimum Value	Reported Maximum Value	Statistical Mean	Number of Exceedances
Fluorene	mg/kg	400	S4UL	3	<0.1	<0.1	0.1	0
Indeno(123-cd)pyrene	mg/kg	36	S4UL	3	<0.1	<0.1	0.1	0
Naphthalene	mg/kg	5.6	S4UL	3	<0.1	<0.1	0.1	0
Phenanthrene	mg/kg	220	S4UL	3	<0.1	<0.1	0.1	0
Pyrene	mg/kg	1200	S4UL	3	<0.1	0.49	0.23	0
Aliphatic EC 5-6	mg/kg	78	S4UL	2	<1	<1	1	0
Aliphatic EC >6-8	mg/kg	230	S4UL	2	<1	<1	1	0
Aliphatic EC >8-10	mg/kg	65	S4UL	2	<1	<1	1	0
Aliphatic EC >10-12	mg/kg	330	S4UL	2	<1	<1	1	0
Aliphatic EC >12-16	mg/kg	2400	S4UL	2	<1	<1	1	0
Aliphatic EC >16-35	mg/kg	92000	S4UL	2	<1	<1	1	0
Aliphatic EC >35-44	mg/kg	92000	S4UL	2	<1	<1	1	0
Aromatic EC 5-7 (benzene)	mg/kg	140	S4UL	2	<1	<1	1	0
Aromatic EC >7-8 (toluene)	mg/kg	290	S4UL	2	<1	<1	1	0
Aromatic EC >8-10	mg/kg	83	S4UL	2	<1	<1	1	0
Aromatic EC >10-12	mg/kg	180	S4UL	2	<1	<1	1	0
Aromatic EC >12-16	mg/kg	330	S4UL	2	<1	<1	1	0
Aromatic EC >16-21	mg/kg	540	S4UL	2	<1	<1	1	0
Aromatic EC >21-35	mg/kg	1500	S4UL	2	<1	<1	1	0
Aromatic EC >35-44	mg/kg	1500	S4UL	2	<1	<1	1	0
pH	-	-	-	13	7.7	9.5	8.72	-
PAHs total	mg/kg	50	WRAS screen	3	<2	<2	2	0
Total Petroleum Hydrocarbons	mg/kg	50	WRAS screen	2	<10	<10	10	0

Values presented in mg/kg, correct to two significant figures (unless greater level of accuracy is possible from analysis or published as a screening value). Bold values indicate where values have been exceeded their respective screening values.

The screening values comprise published Generic Acceptance Criteria (GAC) or C4SL/S4UL published by Land Quality Management (LQM) or calculated by Nott Group.

9.1 SUMMARY OF CHEMICAL ANALYSIS – SOILS

The testing indicates that no elevated concentrations of the determinants tested have been encountered.

9.2 ASBESTOS SCREENING

Four soil samples were screened for asbestos at various locations across the site. The results of the screening are presented within Appendix G. No asbestos was identified in the samples screened.

9.3 WASTE ACCEPTANCE CRITERIA (WAC) ANALYSIS

Waste acceptance criteria (WAC) analysis was undertaken upon representative topsoil and natural superficial deposits to classify its respective waste acceptance criteria. The analytical results are included within Appendix G. It is recommended the results are reviewed by the licenced waste facility accepting the material to class accordingly based upon their licensing and acceptance criteria.

10. GEOTECHNICAL TESTING RESULTS

10.1 LABORATORY TEST RESULTS

A representative selection of soil samples were chosen for geotechnical testing. Geotechnical testing was undertaken by a UKAS accredited laboratory and comprised the following:

- Moisture content and index testing.
- Dry density and saturation moisture content of chalk.
- Sulphate content of 2:1 water soil extract, pH value and total sulphur (concrete classification testing).

The concrete classification testing results are included in Appendix G and the geotechnical laboratory results are included in Appendix H.

10.2 MOISTURE CONTENT AND INDEX TESTING

Representative samples were tested to determine the natural moisture content (NMC), the plastic limit (PL), the liquid limit (LL) and the plasticity index (PI) of the natural superficial geology of the Lowestoft Formation.

A summary of the testing undertaken is presented in the following tables.

TABLE 19: SUMMARY OF INDEX TESTING

Stratum/Material Type	Range (min-max)						No of tests
	NMC (%)	LL (%)	PL (%)	PI (%)	LI	CI	
Natural Superficial Geology (Lowestoft Fm) - Clay	3.0 – 17.3	37 – 51	17 – 18	20 – 34	-0.70 – -0.03	1.03 – 1.70	6

TABLE 20: SUMMARY OF ATTERBERG CLASSIFICATION AND MODIFIED PI

Stratum	Atterberg Classification Range	Calculated Modified I' P	Calculated Volume Change Potential based on Modified I' P
Natural Superficial Geology (Lowestoft Fm) - Clay	CI – CH	18.8 – 30.6	Low to medium

Liquid limit, plastic limit and plasticity index testing indicates the tested natural superficial geology of the Lowestoft Formation are of an immediate to high plasticity (Class CI to CH) with a calculated low to medium volume change potential based on a modified plasticity index in accordance with BRE Digest 240 (1993).

In accordance with BRE Digest 412 (1996), comparison of the soil water contents with soil index properties was undertaken to assess the presence of potentially desiccated soils. As per BRE Digest 412, an indicator of the onset of significant desiccation occurs when the soils water content is at 0.4 times the liquid limit. When the water content is less than 0.4 times the liquid limit the soil can be classed as being significantly desiccated. The following table summarises the assessment of potentially desiccated soils as per BRE Digest 412 guidelines.

TABLE 21: SUMMARY OF ASSESSMENT OF POTENTIALLY DESICCATED SOILS

Exploratory Hole ID	Depth	Strata Type	NMC (%)	LL (%)	0.4 of LL (%)	Desiccation Assessment
WS1	2.00m	Natural Superficial Geology – Lowestoft Formation	3.0	37	14.8	Desiccated
WS3	1.00m	Natural Superficial Geology – Lowestoft Formation	17.3	40	16.0	Not desiccated
WS5	0.60m	Natural Superficial Geology – Lowestoft Formation	11.3	42	16.8	Desiccated
WS8	0.90m	Natural Superficial Geology – Lowestoft Formation	8.8	44	17.6	Desiccated
WS9	1.25m	Natural Superficial Geology – Lowestoft Formation	3.1	37	14.8	Desiccated
WS10	1.50m	Natural Superficial Geology – Lowestoft Formation	15.9	51	20.4	Desiccated

The above assessment indicates of the 6 samples tested only a single sample (WS3 at 1.00m) can be considered as not being desiccated as the soils water content is greater than 0.4 times the respective liquid limit. The remaining tested samples can be classed as being desiccated as the soils natural moisture content is less than 0.4 times the liquid limit. This assessment is also confirmed by the soils respective calculated liquidity index (LI).

10.3 DRY DENSITY AND SATURATION MOISTURE CONTENT OF CHALK

The most easily measured chalk property that is indicative of its mass behaviour beneath a foundation is the dry density (or porosity) of the intact blocks of chalk. For engineering purposes, a four-fold classification has been adopted that corresponds with changes in engineering behaviour. The following table shows the intact dry density chalk scales as described within CIRIA C574 (2002).

TABLE 22: INTACT DRY DENSITY OF CHALK

Density Scale	Intact Dry Density (Mg/m ³)	Porosity*	Saturation Moisture Content*
Low density	<1.55	>0.43	>27.5%
Medium density	1.55 - 1.70	0.43 - 0.37	27.5% - 21.8%
High density	1.70 - 1.95	0.37 - 0.28	21.8% - 14.3%
Very high density	>1.95	<0.28	<14.3%

* = Based on the specific gravity of calcite of 2.70

A single sample retrieved from the grade Dc structureless weathered chalk was tested from exploratory hole WS9. A summary of the dry density and saturation moisture contents are outlined within the following table and the full set of results are included in Appendix H.

TABLE 23: DRY DENSITY AND SATURATION MOISTURE CONTENT RESULTS

Exploratory Hole ID and Depth (m)	Natural Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Saturated Moisture Content (%)	Porosity (%)	Assigned Density
WS9 – 2.00m	21.3	2.74	2.26	7.2	16	Very high density

The single sample tested is of a very high density which with reference to the appropriate strength terminology indicates chalk of a moderately strong strength.

10.4 CONCRETE IN AGGRESSIVE GROUND TESTING

Five soil samples were tested to assess their chemical properties in relation to their potential effect on buried concrete structures as per BRE guidelines. The results of the testing are included within Appendix G and are summarised within the following table.

TABLE 24: CONCRETE IN AGGRESSIVE GROUND TESTING RESULTS

Exploratory hole ID	Depth	Sulphate Content of 2:1 Water: Soil Extract (g/l)	pH Value	Total Potential Sulfate (TPS) as (SO ₄ %) [#]
WS6	0.60m	0.023	9.5	0.090
WS3	1.00m	<0.010	9.0	0.072
WS5	1.50m	0.025	8.3	0.258
WS8	0.90m	0.030	9.4	0.111
WS9	1.75m	0.012	9.0	0.060

Notes:

= Total potential sulfate (SO₄ %) calculated using the stoichiometric equation as per BRE SD 1:2005 guidance.

Data set range: Within 5 – 9

Mean value of the highest two sulphate content of 2:1 water: soil extract results (g/l): 0.028

Mean value of the highest two TPS values: 0.185

11. IN –SITU TESTING

11.1 STANDARD PENETRATION TESTING (SPTs)

Standard penetration tests (SPT's) were undertaken within the window sample holes from 1.00m thereafter until termination depth or refusal ($N > 50$). As per CIRIA C574 guidelines when a SPT was undertaken within the structureless chalk, the spilt spoon was always employed.

The SPT N values range within each respective stratum is outlined within the following table. Calculated undrained shear strengths (c_u) derived from SPT N and site-specific plasticity values are also outlined for clay strata.

TABLE 25: STANDARD PENETRATION TEST RESULTS

Stratum	SPT N Value Range	Calculated c_u Range (kPa) [#]	c_u based on SPT N value [*]	Indicated In-situ Density ^{>}
Natural Superficial Geology (Lowestoft Formation) – Clay	16 – 50	73 – 270 (stiff to very stiff)	Stiff to very stiff	-----
Solid Geology (Chalk) – Grade Dc	11 and 32	-----	-----	-----

[#] Calculated undrained shear strengths (c_u) derived from SPT N and plasticity (PI) values employing equation ($c_u = F_1 N$) as outlined within CIRIA Report 143 (1995).

^{*}Based on correlation between N value and assumed in-situ shear strength range outlined within CIRIA Report 143 (1995).

[>]Classification based on uncorrected SPT N value(s).

¹Uncorrected SPT N value(s).

SPT N values ranging from 16 to 50 were recorded within the clay natural superficial geology (Lowestoft Formation) which based on the correlation outlined within CIRIA Report 143 (1995) approximates to soils of a stiff to very stiff undrained shear strength. In addition, undrained shear strength values (as derived from the SPT N values and site-specific plasticity values employing the formula $c_u = F_1 \times N$ as outlined within CIRIA Report 143 (1995)) ranging from 73 to 270 were calculated indicating soils of a stiff to very stiff undrained shear strength which is consistent with field soil consistency observations made by a Chartered Geologist.

SPT N values of 11 and 32 were recorded within weathered structureless grade Dc chalk. It should be noted for chalk in which N values are less than 25 it may not be possible to distinguish based on SPT N value results between low density relatively unweathered chalk or medium to high density chalk with open discontinuities. Also, in accordance with CIRIA C574, SPT N value results within structureless chalk do not correlate well with many of the parameters, such as mass compressibility or the calculation of skin friction resistance of piles that are required for engineering design. Therefore, SPT N results cannot be expected to yield good predictions of the engineering behaviour of chalk when designing shallow foundations. SPT N values within chalk are more suited for undertaking pile design particularly when determining the base resistance of piles.

11.2 DYNAMIC CONE PENETROMETER (DCP) TESTING

Nine in-situ light dynamic cone penetrometer tests (LDCPT) were undertaken to assess potential sub grade soils for proposed access road and pavement design.

A review of the appropriate exploratory hole logs indicates the dynamic cone penetrometer tests were undertaken within topsoil (clay) and natural superficial (clay) soils.

At the time of the investigation formation levels in relation to existing ground levels were not known, therefore all tests were undertaken from existing ground level.

Employing the relationship between the numbers of blows per 100mm the following table presents the range of calculated CBR values for each respective test location.

The DCP results and graphical plot of blows versus depth are included within Appendix I.

TABLE 26: DYNAMIC CONE PENETROMETER TESTING RESULTS

Test ID	Calculated CBR Range (%)	Mode Lower Bound CBR (%)
DCP1	3.5 – 13	10
DCP2	10 – 16	10
DCP3	6 – 18	10
DCP4	10 – 22 [#]	13
DCP5	6 – 10	10
DCP6	10 – 18	10
DCP7	10 – 16	10
DCP8	6 – 16	6
DCP9	6 - 23 [#]	6

[#] = Upper end values appear to be erroneously high. This may be attributable to friction between the dynamic cone rods and the ground, or a possible obstruction such as gravel or cobbles.

12. GEOTECHNICAL MATERIAL PARAMETERS

Based on the ground conditions encountered, in-situ and laboratory testing, published data and from engineering experience the following table highlights the suitable parameters for each strata encountered.

TABLE 27: GEOTECHNICAL MATERIAL PARAMETERS

Stratum	Parameter	Value	References
Natural Superficial Geology – Lowestoft Formation (<i>clay, stiff to very stiff</i>)	Bulk density (Mg/m ³)	1.9 – 2.3	Carter, M. and Bentley, S. (1991): Correlation of Soil Properties. Pentech Press Ltd Barnes, GE (2010): Soil Mechanics – Principals and Practice, Macmillan Press Limited
	Undrained shear strength (kPa)	73 – 270	Quantitative descriptions on exploratory hole logs Calculation as outlined within CIRIA Report 143 (1995)
	Angle of Friction (°)	25 – 28	Empirical relationship to plasticity tests in conjunction with Published Value as outlined within Carter, M. and Bentley, S. (1991): Correlation of Soil Properties. Pentech Press Ltd
	Coefficient of volume compressibility, m_v (m ² /MN)	0.04 - 0.14 (very low to medium compressibility class)	Calculation as outlined within CIRIA Report 143 (1995) Carter, M. and Bentley, S. (1991): Correlation of Soil Properties. Pentech Press Ltd
	Coefficient of Earth Pressure at Rest (K_o)	0.53 – 0.57	Empirical relationship to plasticity tests in conjunction with Published Value as outlined within Carter, M. and Bentley, S. (1991): Correlation of Soil Properties. Pentech Press Ltd
Weathered Chalk - Structureless grade Dc (<i>very high density</i>)	Bulk density (Mg/m ³)	2.74	Site specific laboratory testing data
	Dry density (Mg/m ³)	2.26	Site specific laboratory testing data
	Saturation moisture content (%)	7.20	Site specific laboratory testing data
	Porosity (%)	16	Site specific laboratory testing data
	Approximate unconfined compressive stress (UCS) based on CIRIA chalk density (MN/m ²)	12.5 – 50.0	Lord et al (2002) CIRIA C574 Engineering in Chalk
	Angle of friction (°)	33	Lord et al (2002) CIRIA C574 Engineering in Chalk
	Effective cohesion (c') – (kN/m ²)	0 - 10	Lord et al (2002) CIRIA C574 Engineering in Chalk
	Yield modulus of chalk (E_v) - (MN/m ²)	20 – 30	Lord et al (1994) CIRIA Project Report 11 Foundations in Chalk Lord et al (2002) CIRIA C574 Engineering in

Stratum	Parameter	Value	References
			Chalk
	Yield stress of chalk (q_v) - (kN/m ²)	250 – 500	Lord et al (1994) CIRIA Project Report 11 Foundations in Chalk Lord et al (2002) CIRIA C574 Engineering in Chalk
	Coefficient of earth pressure at rest (K_0)	0.5 – 1.0	Lord et al (2002) CIRIA C574 Engineering in Chalk
	Poisson's ratio	0.18 – 0.27	Lord et al (2002) CIRIA C574 Engineering in Chalk

13. GEOTECHNICAL ASSESSMENT AND DISCUSSION

13.1 GROUND CONDITIONS ENCOUNTERED

The investigation works encountered clay topsoil to a maximum depth of 0.37m bgl. Stiff to very stiff natural superficial clay deposits of the Lowestoft Formation were encountered below the topsoil horizon from depths ranging from 0.16m to 0.37m and were encountered to a maximum depth of 5.45m bgl (depth of exploratory hole termination). The solid geology of the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) was encountered within a single exploratory hole from a depth of 1.64m to 3.45m bgl (depth of exploratory hole termination) and comprised of a single horizon grade Dc (clast dominated) chalk.

13.2 FOUNDATION DESIGN

No final formation levels have been provided and as such for the purpose of this report the final formation level has been assumed to be at existing site levels. If this changes then further foundation assessment work will be required to confirm the recommendations outlined. In addition, the following assessment is based upon the proposed layout plan outlined within drawing no.2 (Appendix A).

The topsoil, made ground deposits (if encountered), natural very soft to soft clay and very loose to loose granular soils (if encountered) do not constitute a reliable founding medium for any form of traditional foundation such as pad bases. It is therefore recommended that foundation loads should be transferred to more reliable and competent underlying natural soils.

Subject to the recommendations outlined in section 13.8, foundation design could proceed using strip footings, deepened using mass concrete trench fill where made ground or poorer natural soils are encountered, or isolated pad bases bearing upon the natural clay soils of a minimum stiff undrained shear strength and/or structureless grade Dc chalk.

Due to the presence of soils of a medium-volume change potential, seasonal desiccation can cause movement to a depth of up to 0.90m below ground level. Therefore, it is recommended foundations which are outside the zone of influence of existing and/or proposed trees be extended to a minimum depth of 0.90m bgl. Foundations maybe required to extend beyond a minimum depth of 0.90m bgl if they are within the influencing distance of trees, this should be confirmed at detailed design when a detailed assessment is undertaken in accordance with NHBC guidelines 4.2 'building near trees', whereby it is recommended a plot specific assessment is undertaken (see section 13.8).

Providing the following soils are exposed at formation level these strata should be capable of supporting the following allowable bearing capacities as outlined in the below table for long term total settlements of less than 25mm and differential settlements less than 15mm.

- Natural clay soils of consistent stiff undrained shear strength ($c_u > 75\text{kPa}$).
- Grade Dc structureless chalk – Low density or greater.

TABLE 28: CALCULATED ALLOWABLE BEARING CAPACITIES – STRIP FOOTINGS

Minimum Design Undrained Shear Strength (clay soils)	Design CIRIA Chalk Grade	Minimum Foundation Depth Required [#]	Foundation Type		
			Strip Footings		
			0.45m wide	0.60m wide	0.90m wide
75kPa (stiff high strength)	Dc – low density	0.90m	175kN/m ²	165kN/m ²	155kN/m ²

[#] = Required minimum foundation depth in order to make allowance for 0.20m over excavation beneath areas of deeper made ground and/or poor natural soils or to allow the foundation to be founded within soils exhibiting the minimum design undrained shear strength and/or design CIRIA Chalk quoted above. This depth does not consider the minimum depth required based on a detailed assessment undertaken in accordance with NHBC guidelines 4.2 'building near trees'.

TABLE 29: CALCULATED ALLOWABLE BEARING CAPACITIES – PAD BASES

Minimum Design Undrained Shear Strength (clay soils)	Design CIRIA Chalk Grade	Minimum Foundation Depth Required [#]	Foundation Type	
			Pads	
			0.80m x 0.80m	1.00m x 1.00m
75kPa (stiff high strength)	Dc – low density	0.90m	190kN/m ²	185kN/m ²

[#] = Required minimum foundation depth in order to make allowance for 0.20m over excavation beneath areas of deeper made ground and/or poor natural soils or to allow the foundation to be founded within soils exhibiting the minimum design undrained shear strength and/or design CIRIA Chalk quoted above. This depth does not consider the minimum depth required based on a detailed assessment undertaken in accordance with NHBC guidelines 4.2 'building near trees'.

Upon exposure, a suitably qualified/experienced person should carefully inspect the formation soils. Any very loose/loose and very soft/soft strata should be over excavated and replaced by well-compacted, well-graded granular material or with a lean mix concrete.

It is recommended that all formation soils, once exposed, be protected with a blinding layer of concrete in order to prevent deterioration.

Due to heterogeneous nature of the sites underlying natural geology and undrained shear strength it is recommended suitably designed reinforcement is incorporated within the design of all foundations in order to stiffen the foundation and reduce differential settlements particularly when a foundation spans soils of a variable undrained shear strength and type.

13.3 GROUND BEARING FLOOR SLAB DESIGN

Due to the presence of near surface shrinkable medium volume change potential clay soils (associated with the natural superficial geology) it is recommended suspended floor slabs are employed.

Precast concrete, timber or in-situ concrete are acceptable design options. The minimum void dimensions under the suspended floor slab should consider the presence of clays of a medium volume change potential.

No final formation levels have been developed and as such for the purpose of this report the final formation level has been assumed to be at existing site levels. If this changes then further foundation assessment work will be required to confirm the recommendations outlined within this report.

13.4 GROUNDWATER – EXCAVATIONS

Based upon the information obtained groundwater maybe encountered during excavation particularly as perched groundwater. Based on experience inflow rates of slow to fast may be encountered.

However, the depth and extent of groundwater may vary with the incidence of rainfall. If only minor influxes are revealed, then a flexible system of pumping from sumps would be sufficient to deal with groundwater. At best, the use of such a system could be sporadic but may in the worst case necessitate continuous pumping.

13.5 EXCAVATIONS

Based on the ground conditions encountered, it is anticipated that excavations should readily be achieved adopting standard excavation plant.

It is recommended full support of all excavations is undertaken during excavation and construction to prevent collapse and provide safe-working conditions particularly should it be necessary for personnel to enter.

Chalk that has been remoulded or 'puttied' by mechanical excavators should be removed, if necessary, by hand trimming.

The exposed formation level should be 'blinded' immediately after excavation to prevent deterioration. In addition, formation levels should not be excavated and exposed during periods of precipitation, regardless of intensity.

All excavations should be undertaken in accordance with CIRIA Report 97.

13.6 CONCRETE CLASSIFICATION

BRE concrete classification tests on retrieved soil samples has been undertaken. The results were analysed in accordance with BRE Special Digest 1 'Concrete in aggressive ground' 2005 to classify the concrete for the proposed development.

A design sulphate class of DS-1 and an ACEC class of AC-1 is deemed appropriate for the site.

13.7 ROADS AND PAVEMENT ASSESSMENT

Based on the calculated values obtained from in-situ light dynamic cone penetration tests (LDCPT) it is recommended that a preliminary design California Bearing Ratio of 6% (equivalent estimated design subgrade surface modulus of 55MPa) be used for design of the road and pavement foundations across the site.

It is recommended all formation levels are inspected and proof rolled prior to the construction of roads or pavements. Cobbles and large roots should also be removed if encountered at formation level.

If the exposed sub grade soils appear unsuitable, for example, if saturated very soft-to-soft clays or very loose to loose granular soils are encountered, it is recommended these soils are excavated and replaced with compacted sub base material. The use of geotextiles may also be considered in such areas to reduce the road construction thickness and improve any poor sub grade soils.

The design CBR should be confirmed by in-situ tests prior to construction.

Excavation and exposure of clay soils at formation level may result in potential heaving. It is recommended that during construction the potential for moisture content changes within formation soils are kept to a minimum as follows:

- Excavation should not take place during any form of precipitation regardless of intensity.
- Surface water should not be allowed to enter any excavation or exposed formations level.
- If delays occur during construction, the exposed formation level should be protected by either a waterproof membrane, which can be removed once construction resumes or suitable placement of sub base material.

In addition, access roads, drives and pavement areas and pathways should be designed and detailed to cater for potential ground movement associated with soils of a medium volume change potential.

13.8 SHRINKABLE CLAY SOILS, BUILDING NEAR TREES AND DESICCATION OF EXISTING SITE SOILS

Index property tests have been undertaken upon representative natural superficial geology (Lowestoft Formation) clay soils as the modified plasticity index can be used as an indicator of soil volume change potential.

Liquid limit, plastic limit and plasticity index testing indicates the tested natural superficial geology of the Lowestoft Formation are of an immediate to high plasticity (Class CI to CH) with a calculated low to medium volume change potential based on a modified plasticity index in accordance with BRE Digest 240 (1993). In addition, of the 6 samples tested only a single sample (WS3 at 1.00m) can be considered as not being desiccated as the soils water content is greater than 0.4 times the respective liquid limit. The remaining tested samples can be classed as being desiccated as the soils natural moisture content is less than 0.4 times the liquid limit. This assessment is also confirmed by the soils respective calculated liquidity index (LI).

Once the final layout indicating proposed and existing trees is known a detailed plot specific assessment in accordance with the appropriate NHBC guidelines (4.2 'Building near trees') is recommended. In addition, an assessment for the requirement of heave precaution measures should also be undertaken.

13.9 RADON ASSESSMENT

A radon report obtained from the British Geological Survey and Health Protection Agency indicates that the site is not located within a radon-affected area, as less than 1% of properties are above the action level. Therefore, radon protective measures are not necessary.

13.10 COAL MINING ASSESSMENT

The site is not located within an area affected by past, current or future coal mining. No further work or assessment is required in respect to coal mining hazards on-site.

13.11 DISSOLUTION FEATURES

The BGS has mapped the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) across the site whereby our investigation has encountered weathered structureless grade Dc chalk within a single exploratory hole from a depth of 1.64m bgl.

Dissolution features are common in chalk and may result in differential or collapse settlement of foundations, if undetected. Development and construction activities on a site may cause potential subsidence either by modifying surface drainage (for the example the disposal of drainage into the ground as most subsidence events are triggered by water) and/or altering loads imposed on ground without adequate support. For example, increased water flow can initiate the collapse of normally stable cavities in several ways, firstly, the additional weight of wet soil, floodwater or saturated superficial deposits can increase the load to a critical level. Alternatively, increased water flow can flush out or compact sediments infilling a cavity.

There is no evidence of dissolution features in our ground investigation works, however, the presence of dissolution features cannot be discounted.

However, the potential implications of dissolution should be assessed in terms of the proposed construction. The overall risk present to the development depends on the vulnerability of these hazards and its intended use. The vulnerability depends on the type of substructure, whereby the risk of this development may be deemed to be higher on the merit the proposed structures will be constructed utilising strip footings and/or pad bases.

It is recommended that an observational approach is adopted during construction and if evidence of dissolution features is encountered during construction advice from a suitably qualified Geotechnical Engineer should be sought. In the situation where the proposed structure cannot safely bridge across a possible dissolution feature then either excavation and replacement, if possible, or treatment of the feature itself is required. Treatment could be in the form of grouting either to strengthen the infill material of the feature or to stabilise the feature itself and so improve the overall load bearing behaviour. Where the features can be located and are of shallow depth they can be completely excavated and replaced with compacted suitable material or mass concrete. Alternatively, they can be excavated and combined with bridging.

The ingress of water into chalk can initiate new dissolution features especially within low density chalk as encountered during this investigation, therefore pipework and water drains installed at the site should be constructed using flexible material and should incorporate flexible joints to prevent failure and the release of water. In addition, the suitability of soakaways in this chalk should be evaluated.

14. GEOTECHNICAL RISK REGISTER

The geotechnical risk register contained below is specific for this project and has been prepared based on available data. A risk matrix identifies potential risks to the scheme during the feasibility, design and construction stages (see Table 30 – Risk Register). For each potential hazard/risk identified, a risk rating is assigned before control, risk consequences are identified and risk control measures suggested. The risk rating is obtained from:

Risk rating (RR) = Probability (P) x Impact (I)

P and I values are assigned in accordance with the values in the table below. 'I' values involve a subjective assessment of how the implied risk may impact on the project timeframe with an indicative non-quantified order of cost assigned.

TABLE 30: RISK REGISTER

Probability (P)		Impact (I)		Time	Outline Cost	Degree of Risk Rating (RR) (P x I)	
Very Likely	5	Very High	5	>10 weeks on completion	>£1m	16 – 25	Very High Risk – unacceptable. Re-examine activities to provide lower risk
Likely	4	High	4	>1 week on completion	£100k to £1m	9 - 15	High Risk – Apply further mitigation measures and/or alter method of work to reduce risk further. Seek project/Director approval if risk cannot be reduced
Probable	3	Medium	3	>4 weeks: <1 week on completion	£10k to £100k	6 - 8	Medium Risk – Tolerable only if further mitigation if now reasonably practical and there is need to continue activity with identified controls
Unlikely	2	Low	2	1 to weeks: none on completion	£1k to £10k	2 – 5	Low Risk – Broadly acceptable if all practical control measures are in place
Negligible	1	Very Low	1	<1 week to activity: none on completion	<£1k	1	Very Low Risk – Acceptable when any required control measures are implemented

TABLE 31: SITE SPECIFIC GEOTECHNICAL RISK REGISTER

Hazard/Risk Description	Risk Rating before Control			Consequence	Risk Control Measures (RCM)	Residual Risk (following application of RCM)		
	P	I	RR			P	I	RR
Damage to existing and/or adjacent services and structures	5	4	16	Structural instability of existing structures/services H & S risk Delays Potential claims from affected parties	Locate works outside of zone of influence of existing structures/services during construction. Undertake suitable risk assessment and method of working to mitigate risk. Protect existing services from construction plant. Transmit foundation loads to competent strata beneath existing services	1	1	1
Variable made and infilled ground	5	4	16	Variable and insufficient bearing stratum Excessive total and differential settlement resulting in structural damage/collapse. Sliding failure Bearing capacity failure	Consult ground investigation report and encountered ground conditions – Considered low risk for the site based on encountered ground conditions	1	1	1
Very soft to soft/compressible, highly weathered and very loose to loose natural soils	4	4	16	Variable and insufficient bearing stratum Excessive total and differential settlement resulting in structural damage/collapse. Sliding failure Bearing capacity failure	Consult ground investigation report and encountered ground conditions - investigation works and subsequent assessment indicate the natural superficial clay soils exhibit a variation within undrained shear strength Use appropriate foundations accordingly. Identify, based on ground investigation results, areas of compressible ground and design foundation accordingly	1	1	1
Unexpected geological features (not including dissolution features)	2	2	4	Collapse	Low risk for site based on observations at ground investigation stage and review of published geological information for the site	2	1	2
Mining and quarrying activities	4	4	16	Potential remediation of old	Site is not located within a coal mining area.	1	1	1

Hazard/Risk Description	Risk Rating before Control			Consequence	Risk Control Measures (RCM)	Residual Risk (following application of RCM)		
	P	I	RR			P	I	RR
				shafts Collapse	Sporadic underground mining of chalk 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			
Buried obstructions	2	3	6	Hard spots below structures leading to differential settlement. Potential delays during construction	Cobbles and boulder size fragments made be encountered within the natural superficial geology – based upon the recommended foundation type and depth of construction the overall risk is considered low for the site.	1	1	1
Unforeseen ground conditions	3	3	9	Excessive settlement Sliding failure Bearing capacity failure	Consult ground investigation before design. Over excavation of soft spots/loose/highly weathered soils required Watching brief recommended during construction	2	2	4
Dissolution features within soluble strata	4	4	16	Potential delays during construction Collapse Excessive settlement	Watching brief recommended during construction (see section 13.11)	2	2	4
Highly fractured and loose rock in excavation	3	3	9	Excessive settlement	Consult ground investigation report and encountered ground conditions Watching brief recommended during construction whereby highly fractured and loose highly weathered chalk may require over excavation if encountered Monitor excavated arising's volume	1	1	1
Stability of excavations	3	3	9	Collapse of excavation resulting in delays in construction	Consult ground investigation report with reference to the encountered ground conditions.	2	2	4

Hazard/Risk Description	Risk Rating before Control			Consequence	Risk Control Measures (RCM)	Residual Risk (following application of RCM)		
	P	I	RR			P	I	RR
					Provide support to all excavations to prevent collapse			
Unsuitable site won material for reuse in earthworks construction	3	3	9	Delays Serviceability issue	No earthworks proposed as part of redevelopment at the time of the writing of this report. Further testing will be required if this changes along with a site-specific earthworks specification.	1	1	1
Insufficient ground improvement	3	3	9	Delays Serviceability issue	Ground improvement is not proposed or recommended based on encountered ground conditions	1	1	1
Slope instability of adjacent slopes	4	4	16	Slope failure H & S risk	Considered low risk for the site – no further works or assessment recommended	1	1	1
Increase in pore water pressure and reduction in shear strength of any potential failure surfaces during construction	2	5	10	Slope failure H & S risk	Considered low risk for the site – no further works or assessment recommended	1	1	1
Slope instability of proposed earthwork slopes	2	5	10	Slope failure H & S risk	No earthworks proposed as part of redevelopment at the time of the writing of this report	1	1	1
Increase in pore water pressure and reduction in shear strength of any potential failure surfaces during earthwork construction	2	5	10	Slope failure H & S risk	No earthworks proposed as part of redevelopment at the time of the writing of this report	1	1	1
Failure in cut slopes during installation of retaining walls	2	5	10	Slope failure H & S risk	Retaining structures are not proposed as part of the development of the site	1	1	1
Failure of retaining walls	2	5	10	Serviceability issue H & S risk	Retaining structures are not proposed as part of the development of the site	1	1	1
Radon gas - the site is not located within a radon-affected area, as less than 1% of properties are above the action level therefore protective measures are not necessary	2	1	2	H & S risk	No further work or assessment is required in respect to radon on site. Protection measures are not required	1	1	1

Hazard/Risk Description	Risk Rating before Control			Consequence	Risk Control Measures (RCM)	Residual Risk (following application of RCM)		
	P	I	RR			P	I	RR
Underground gas	2	1	2	H & S risk	No feasible potential ground gas source identified. No further works or assessment recommended	1	1	1
Chemical attack on buried structural concrete	3	2	6	Serviceability issue	Adopt concrete protection design in accordance with report recommendations	1	1	1
Disposal of excessive amounts of unacceptable material	3	4	12	Delays during construction costs due to excessive disposal	Minimise quantities of excavated material generated. Produce material management plan	1	2	2
Groundwater levels – effect on surface water drainage	3	2	6	Delays, flooding	Ensure groundwater regime at the site is unaltered. Ensure appropriate temporary works and drainage	1	2	2
Groundwater flow – effect of stability of excavations	3	2	6	Excavation collapse	Ensure appropriate temporary works and dewatering methods adopted. Consult ground investigation report and exploratory hole logs for groundwater information	1	2	2
Heave/shrinkage of cohesive soils due to desiccation and volume change potential	1	2	2	Differential settlement and movement on foundation	Founding/transferring of foundations/infrastructure beneath the zone of seasonal moisture content variation. Compliance at design stage with published NHBC and BRE guidelines – a plot specific assessment is recommended in accordance with the appropriate NHBC guidelines (4.2 'Building near trees') – see section 13.8. Adopt appropriate heave protection measures within foundation design if required	1	1	1
Poor sub grade soils at proposed formation level during access road construction	3	2	6	Delays during construction Serviceability issue Excessive total	The design CBR should be confirmed by in-situ tests prior to construction	1	1	1

Hazard/Risk Description	Risk Rating before Control			Consequence	Risk Control Measures (RCM)	Residual Risk (following application of RCM)		
	P	I	RR			P	I	RR
				and differential settlement				
Unsuitability of site won material as use as aggregates in construction	1	2	2	Delays Serviceability issue	Recommended a site-specific method statement and appropriate specification is produced if the reuse of site won material is proposed	1	1	1

Risk Rating (RR) = Probability (P) x Impact (I)

The risk register indicates lower risk ratings following adoption of control measures.

15. CONTAMINATED LAND ASSESSMENT

15.1 POTENTIALLY SIGNIFICANT POLLUTION LINKAGES

A revised conceptual model comprising the identification and assessment of potentially significant pollutant linkages has been undertaken.

15.2 POTENTIAL SOURCES

Potential contamination sources identified from the ground investigation and chemical testing have been summarised in the following table.

TABLE 32: POTENTIAL CONTAMINATION SOURCES IDENTIFIED DURING SITE WORKS

Source	Location	Comments
No sources identified	N/A	No further works or assessment warranted.

15.3 RISK ASSESSMENT

The risk of significant harm or pollution of controlled waters has been assessed qualitatively as **low**, **medium** or **high** using the criteria shown in Appendix E.

A risk estimation matrix for all pollutant linkages identified is shown in the following table.

TABLE 33: REVISED CONTAMINATION ASSESSMENT BASED UPON RESULTS OF SITE WORK

Receptor	Sources	Risk	Justification
Human			
Existing site users	None identified	Low	No contamination source identified - No further works or assessment warranted or recommended
Future site users	None identified	Low	No contamination source identified - No further works or assessment warranted or recommended
Construction workers	None identified	Low	PPE to be worn by site workers
Property			
Site structures (concrete structures)	Concrete aggressive ground	Low	A design sulphate class of DS-1 and an ACEC class of AC-1 is deemed to be appropriate for the site.
Safety of water supply pipes	No elevated hydrocarbons encountered	Low	No further work warranted

Receptor	Sources	Risk	Justification
Site Structures (dangerous gas migration)	No made ground, infilled ground or organic material have been encountered during our site investigation works which would be deemed a potential ground gas source. No active or historical landfills are recorded within a 500m radius of the site. In addition, based on the available desk study information the time of potential off-site infilling further reduces the risk of ground gas generation and migration.	Low	No further work warranted
Controlled Waters			
Secondary undifferentiated aquifer (superficial geology)	No sources of contamination identified	Low	No further work warranted.
Principal aquifer (solid geology)	No sources of contamination identified	Low	No further work warranted.
Source protection zone	No sources of contamination identified	Low	No further work warranted.
Water network entries	No sources of contamination identified	Low	No further work warranted.
Unspecified surface water features	No sources of contamination identified	Low	No further work warranted.

16. CONCLUSIONS AND RECOMMENDATIONS

The Nott Group have been instructed by Wheatley Group Development Limited to undertake a contaminated land and geotechnical assessment at an area of land located to the west of Police Row, Therfield, Hertfordshire.

The Nott Group has undertaken a review of available site information provided and developed a conceptual model. A ground investigation has been undertaken which included window sample holes with in-situ testing and in-situ light dynamic cone penetrometer tests. This was followed up by chemical and geotechnical testing on selected soil samples. A conceptual model for the site in accordance with the current Contaminated Land Legislation has been developed with the following conclusions and recommendations. In addition, a geotechnical appraisal has also been developed in respect to potential foundation solutions.

16.1 GROUND CONDITIONS ENCOUNTERED

The investigation works encountered clay topsoil to a maximum depth of 0.37m bgl. Stiff to very stiff natural superficial clay deposits of the Lowestoft Formation were encountered below the topsoil horizon from depths ranging from 0.16m to 0.37m and were encountered to a maximum depth of 5.45m bgl (depth of exploratory hole termination). The solid geology of the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) was encountered in a single exploratory hole from a depth of 1.64m bgl and comprised of a single horizon grade Dc (clast dominated) chalk.

16.2 CONTAMINATED LAND ASSESSMENT AND RECOMMENDATIONS

The historical maps indicate from 1877 until 1976, the north of the site (with minor redevelopment shown from 1896) was occupied by several unspecified buildings and a pond. The remainder of the site is part of a field (agricultural land). From 1976 to the present day, the site is part of a field (agricultural land).

Several exploratory holes have been advanced and no visual or olfactory evidence of contamination was noted.

No elevated concentrations of the determinants tested have been encountered in the soils sampled. The contaminated land assessment undertaken indicates that the risk of encountering contamination during development has been assessed as low. As a result, no further work is warranted or recommended with respect to soil contamination.

This report should be forwarded to the Local Authority for consultation and agreement.

16.3 GEOTECHNICAL ASSESSMENT AND RECOMMENDATIONS

No final formation levels have been developed and for the purpose of this report the final formation level has been assumed to be at existing site levels. If this changes then further foundation assessment work will be required.

Foundations could be constructed using strip footings, deepened using mass concrete trench fill where made ground or poorer natural soils are encountered. Alternatively, pad bases founded within the natural clay soils of a minimum stiff undrained shear strength and/or structureless grade Dc chalk are feasible.

Due to the presence of near surface shrinkable medium volume change potential soils (associated with the natural superficial geology) it is recommended that suspended floor slabs are employed. Precast concrete, timber or in-situ concrete are acceptable design options.

This investigation has encountered clay soils of calculated medium volume change potential in addition to being desiccated. Once the final layout and existing trees are known a detailed plot specific assessment in accordance with the appropriate NHBC guidelines (4.2 'Building near trees') is recommended.

Based on the ground conditions encountered, it is anticipated that excavations should readily be achieved adopting standard excavation plant. It is recommended that full support of all excavations is undertaken during excavation and construction to prevent collapse and provide safe-working conditions particularly should it be necessary for personnel to enter.

Based upon the information obtained groundwater may be encountered during excavation particularly as perched groundwater. If only minor influxes are encountered, then a flexible system of pumping from sumps would be sufficient to deal with groundwater. At best, the use of such a system could be sporadic but may in the worst case necessitate continuous pumping.

For concrete classification purposes a design sulphate class of DS-1 and an ACEC class of AC-1 is deemed appropriate for the site.

It is recommended that a preliminary design California Bearing Ratio of 6% (equivalent estimated design subgrade surface modulus of 55MPa) be used for design of the road and pavement foundations across the site.

The BGS has mapped the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) across the site and our investigation has encountered weathered structureless grade Dc chalk within a single exploratory hole from a depth of 1.64m bgl. Dissolution features are common in chalk and may result in differential or collapse settlement of foundations, if undetected. Development and construction activities may cause potential subsidence either by modifying surface drainage and/or altering loads imposed on ground without adequate support. There was no evidence of dissolution features in our ground investigation works, however, the presence of dissolution features cannot be discounted. Their treatment, if present, can be undertaken by several engineering options which includes foundation bridging or grouting. It is recommended that an observational approach is adopted during construction. If evidence of dissolution features is encountered during construction, a geotechnical engineer should be consulted. In addition, the suitability of soakaways chalk should also be evaluated.

The site is not located within an area affected by past, current or future coal mining. No further work or assessment is required in respect to coal mining hazards on-site.

The site is not located within a radon-affected area, as less than 1% of properties are above the action level. Therefore, radon protective measures are not necessary.

A geotechnical risk register specific for this project has been prepared for each potential hazard/risk identified. A risk rating is assigned before control, risk consequences and risk control measures identified. The risk register indicates lower risk ratings following adoption of control measures.

GLOSSARY

For this report the following terms and definitions apply (see BS 10175:2001).

Accuracy	Level of agreement between true value and observed value.
Conceptual Model	Textual and or schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the base of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. Note 1: The conceptual model is initially derived from the information obtained by the preliminary investigation. This conceptual model is used to focus subsequent investigations, where these are necessary, to meet the objectives of the investigations and the risk assessment. The results of the field investigation can provide additional data that can be used to further refine the conceptual model.
Contamination	Presence of a substance which is in, on or under land, and which has <u>the potential</u> to cause significant harm or to cause significant pollution of controlled water. Note 1: There is no assumption in this definition that harm results from the presence of the contamination. Note 2: Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. Note 3: Contamination may relate to soils, groundwater or ground gas.
Controlled water	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters. Note 1: See Section 104 of The Water Resources Act 1991.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case humans, including property.
Hazard	Inherently dangerous quality of a substance, procedure or event.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
Precision	Level of agreement within a series of measurements of a parameter.
Receptor	Persons, living organisms, ecological systems, controlled water, atmosphere, structures and utilities that could be adversely affected by the contaminant(s).
Risk	Probability of the occurrence of, and magnitude of the consequences of, an unwanted adverse effect on a receptor.
Risk assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
Soil	Upper layer of the earth's crust composed of mineral parts, organic substance, water, air and living matter. Note 1: In accordance with BS 10175:2001 the term soil has the meaning ascribed to it through general use in civil engineering and includes topsoil and subsoil; deposits such as clays, silt, sand, gravel, cobbles, boulders and organic deposits such as peat; and material of natural or human origin (e.g. fills and deposited wastes). The term embraces all components of soil, including mineral matter, organic matter, soil gas and moisture, and living organisms.
Source	Location from which contamination is, or was, derived. Note 1: This could be the location of the highest soil or groundwater concentration of the contaminant(s).
Uncertainty	Parameter, associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement.

Appendix A SITE PLANS AND DRAWINGS

Drawing No. 1 – Site Location Plan

Drawing No. 2 – Proposed Site Layout

Drawing No. 3 – Exploratory Hole Location Plan – Window Sample Holes

Drawing No. 4 – In-situ DCP (CBR) Test Location Plan

On separate sheets



Title: **Appendix A – Site Location Plan**

Project Name: **Land to the West of Police Row, Therfield, Hertfordshire**

Client: **Wheatley Group Developments Limited**

Project No: **73792**

Date: **22/08/2022**

Drawing No **1**



Do Not Scale



Title:	Appendix A – Proposed Site Layout Plan		
Project Name:	Land to the West of Police Row, Therfield, Hertfordshire		
Client:	Wheatley Group Developments Limited		
Project No:	73792	Date:	22/08/2022
		Drawing No	2



Key



**Window Sample
Hole (WS)**

Do Not Scale



Title: **Appendix A – Exploratory Hole Location Plan – Window Sample Holes**

Project Name: **Land to the West of Police Row, Therfield, Hertfordshire**

Client: **Wheatley Group Developments Limited**

Project No: **73792**

Date: **22/08/2022**

Drawing No **3**



Key



**In-situ DCP (CBR)
Test Location (DCP)**

Do Not Scale



Title: **Appendix A – In-situ DCP (CBR) Test Location Plan**

Project Name: **Land to the West of Police Row, Therfield, Hertfordshire**

Client: **Wheatley Group Developments Limited**

Project No: **73792**

Date: **22/08/2022**

Drawing No **4**



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: County Series

Map date: 1877

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1877
Edition N/A
Copyright N/A
Levelled N/A

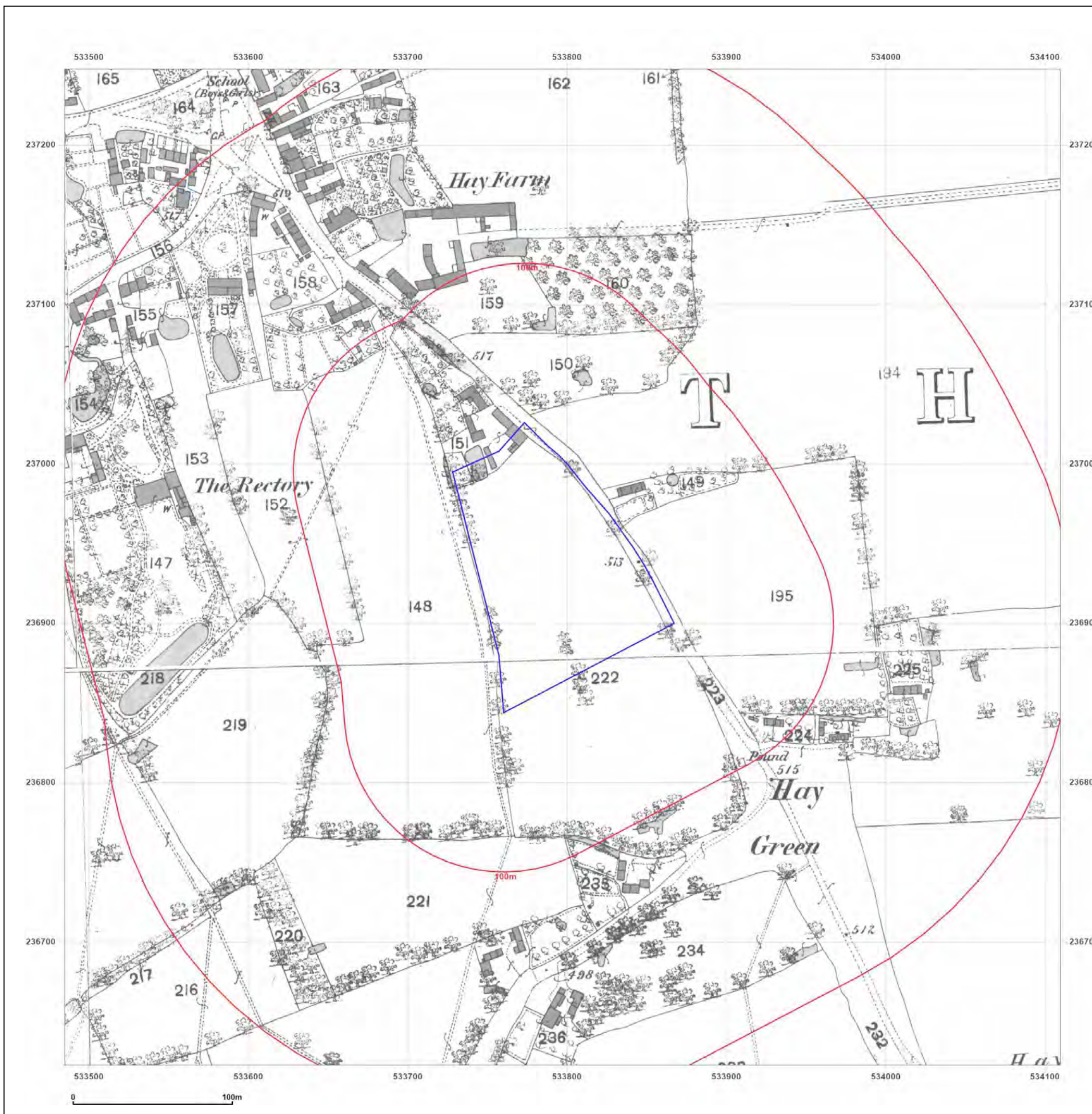


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: County Series

Map date: 1898

Scale: 1:2,500

Printed at: 1:2,500



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

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

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

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

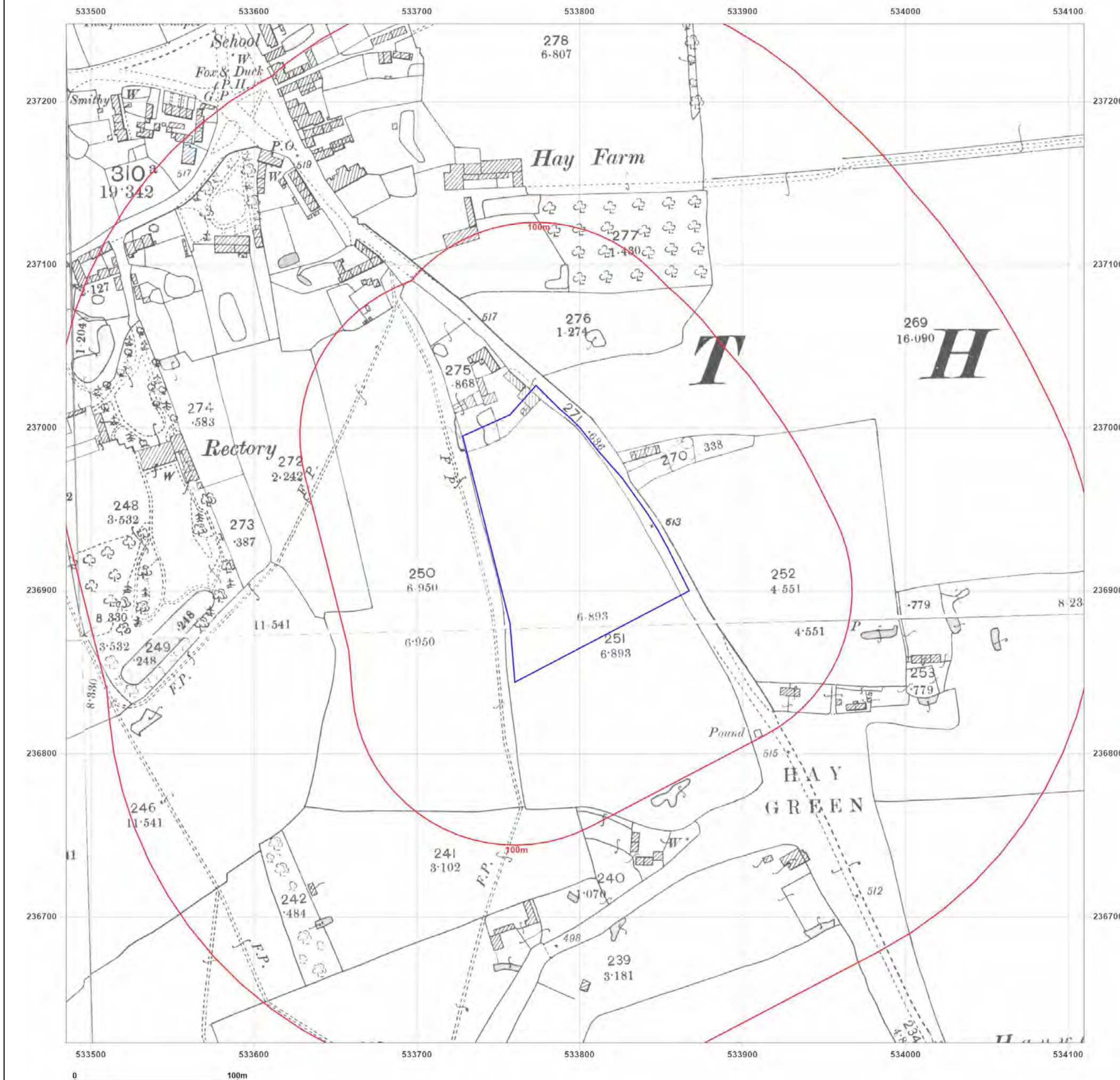


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: County Series

Map date: 1923-1924

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1924
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1924
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1923
Revised 1923
Edition N/A
Copyright N/A
Levelled N/A

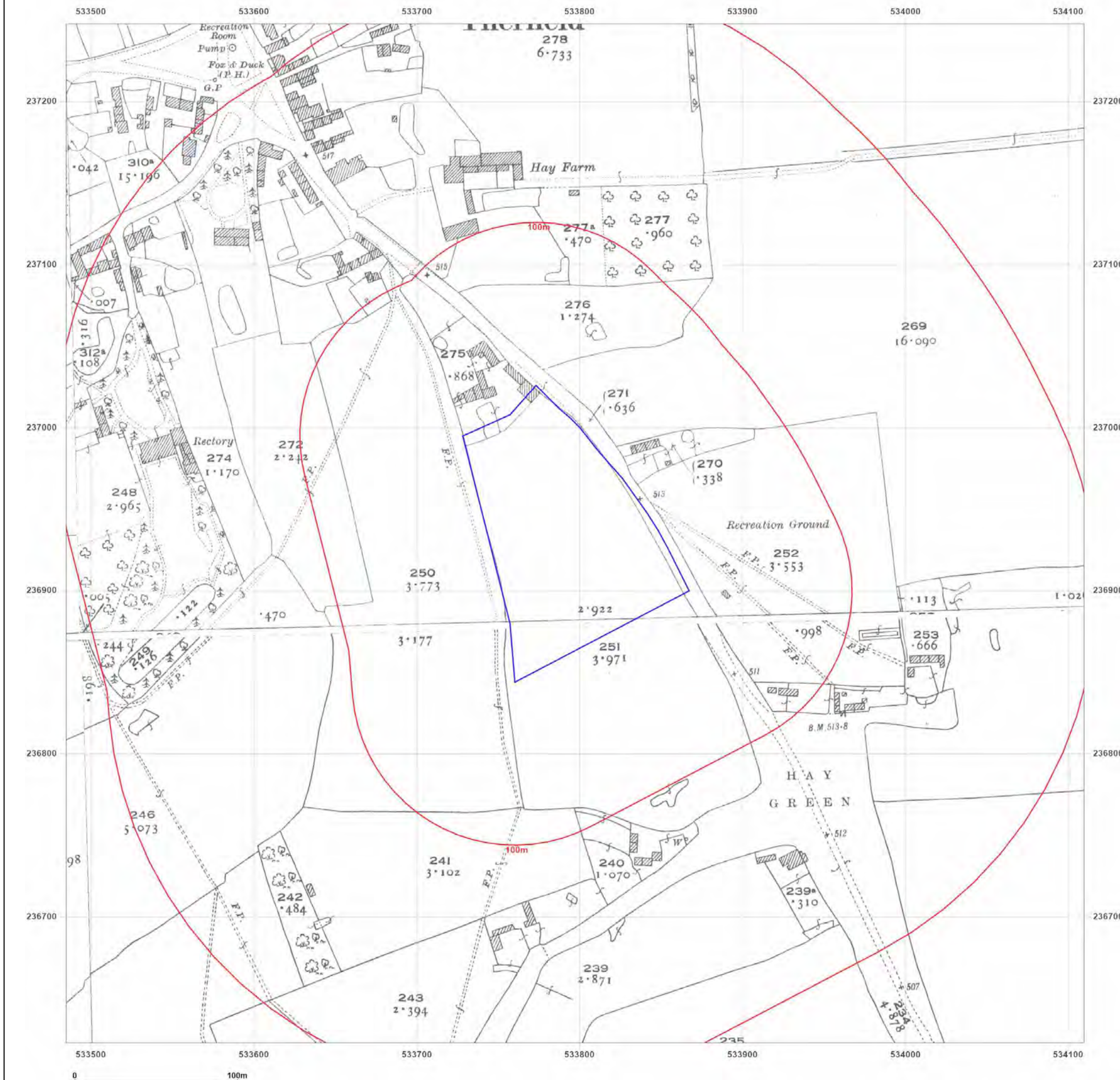


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: National Grid

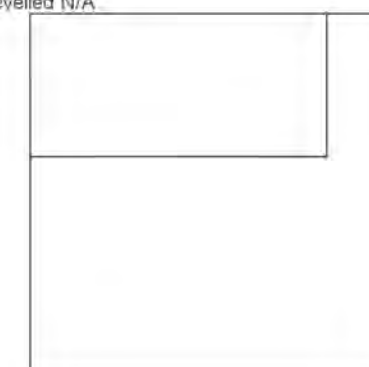
Map date: 1975

Scale: 1:2,500

Printed at: 1:2,500



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



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

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: National Grid

Map date: 1975-1976

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1974
Revised 1974
Edition N/A
Copyright 1975
Levelled 1968



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

Surveyed 1974
Revised 1974
Edition N/A
Copyright 1975
Levelled 1968

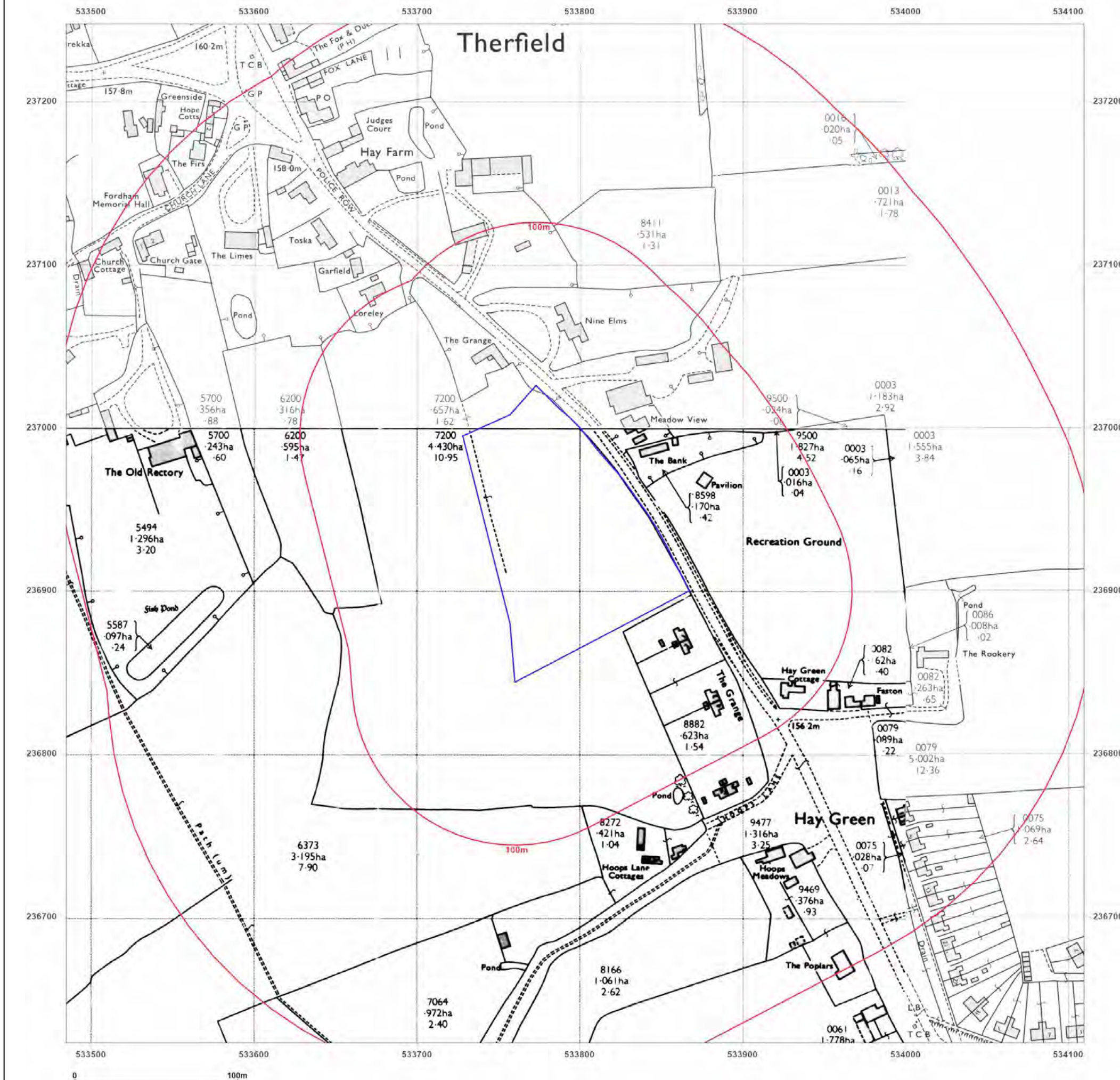


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: National Grid

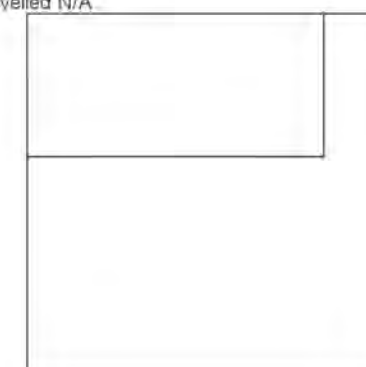
Map date: 1993

Scale: 1:2,500

Printed at: 1:2,500



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

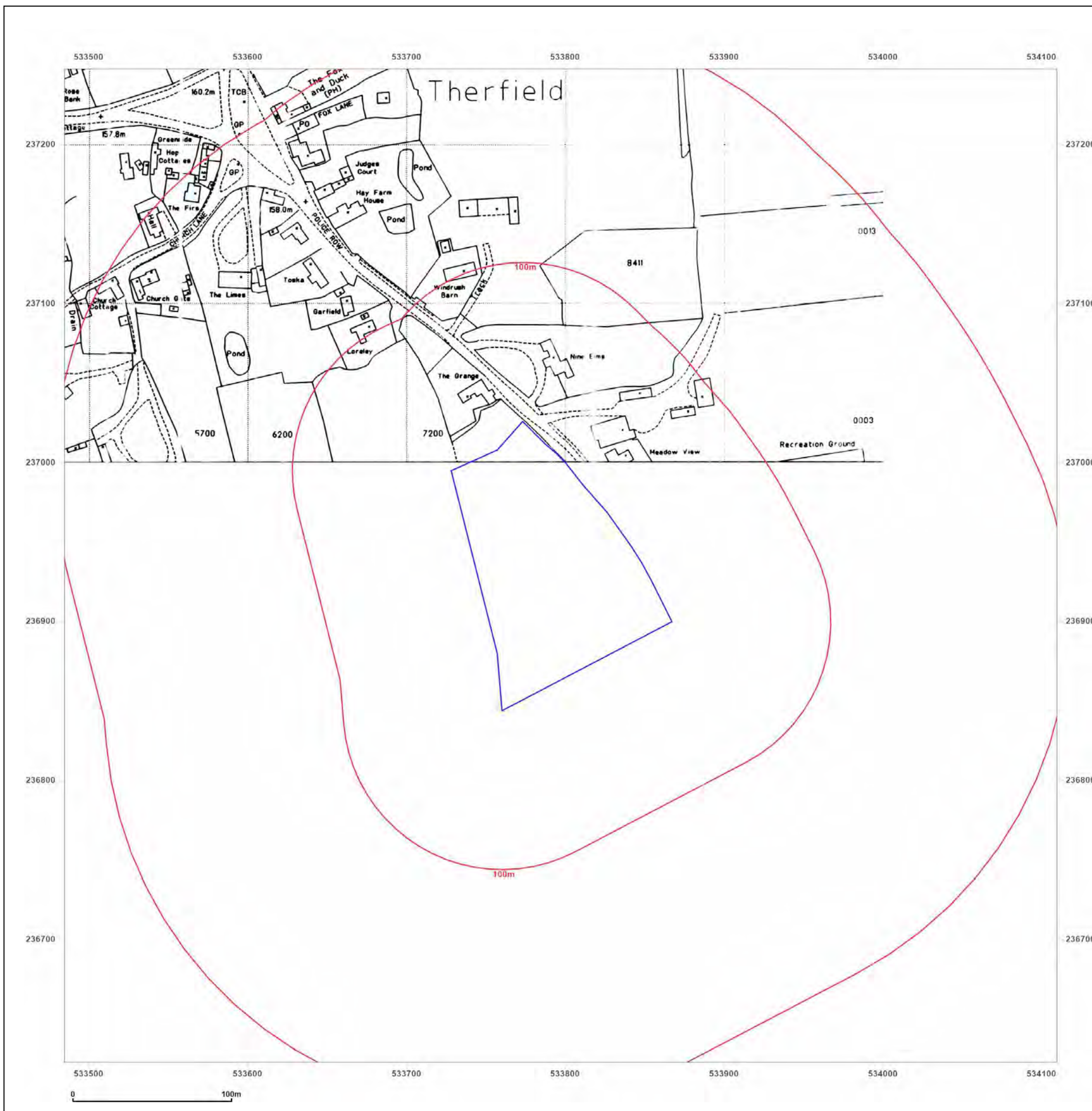


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: National Grid

Map date: 1993-1994

Scale: 1:2,500

Printed at: 1:2,500



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

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

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

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



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

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: National Grid

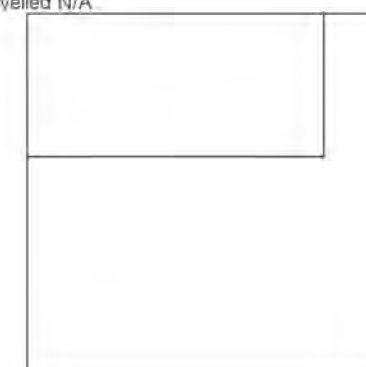
Map date: 1994

Scale: 1:2,500

Printed at: 1:2,500



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



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

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250

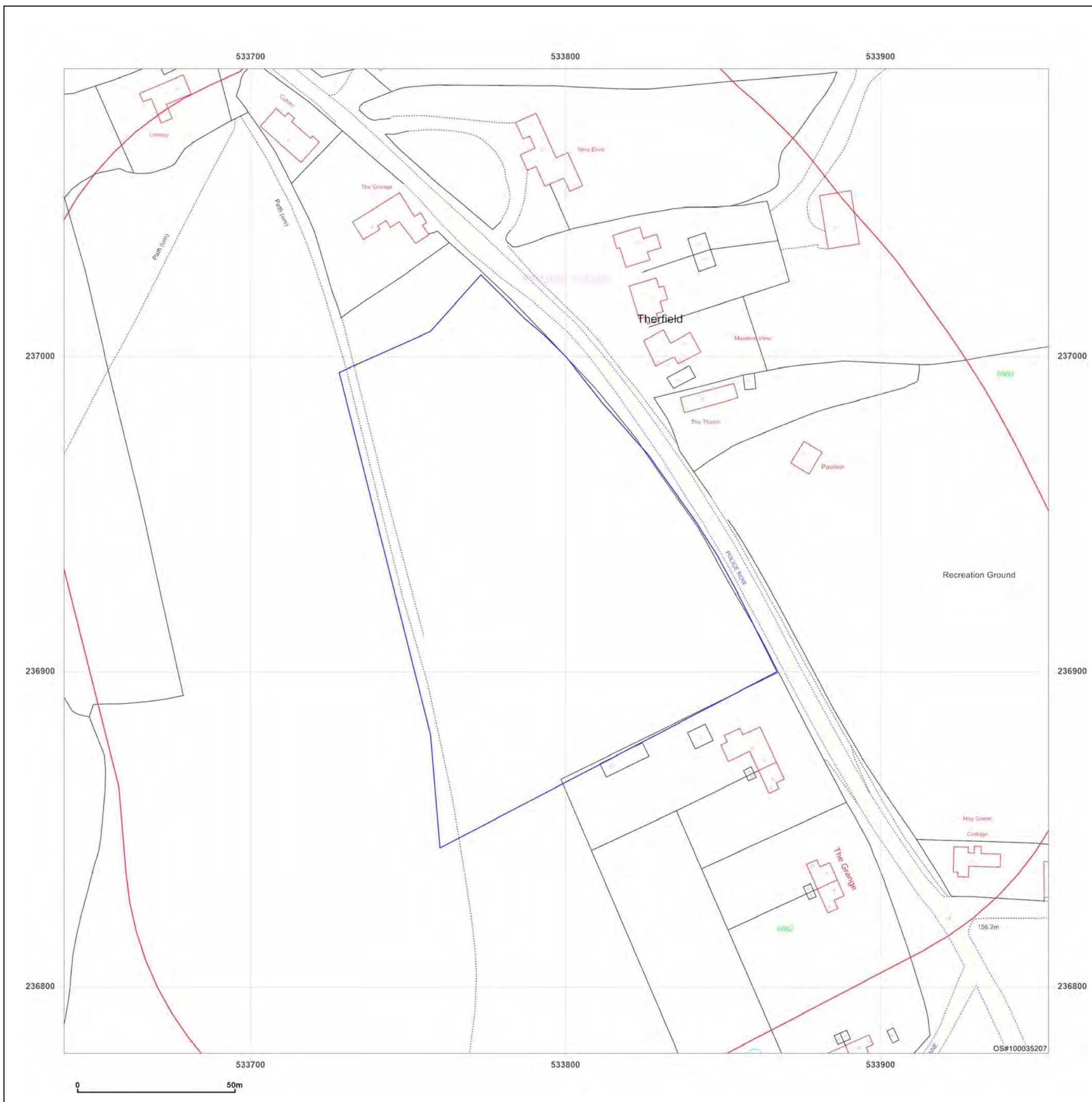


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: County Series

Map date: 1882-1883

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1877
Revised N/A
Edition 1882
Copyright N/A
Levelled N/A

Surveyed 1877
Revised N/A
Edition 1883
Copyright N/A
Levelled N/A

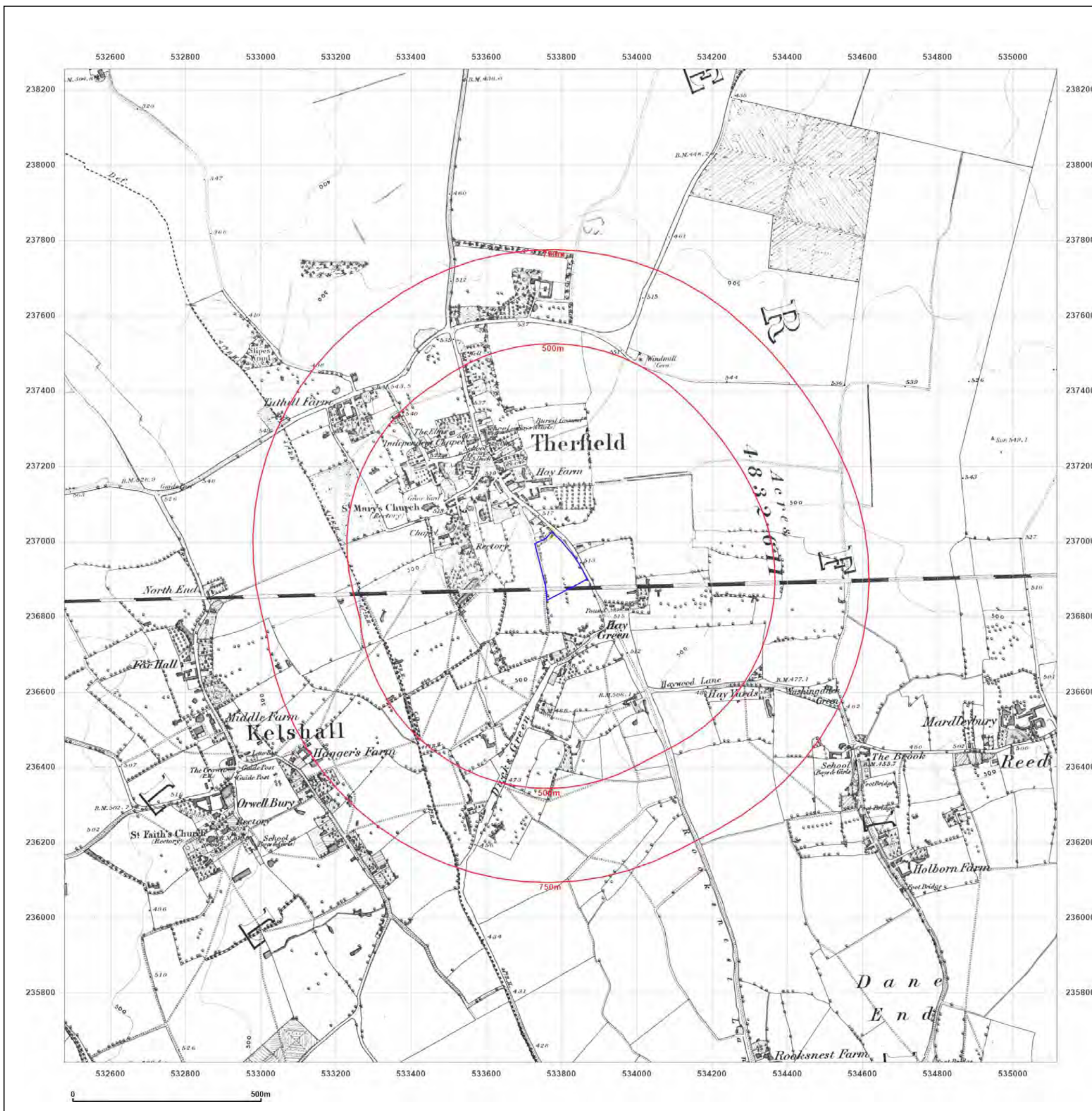


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: County Series

Map date: 1896

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1877
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

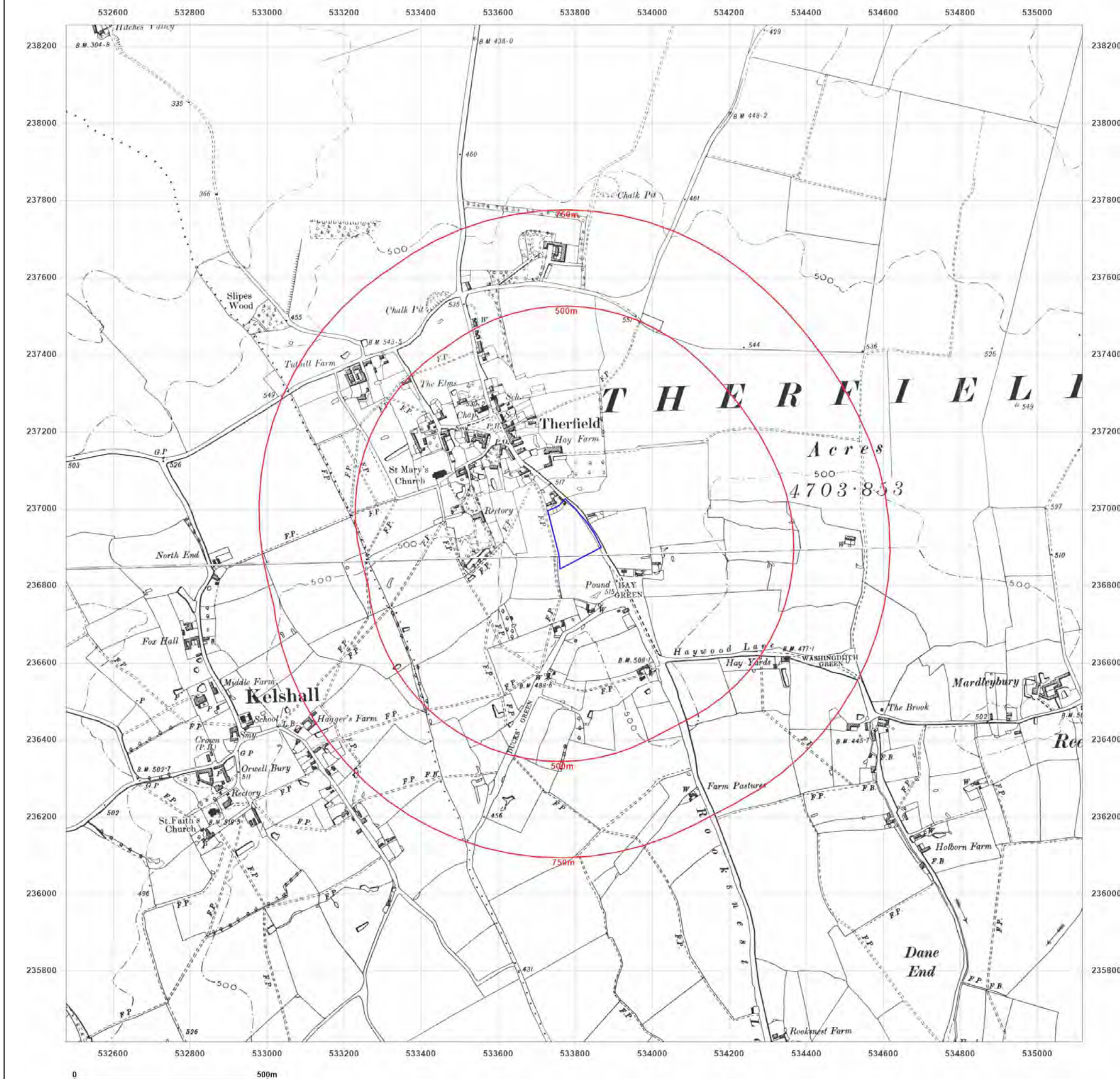


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: County Series

Map date: 1922

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1876
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1876
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

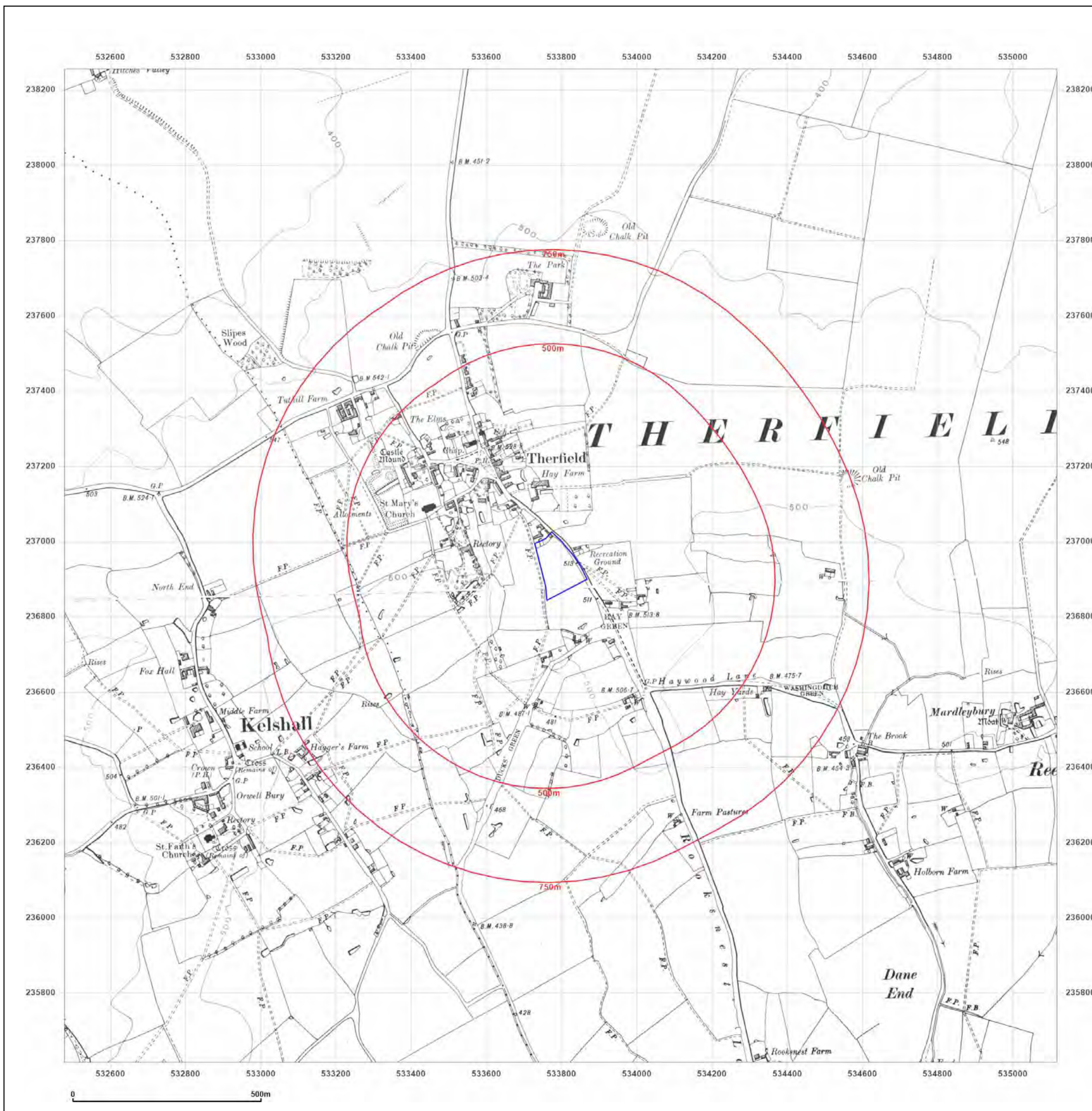


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: County Series

Map date: 1922

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1876
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1876
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

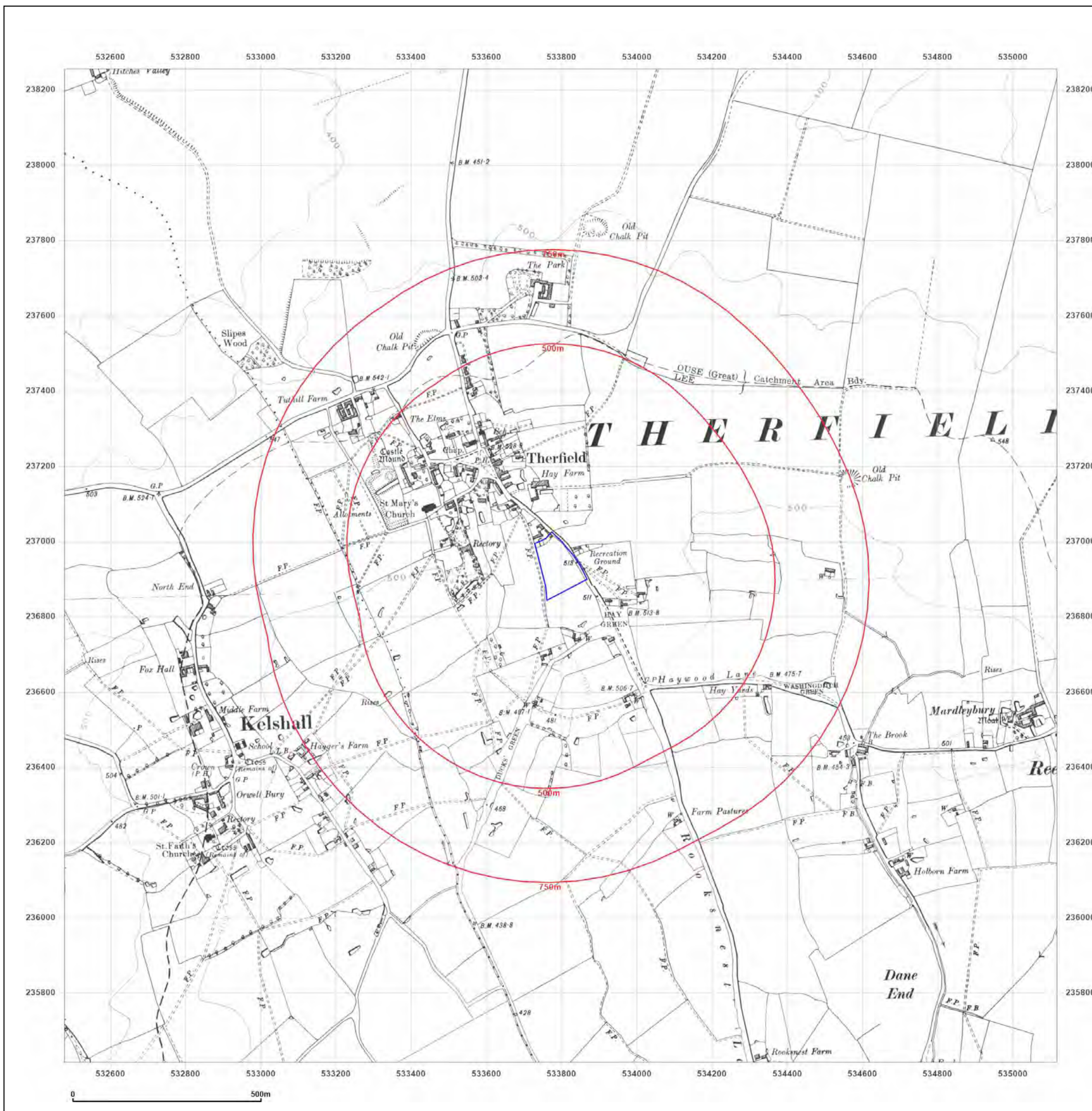


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: County Series

Map date: 1947

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1876
Revised 1947
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1876
Revised 1947
Edition N/A
Copyright N/A
Levelled N/A

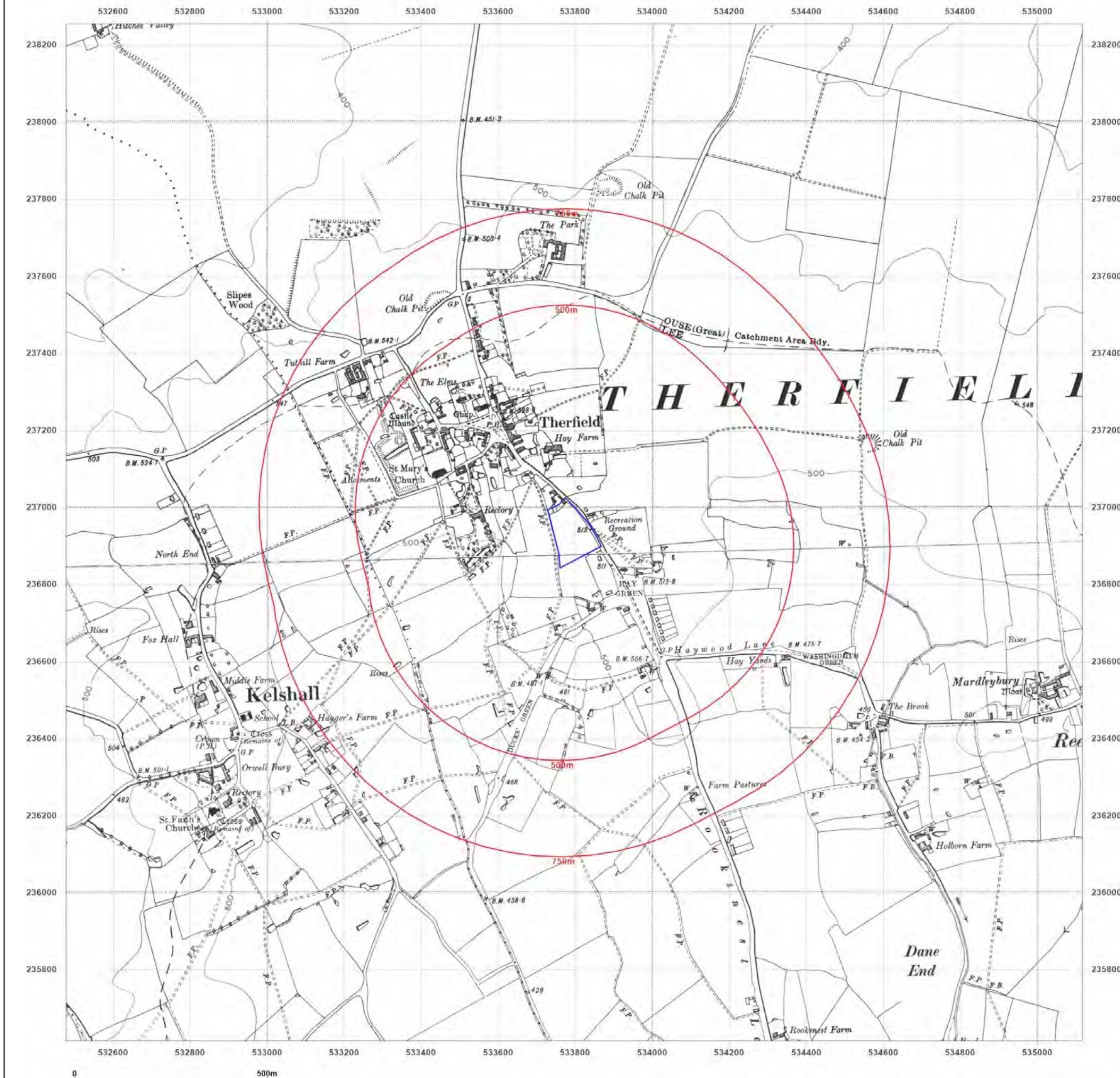


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: Provisional

Map date: 1960

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1953
Revised 1953
Edition N/A
Copyright 1960
Levelled N/A

Surveyed 1952
Revised 1952
Edition N/A
Copyright 1960
Levelled N/A

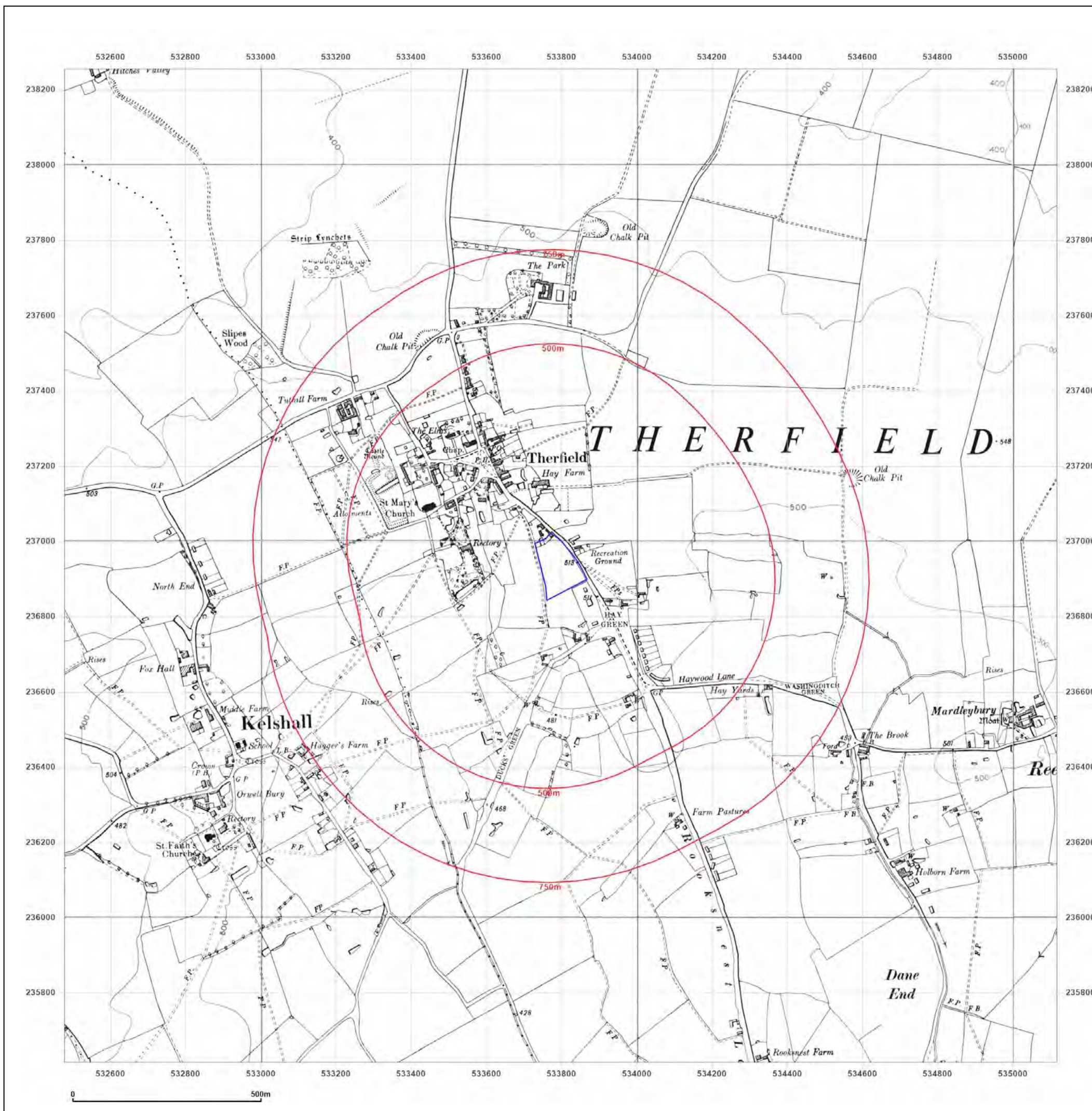


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: National Grid

Map date: 1982

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
Revised 1982
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1975
Revised 1982
Edition N/A
Copyright N/A
Levelled N/A

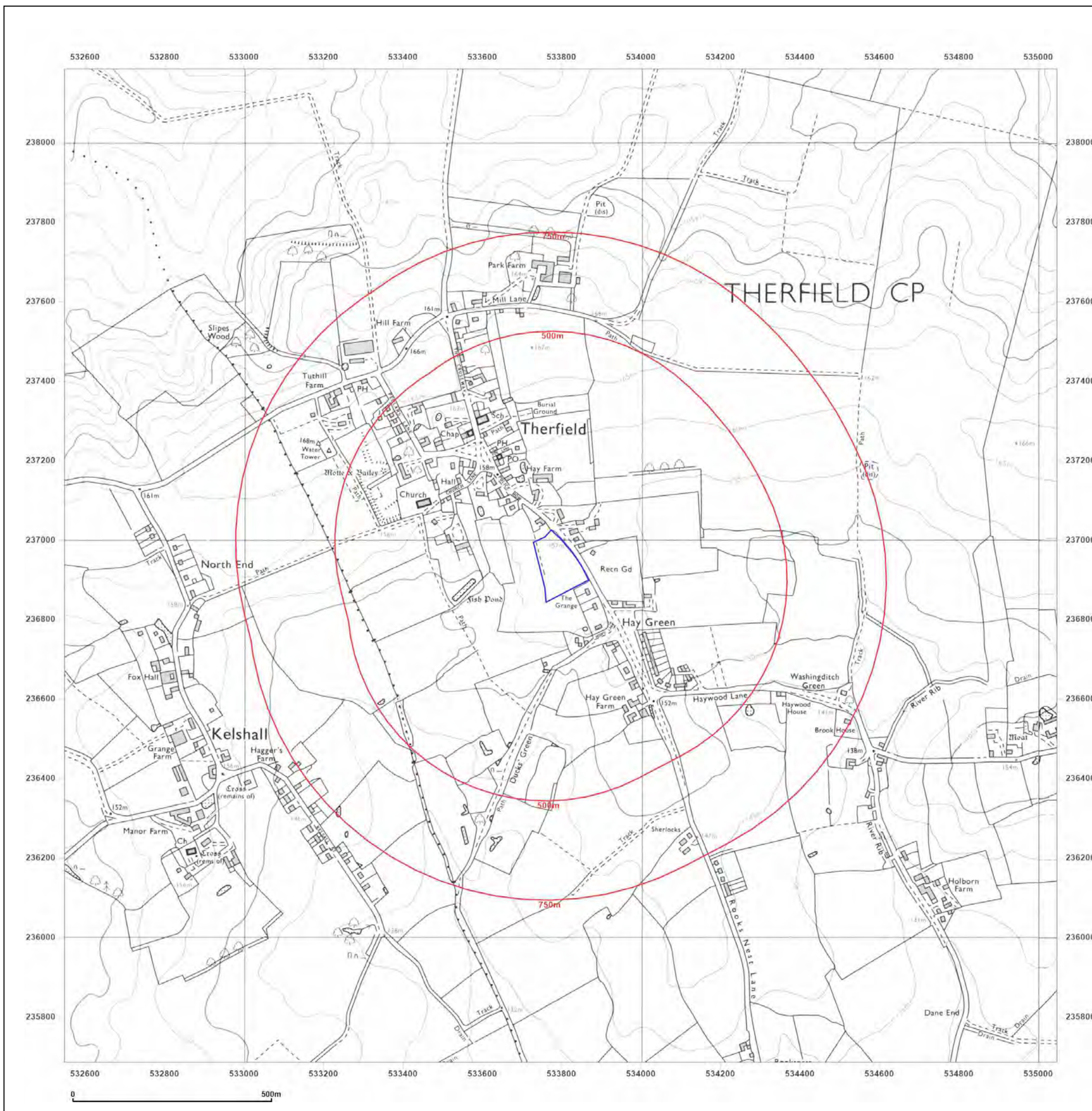


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000

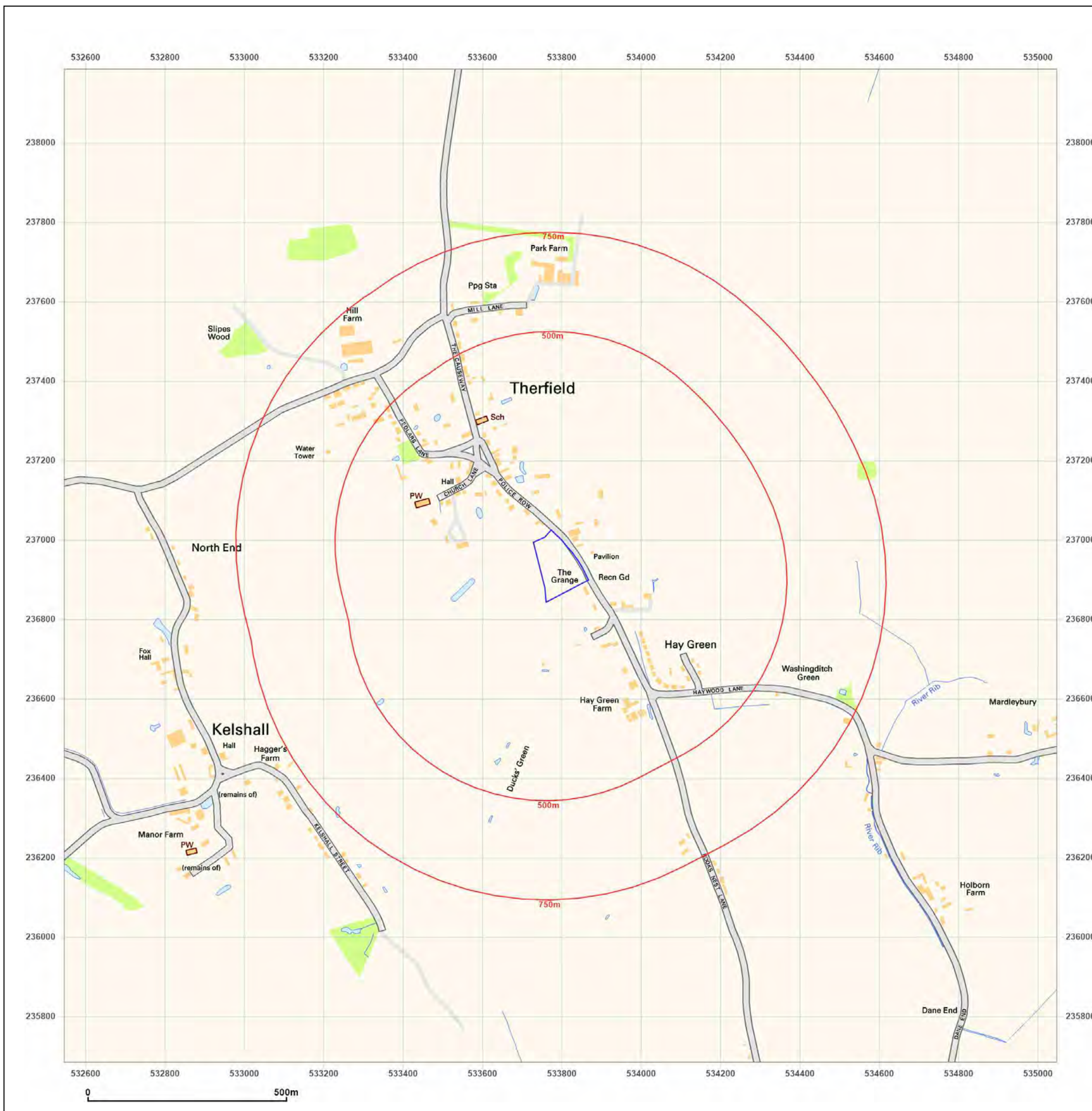


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



Site Details:

LAND TO WEST OF POLICE
ROW, THERFIELD, SG8 9QE

Client Ref: 73792
Report Ref: GS-8892956
Grid Ref: 533797, 236935

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000

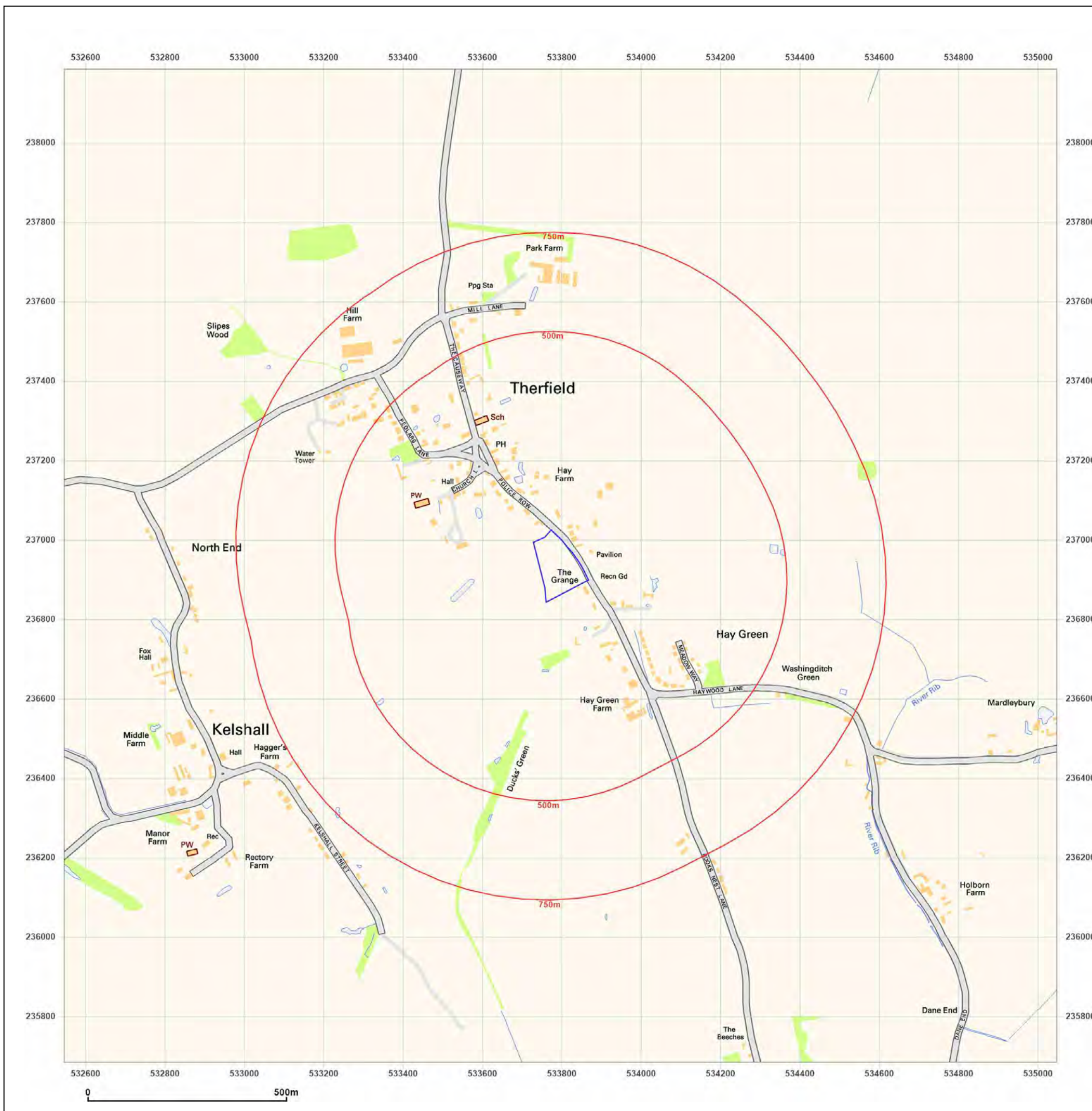


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 11 July 2022

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



LAND TO WEST OF POLICE ROW, THERFIELD, SG8 9QE

Order Details

Date: 11/07/2022

Your ref: 73792

Our Ref: GS-8892957

Site Details

Location: 533790 236943

Area: 1.35 ha

Authority: [North Hertfordshire District Council](#)



Summary of findings

p. 2 **Aerial image**

p. 8

OS MasterMap site plan

p.13 groundsure.com/insightuserguide

Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	<u>Historical industrial land uses</u>	0	0	1	6	-
15	1.2	Historical tanks	0	0	0	0	-
15	1.3	Historical energy features	0	0	0	0	-
15	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	Historical garages	0	0	0	0	-
16	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
17	2.1	<u>Historical industrial land uses</u>	0	0	1	8	-
18	2.2	Historical tanks	0	0	0	0	-
18	2.3	Historical energy features	0	0	0	0	-
18	2.4	Historical petrol stations	0	0	0	0	-
19	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
20	3.1	Active or recent landfill	0	0	0	0	-
20	3.2	Historical landfill (BGS records)	0	0	0	0	-
21	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
21	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
21	3.5	Historical waste sites	0	0	0	0	-
21	3.6	Licensed waste sites	0	0	0	0	-
21	3.7	<u>Waste exemptions</u>	0	0	20	2	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
24	4.1	Recent industrial land uses	0	0	0	-	-
24	4.2	Current or recent petrol stations	0	0	0	0	-
25	4.3	Electricity cables	0	0	0	0	-
25	4.4	Gas pipelines	0	0	0	0	-
25	4.5	Sites determined as Contaminated Land	0	0	0	0	-



25	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
25	4.7	Regulated explosive sites	0	0	0	0	-
26	4.8	Hazardous substance storage/usage	0	0	0	0	-
26	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
26	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
26	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
26	4.12	Radioactive Substance Authorisations	0	0	0	0	-
27	4.13	<u>Licensed Discharges to controlled waters</u>	0	0	0	1	-
27	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
27	4.15	Pollutant release to public sewer	0	0	0	0	-
27	4.16	List 1 Dangerous Substances	0	0	0	0	-
28	4.17	List 2 Dangerous Substances	0	0	0	0	-
28	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	1	0	-
28	4.19	Pollution inventory substances	0	0	0	0	-
28	4.20	Pollution inventory waste transfers	0	0	0	0	-
29	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
30	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
31	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
32	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
33	5.4	<u>Groundwater vulnerability- soluble rock risk</u>	Identified (within 0m)				
33	5.5	Groundwater vulnerability- local information	None (within 0m)				
35	5.6	<u>Groundwater abstractions</u>	0	0	0	0	1
36	5.7	Surface water abstractions	0	0	0	0	0
36	5.8	Potable abstractions	0	0	0	0	0
36	5.9	<u>Source Protection Zones</u>	1	0	0	0	-
37	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
38	6.1	<u>Water Network (OS MasterMap)</u>	0	0	7	-	-



39	6.2	<u>Surface water features</u>	0	0	6	-	-
39	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
40	6.4	<u>WFD Surface water bodies</u>	0	0	0	-	-
40	6.5	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
41	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
41	7.2	Historical Flood Events	0	0	0	-	-
41	7.3	Flood Defences	0	0	0	-	-
42	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
42	7.5	Flood Storage Areas	0	0	0	-	-
43	7.6	Flood Zone 2	None (within 50m)				
43	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
44	8.1	Surface water flooding	Negligible (within 50m)				
Page	Section	Groundwater flooding					
45	9.1	<u>Groundwater flooding</u>	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
46	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
47	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
47	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
47	10.4	Special Protection Areas (SPA)	0	0	0	0	0
47	10.5	National Nature Reserves (NNR)	0	0	0	0	0
48	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
48	10.7	<u>Designated Ancient Woodland</u>	0	0	0	0	1
48	10.8	Biosphere Reserves	0	0	0	0	0
48	10.9	Forest Parks	0	0	0	0	0
49	10.10	Marine Conservation Zones	0	0	0	0	0
49	10.11	Green Belt	0	0	0	0	0
49	10.12	Proposed Ramsar sites	0	0	0	0	0



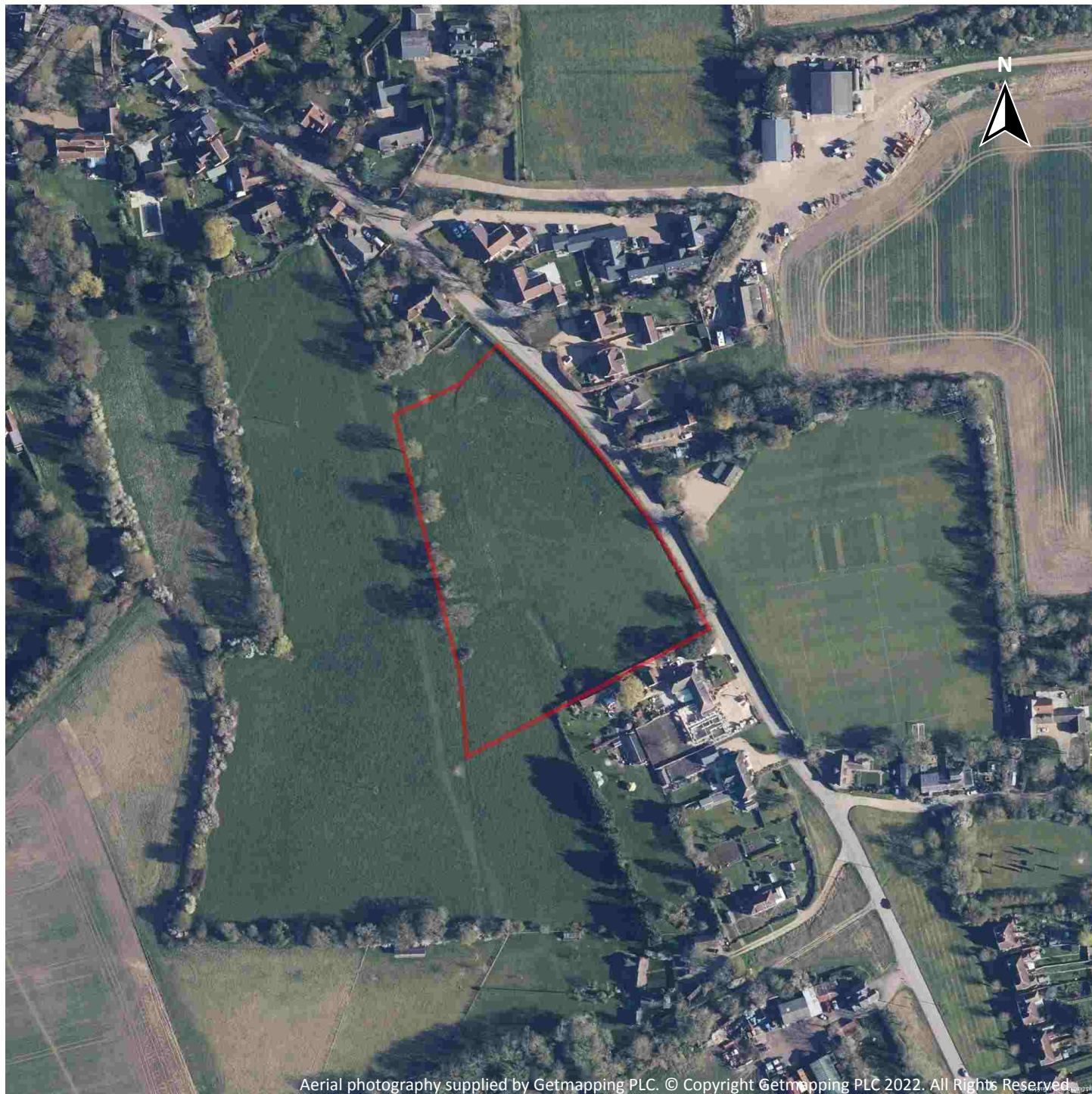
49	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
49	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
50	10.15	Nitrate Sensitive Areas	0	0	0	0	0
50	10.16	<u>Nitrate Vulnerable Zones</u>	2	0	2	1	9
51	10.17	<u>SSSI Impact Risk Zones</u>	1	-	-	-	-
52	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
53	11.1	World Heritage Sites	0	0	0	-	-
54	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
54	11.3	National Parks	0	0	0	-	-
54	11.4	<u>Listed Buildings</u>	0	2	6	-	-
55	11.5	<u>Conservation Areas</u>	1	0	0	-	-
55	11.6	Scheduled Ancient Monuments	0	0	0	-	-
56	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
57	12.1	<u>Agricultural Land Classification</u>	Grade 3 (within 250m)				
58	12.2	<u>Open Access Land</u>	0	1	10	-	-
58	12.3	Tree Felling Licences	0	0	0	-	-
59	12.4	<u>Environmental Stewardship Schemes</u>	0	0	2	-	-
59	12.5	<u>Countryside Stewardship Schemes</u>	0	0	2	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
60	13.1	<u>Priority Habitat Inventory</u>	0	0	4	-	-
61	13.2	Habitat Networks	0	0	0	-	-
61	13.3	Open Mosaic Habitat	0	0	0	-	-
61	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
62	14.1	<u>10k Availability</u>	Identified (within 500m)				
63	14.2	Artificial and made ground (10k)	0	0	0	0	-
64	14.3	Superficial geology (10k)	0	0	0	0	-

64	14.4	Landslip (10k)	0	0	0	0	-
65	14.5	Bedrock geology (10k)	0	0	0	0	-
65	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
66	15.1	<u>50k Availability</u>	Identified (within 500m)				
67	15.2	Artificial and made ground (50k)	0	0	0	0	-
67	15.3	Artificial ground permeability (50k)	0	0	-	-	-
68	15.4	<u>Superficial geology (50k)</u>	1	0	0	1	-
69	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
69	15.6	Landslip (50k)	0	0	0	0	-
69	15.7	Landslip permeability (50k)	None (within 50m)				
70	15.8	<u>Bedrock geology (50k)</u>	1	0	0	0	-
71	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
71	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
72	16.1	<u>BGS Boreholes</u>	0	0	3	-	-
Page	Section	Natural ground subsidence					
74	17.1	<u>Shrink swell clays</u>	Low (within 50m)				
75	17.2	<u>Running sands</u>	Very low (within 50m)				
76	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
77	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
78	17.5	<u>Landslides</u>	Very low (within 50m)				
79	17.6	<u>Ground dissolution of soluble rocks</u>	Very low (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
81	18.1	Natural cavities	0	0	0	0	-
82	18.2	BritPits	0	0	0	0	-
82	18.3	<u>Surface ground workings</u>	0	0	25	-	-
83	18.4	Underground workings	0	0	0	0	0
83	18.5	Historical Mineral Planning Areas	0	0	0	0	-



83	18.6	<u>Non-coal mining</u>	1	0	0	0	0
84	18.7	Mining cavities	0	0	0	0	0
84	18.8	JPB mining areas	None (within 0m)				
84	18.9	Coal mining	None (within 0m)				
84	18.10	Brine areas	None (within 0m)				
85	18.11	Gypsum areas	None (within 0m)				
85	18.12	Tin mining	None (within 0m)				
85	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
86	19.1	<u>Radon</u>	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
87	20.1	<u>BGS Estimated Background Soil Chemistry</u>	3	0	-	-	-
87	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
87	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
88	21.1	Underground railways (London)	0	0	0	-	-
88	21.2	Underground railways (Non-London)	0	0	0	-	-
88	21.3	Railway tunnels	0	0	0	-	-
88	21.4	Historical railway and tunnel features	0	0	0	-	-
88	21.5	Royal Mail tunnels	0	0	0	-	-
89	21.6	Historical railways	0	0	0	-	-
89	21.7	Railways	0	0	0	-	-
89	21.8	Crossrail 1	0	0	0	0	-
89	21.9	Crossrail 2	0	0	0	0	-
89	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 06/04/2021

Site Area: 1.35ha



Recent site history - 2018 aerial photograph



Capture Date: 03/08/2018

Site Area: 1.35ha



Recent site history - 2015 aerial photograph



Capture Date: 03/07/2015

Site Area: 1.35ha



Recent site history - 2009 aerial photograph

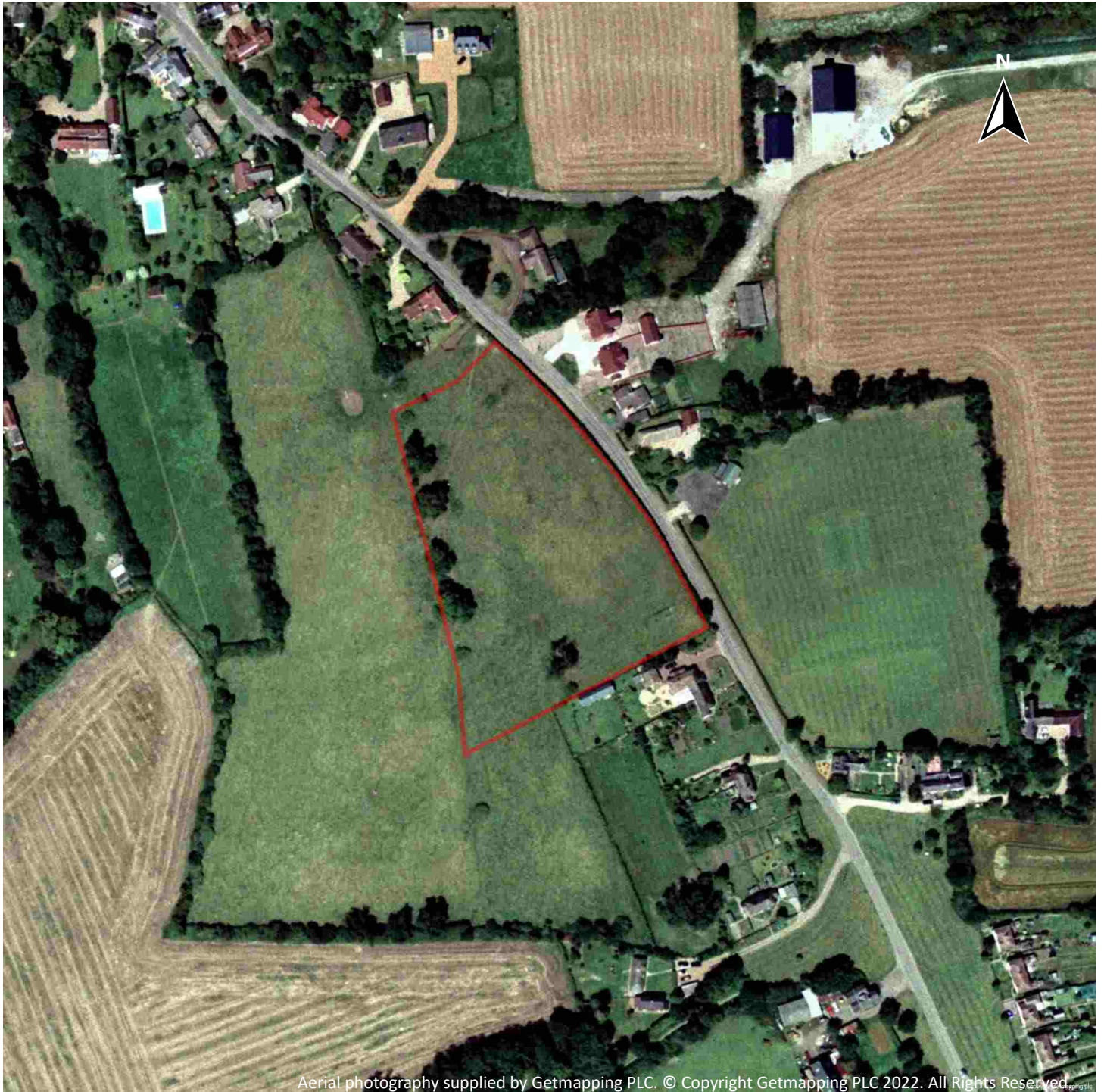


Capture Date: 29/06/2009

Site Area: 1.35ha



Recent site history - 1999 aerial photograph



Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2022. All Rights Reserved.

Capture Date: 18/07/1999

Site Area: 1.35ha



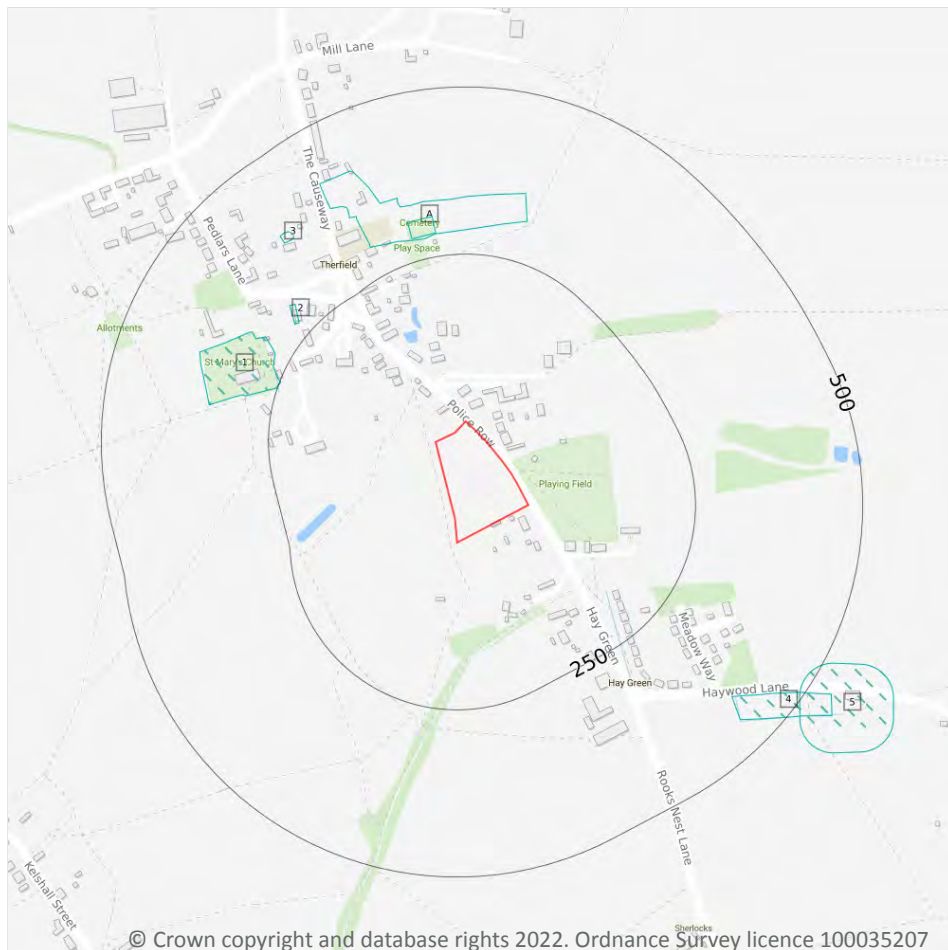
OS MasterMap site plan



Site Area: 1.35ha



1 Past land use



— Site Outline
Search buffers in metres (m)
 Historical industrial land uses

1.1 Historical industrial land uses

Records within 500m

7

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

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
1	248m W	Grave Yard	1877	2050801



ID	Location	Land use	Dates present	Group ID
2	271m NW	Smithy	1896	2059184
A	280m N	Burial Ground	1877	2113540
A	284m N	Burial Ground	1982	2073972
3	371m NW	Refuse Heap	1877	2063170
4	418m SE	Unspecified Yards	1896 - 1947	2066079
5	488m SE	Unspecified Yard	1877	2062049

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

0

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

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m

0

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

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m

0

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



This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m

0

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

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

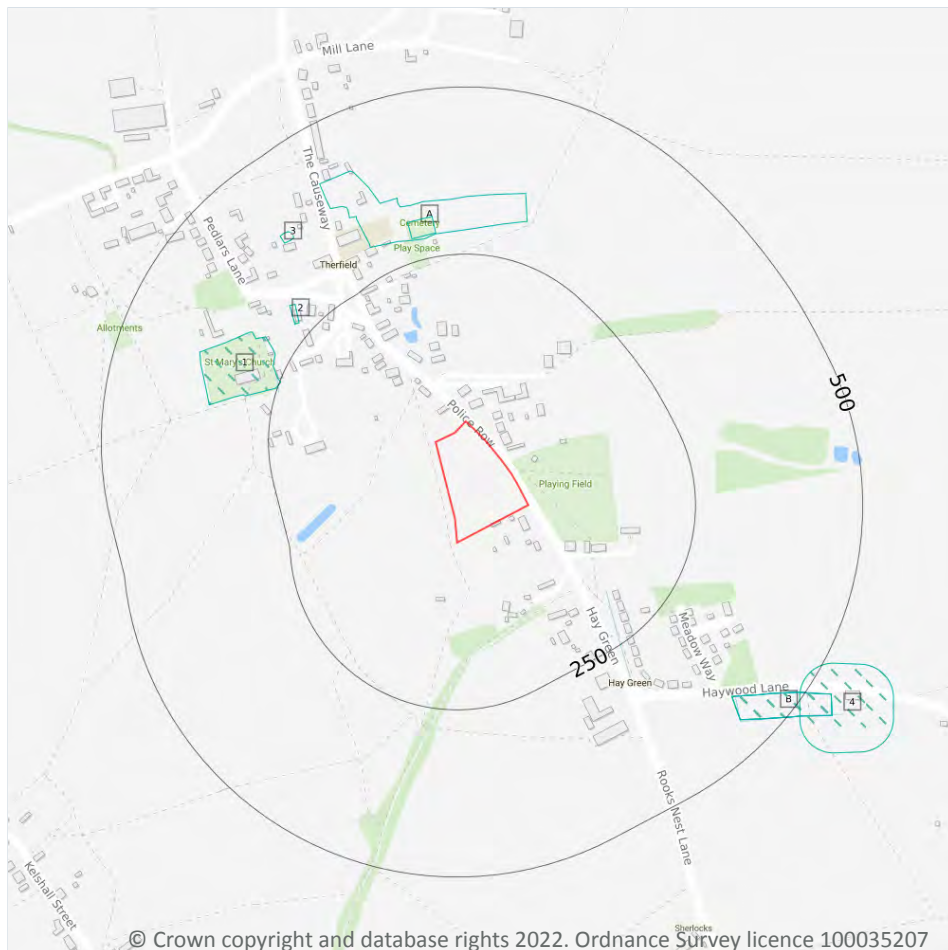
0

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

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



2 Past land use - un-grouped



— Site Outline
Search buffers in metres (m)
 Historical industrial land uses

2.1 Historical industrial land uses

Records within 500m

9

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

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

ID	Location	Land Use	Date	Group ID
1	248m W	Grave Yard	1877	2050801
2	271m NW	Smithy	1896	2059184
A	280m N	Burial Ground	1877	2113540

ID	Location	Land Use	Date	Group ID
A	284m N	Burial Ground	1982	2073972
3	371m NW	Refuse Heap	1877	2063170
B	418m SE	Unspecified Yards	1896	2066079
B	418m SE	Unspecified Yards	1947	2066079
B	418m SE	Unspecified Yards	1922	2066079
4	488m SE	Unspecified Yard	1877	2062049

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	0
----------------------------	----------

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

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	0
----------------------------	----------

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

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0
----------------------------	----------

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

This data is sourced from Ordnance Survey / Groundsure.



2.5 Historical garages

Records within 500m

0

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

This data is sourced from Ordnance Survey / Groundsure.



3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- Waste exemptions

3.1 Active or recent landfill

Records within 500m

0

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

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

3.2 Historical landfill (BGS records)

Records within 500m

0

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

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m**0**

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

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

3.4 Historical landfill (EA/NRW records)

Records within 500m**0**

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

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

3.5 Historical waste sites

Records within 500m**0**

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

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

3.6 Licensed waste sites

Records within 500m**0**

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

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

3.7 Waste exemptions

Records within 500m**22**

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

Features are displayed on the Waste and landfill map on **page 20**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	103m N	Hay Farm Police Row ROYSTON Hertfordshire SG8 9QE	EPR/VF0103M Q/A001	Using waste exemption	Both agricultural and non-agricultural waste	Spreading of plant matter to confer benefit
A	132m N	Hay Farm Police Row ROYSTON Hertfordshire SG8 9QE	EPR/CF0333LH /A001	Storing waste exemption	Agricultural Waste Only	Storage of waste in a secure place
A	132m N	Hay Farm Police Row ROYSTON Hertfordshire SG8 9QE	EPR/CF0333LH /A001	Using waste exemption	Agricultural Waste Only	Spreading waste on agricultural land to confer benefit
A	132m N	Hay Farm Police Row ROYSTON Hertfordshire SG8 9QE	EPR/CF0333LH /A001	Using waste exemption	Agricultural Waste Only	Incorporation of ash into soil
A	132m N	Hay Farm Police Row ROYSTON Hertfordshire SG8 9QE	EPR/CF0333LH /A001	Disposing of waste exemption	Agricultural Waste Only	Deposit of waste from dredging of inland waters
A	132m N	Hay Farm Police Row ROYSTON Hertfordshire SG8 9QE	EPR/CF0333LH /A001	Disposing of waste exemption	Agricultural Waste Only	Burning waste in the open
A	132m N	Hay Farm Police Row ROYSTON Hertfordshire SG8 9QE	EPR/CF0333LH /A001	Storing waste exemption	Agricultural Waste Only	Storage of waste in secure containers
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX214044	Disposing of waste exemption	On a Farm	Burning waste in the open
A	133m N	-	WEX261040	Disposing of waste exemption	On a farm	Burning waste in the open
A	133m N	-	WEX261040	Disposing of waste exemption	On a farm	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
A	133m N	-	WEX261040	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX132727	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX132727	Disposing of waste exemption	On a farm	Burning waste in the open

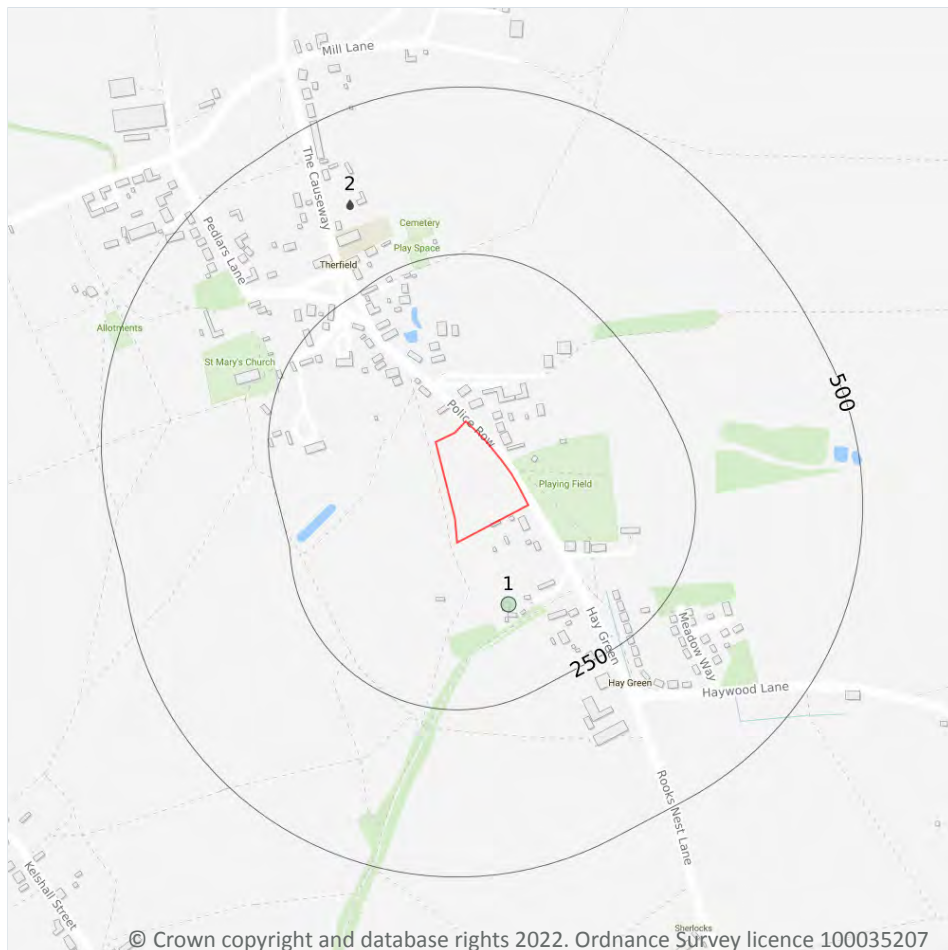


ID	Location	Site	Reference	Category	Sub-Category	Description
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX132727	Using waste exemption	On a farm	Use of waste in construction
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX120145	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX120145	Disposing of waste exemption	On a farm	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX120145	Disposing of waste exemption	On a farm	Burning waste in the open
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX042272	Disposing of waste exemption	On a farm	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
A	133m N	HAY FARM, POLICE ROW, THERFIELD, ROYSTON, SG8 9QE	WEX042272	Disposing of waste exemption	On a farm	Burning waste in the open
1	246m SE	HAY GREEN FARMS, HAY GREEN, THERFIELD, ROYSTON, SG8 9QN	WEX174472	Disposing of waste exemption	On a farm	Burning waste in the open
B	320m SE	HAY GREEN FARM, HAY GREEN, THERFIELD, ROYSTON, SG8 9QN	WEX015070	Disposing of waste exemption	On a farm	Burning waste in the open
B	324m SE	Hay Green Farm Hay Green ROYSTON Hertfordshire SG8 9QN	EPR/KE5159JU /A001	Disposing of waste exemption	Both agricultural and non-agricultural waste	Burning waste in the open

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



4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Licensed Discharges to controlled waters
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m

0

Current potentially contaminative industrial sites.

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m

0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m**0**

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m**0**

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m**0**

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

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m**0**

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

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m**0**

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

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m**0**

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

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m**0**

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

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

4.10 Licensed industrial activities (Part A(1))

Records within 500m**0**

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

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

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

Records within 500m**0**

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

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m**0**

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

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

4.13 Licensed Discharges to controlled waters

Records within 500m

1

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

Features are displayed on the Current industrial land use map on **page 24**

ID	Location	Address	Details	
2	367m NW	HOUSE, THE CAUSEWAY, THERFIELD, ROY, HOUSE THE CAUSEWAY THERFIELD, ROYSTON HERTS	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: CLCU.0169 Permit Version: 1 Receiving Water: -	Status: LAPSED UNDER SCHEDULE 23 ENVIRONMENT ACT 1995 Issue date: 11/10/1968 Effective Date: 11/10/1968 Revocation Date: 01/10/1996

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

4.14 Pollutant release to surface waters (Red List)

Records within 500m

0

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

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

4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

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

4.16 List 1 Dangerous Substances

Records within 500m

0

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

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



4.17 List 2 Dangerous Substances

Records within 500m

0

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

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

4.18 Pollution Incidents (EA/NRW)

Records within 500m

1

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

Features are displayed on the Current industrial land use map on **page 24**

ID	Location	Details	
1	117m SE	Incident Date: 13/02/2002 Incident Identification: 58029 Pollutant: Sewage Materials Pollutant Description: Final Effluent	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

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

4.19 Pollution inventory substances

Records within 500m

0

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

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

4.20 Pollution inventory waste transfers

Records within 500m

0

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

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



4.21 Pollution inventory radioactive waste

Records within 500m

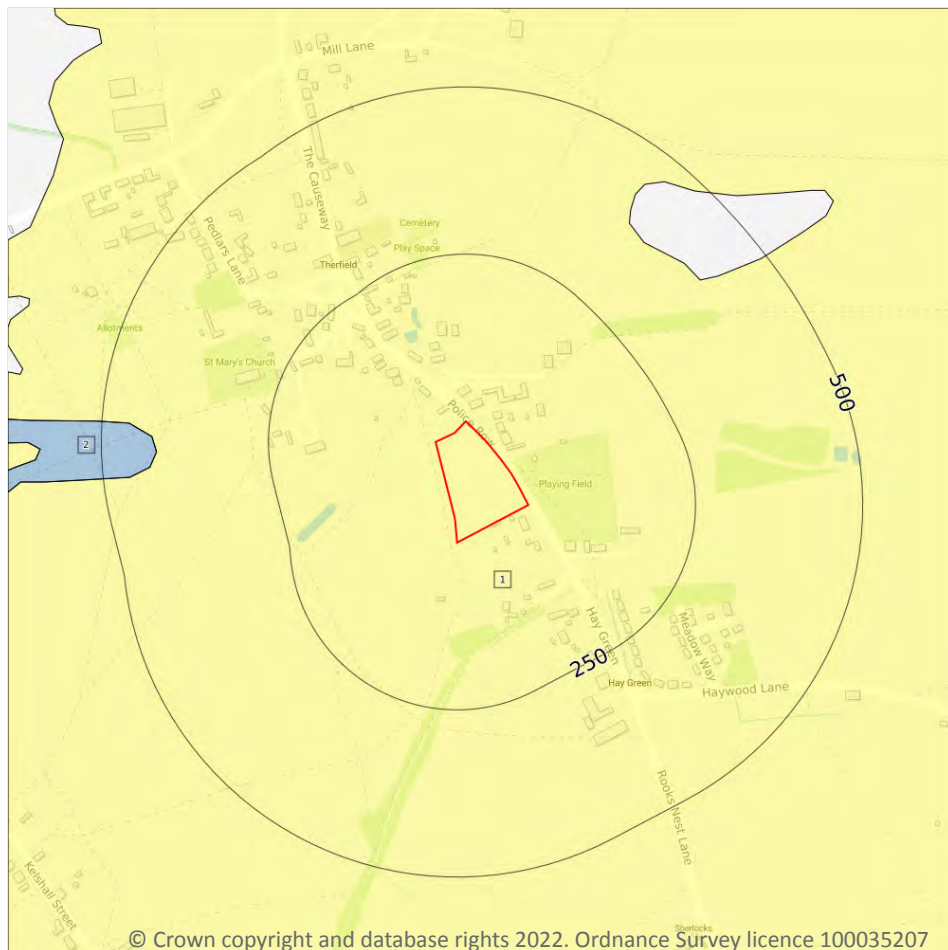
0

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

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



5 Hydrogeology - Superficial aquifer



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive
 - Unknown

5.1 Superficial aquifer

Records within 500m

2

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 30**

ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	418m W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

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



Bedrock aquifer



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

1

Aquifer status of groundwater held within bedrock geology.

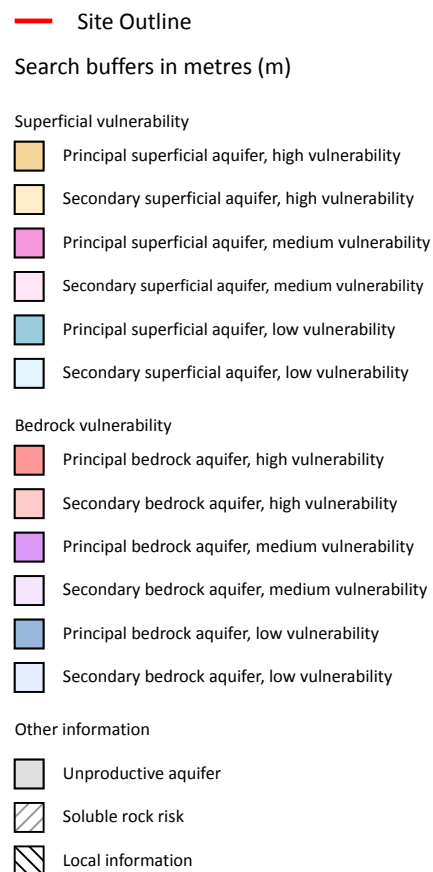
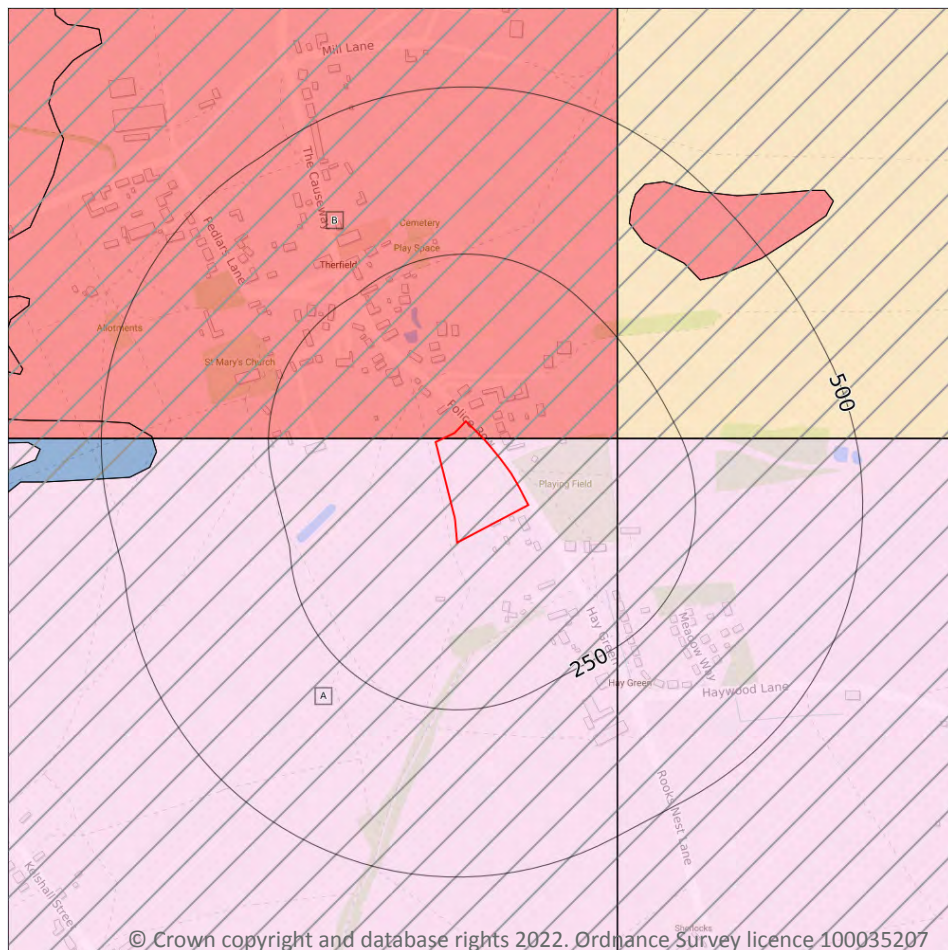
Features are displayed on the Bedrock aquifer map on **page 31**

ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

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



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

2

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

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

Features are displayed on the Groundwater vulnerability map on **page 32**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
A	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures
B	On site	Summary Classification: Principal bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: 3-10m Patchiness value: <90% Recharge potential: No Data	Vulnerability: High Aquifer type: Principal Flow mechanism: Well connected fractures

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

5.4 Groundwater vulnerability- soluble rock risk

Records on site	2
------------------------	----------

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

ID	Maximum soluble risk category	Percentage of grid square covered by maximum risk
A	Very significant soluble rocks are likely to be present with a moderate possibility of localised natural subsidence or dissolution-related degradation of bedrock, especially in adverse conditions such as concentrated surface or subsurface water flow.	2.0%
B	Very significant soluble rocks are likely to be present with a moderate possibility of localised natural subsidence or dissolution-related degradation of bedrock, especially in adverse conditions such as concentrated surface or subsurface water flow.	1.0%

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

5.5 Groundwater vulnerability- local information

Records on site	0
------------------------	----------

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



email on enquiries@environment-agency.gov.uk.

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



Abstractions and Source Protection Zones



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

5.6 Groundwater abstractions

Records within 2000m

1

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

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

ID	Location	Details	
-	1957m N	Status: Historical Licence No: 6/33/30/*G/0173 Details: Transfer Between Sources (Pre Water Act 2003) Direct Source: GROUND WATER SOURCE OF SUPPLY Point: WORK NO.46,BORE AT THERFIELD Data Type: Point Name: ENVIRONMENT AGENCY Easting: 533670 Northing: 238980	Annual Volume (m ³): 3,000,000 Max Daily Volume (m ³): 11000 Original Application No: - Original Start Date: 25/07/1977 Expiry Date: 31/03/2015 Issue No: 101 Version Start Date: 17/05/2007 Version End Date: -

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

5.7 Surface water abstractions

Records within 2000m	0
-----------------------------	----------

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

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

5.8 Potable abstractions

Records within 2000m	0
-----------------------------	----------

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

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

5.9 Source Protection Zones

Records within 500m	1
----------------------------	----------

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination. Features are displayed on the Abstractions and Source Protection Zones map on **page 35**

ID	Location	Type	Description
1	On site	3	Total catchment

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

5.10 Source Protection Zones (confined aquifer)

Records within 500m

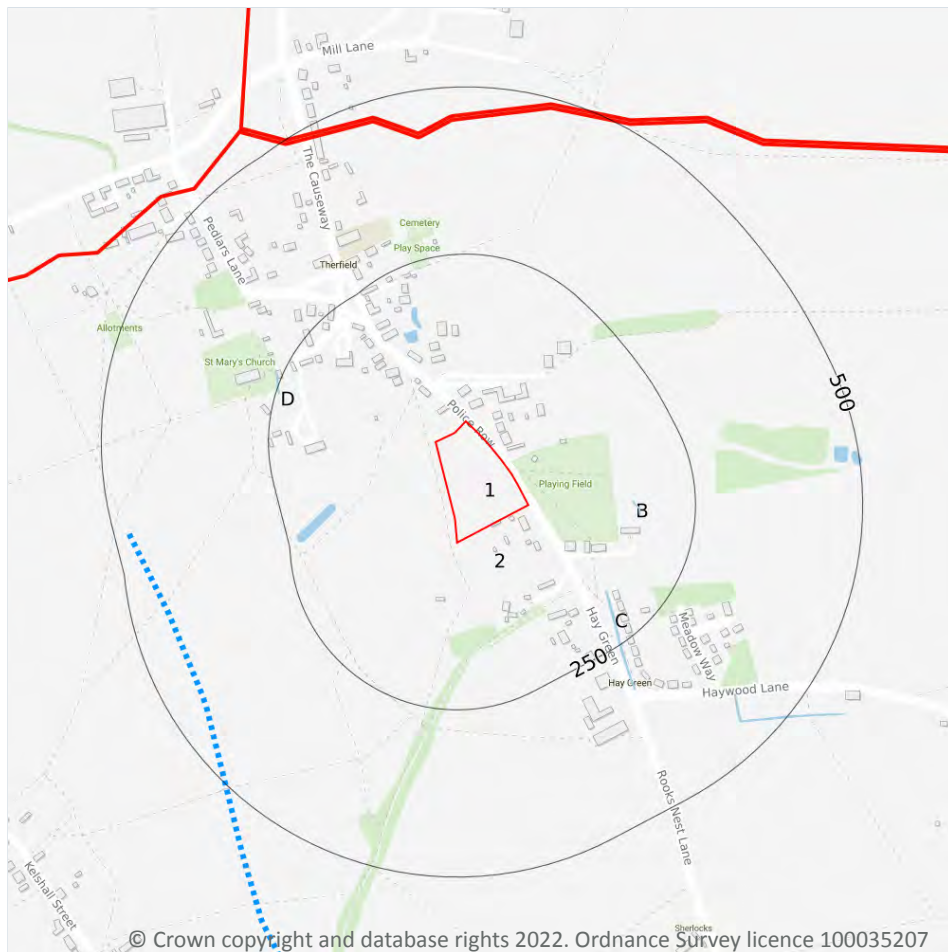
0

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

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



6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

7

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

Features are displayed on the Hydrology map on **page 38**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	156m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
B	160m E	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	172m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	234m SE	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
C	236m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	245m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	248m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

6

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

Features are displayed on the Hydrology map on **page 38**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site

1

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

Features are displayed on the Hydrology map on **page 38**



ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	On site	River	Rib (upper stretches, above confluence with the Quin)	GB106038040140	Lee Upper	Lee Upper

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

6.4 WFD Surface water bodies

Records identified	1
---------------------------	----------

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

Features are displayed on the Hydrology map on **page 38**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
5	439m W	River	Rib (upper stretches, above confluence with the Quin)	GB106038040140	Moderate	Fail	Moderate	2019

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

6.5 WFD Groundwater bodies

Records on site	1
------------------------	----------

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

Features are displayed on the Hydrology map on **page 38**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	On site	Cam and Ely Ouse Chalk	GB40501G400500	Poor	Poor	Poor	2019

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



7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m**0**

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

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

7.2 Historical Flood Events

Records within 250m**0**

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

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

7.3 Flood Defences

Records within 250m**0**

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

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



7.4 Areas Benefiting from Flood Defences

Records within 250m

0

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

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

7.5 Flood Storage Areas

Records within 250m

0

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

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



River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0
--------------------	---

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

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

7.7 Flood Zone 3

Records within 50m	0
--------------------	---

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

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

8 Surface water flooding

8.1 Surface water flooding

Highest risk on site

Negligible

Highest risk within 50m

Negligible

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

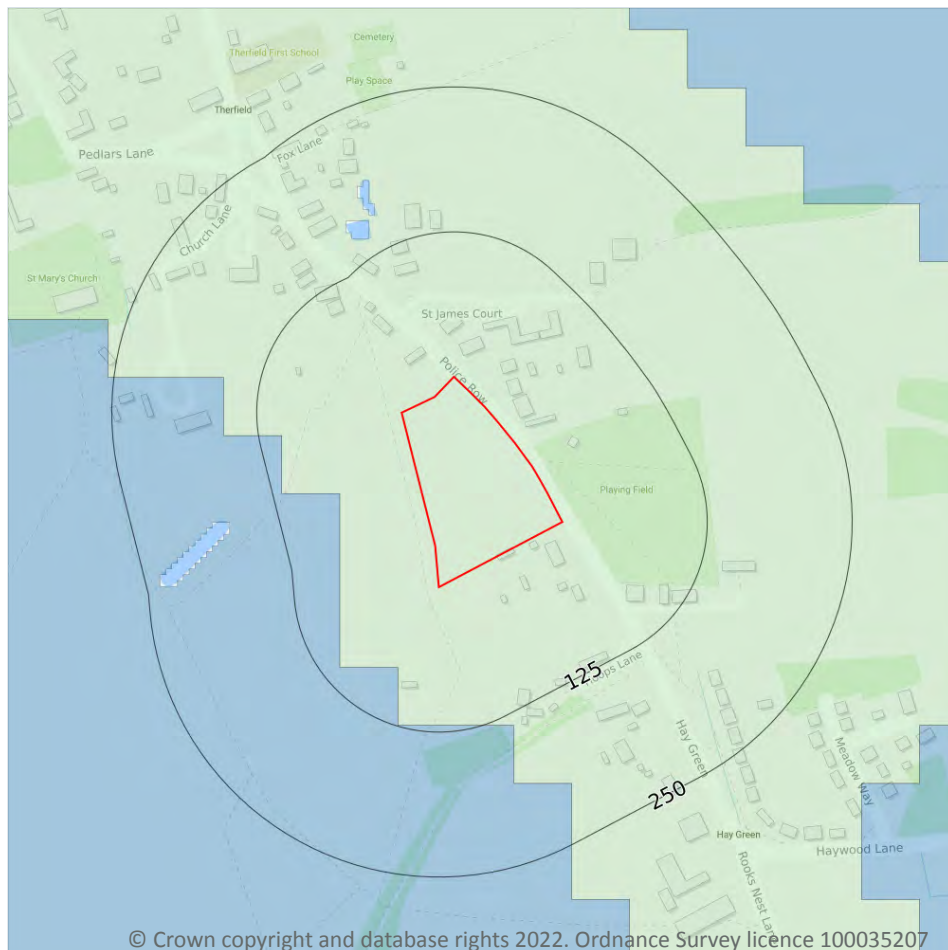
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site. The table below shows the maximum flood depths for a range of return periods for the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

Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.



9 Groundwater flooding



— Site Outline
Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

Highest risk on site

Low

Highest risk within 50m

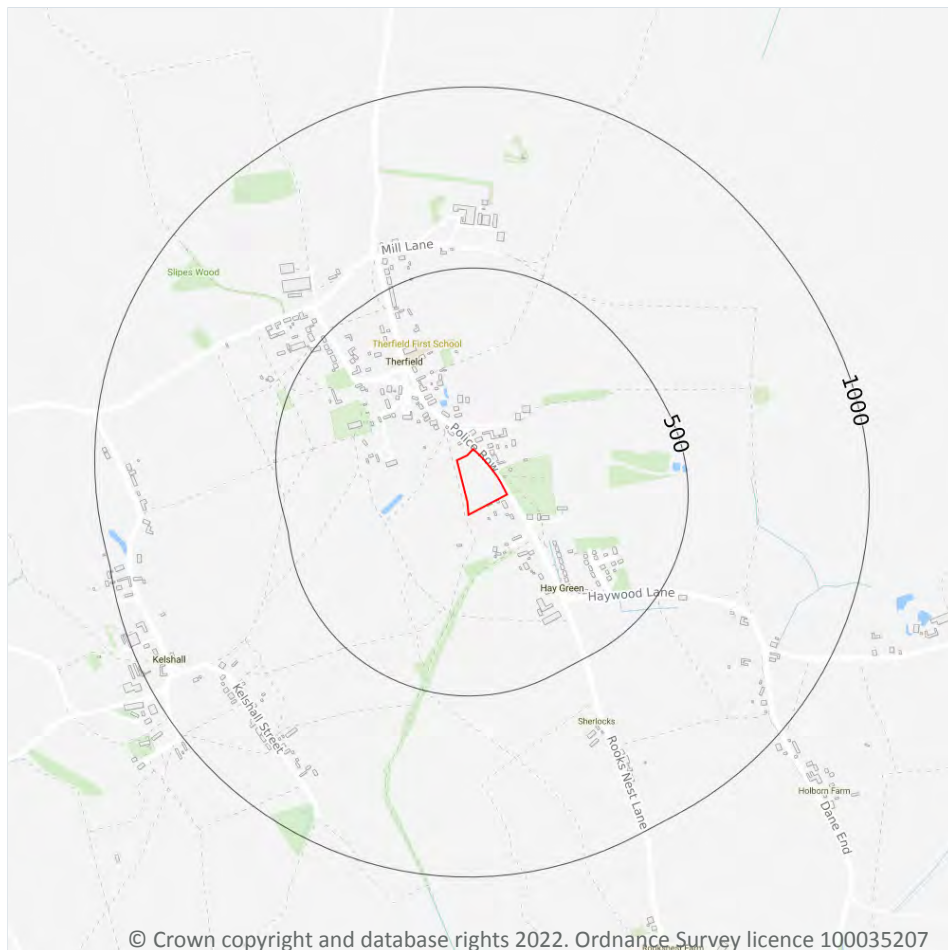
Low

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

Features are displayed on the Groundwater flooding map on **page 45**

This data is sourced from Ambiantal Risk Analytics.

10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

0

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

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

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m**0**

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

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

10.3 Special Areas of Conservation (SAC)

Records within 2000m**0**

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

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

10.4 Special Protection Areas (SPA)

Records within 2000m**0**

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

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

10.5 National Nature Reserves (NNR)

Records within 2000m**0**

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

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

10.6 Local Nature Reserves (LNR)

Records within 2000m**0**

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

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

10.7 Designated Ancient Woodland

Records within 2000m**1**

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

Features are displayed on the Environmental designations map on **page 46**

ID	Location	Name	Woodland Type
-	1552m S	Lords Wood	Ancient & Semi-Natural Woodland

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

10.8 Biosphere Reserves

Records within 2000m**0**

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

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

10.9 Forest Parks

Records within 2000m**0**

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

This data is sourced from the Forestry Commission.



10.10 Marine Conservation Zones

Records within 2000m**0**

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

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

10.11 Green Belt

Records within 2000m**0**

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

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

10.12 Proposed Ramsar sites

Records within 2000m**0**

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

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m**0**

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

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

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m**0**

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

This data is sourced from Natural England.



10.15 Nitrate Sensitive Areas

Records within 2000m

0

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

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

14

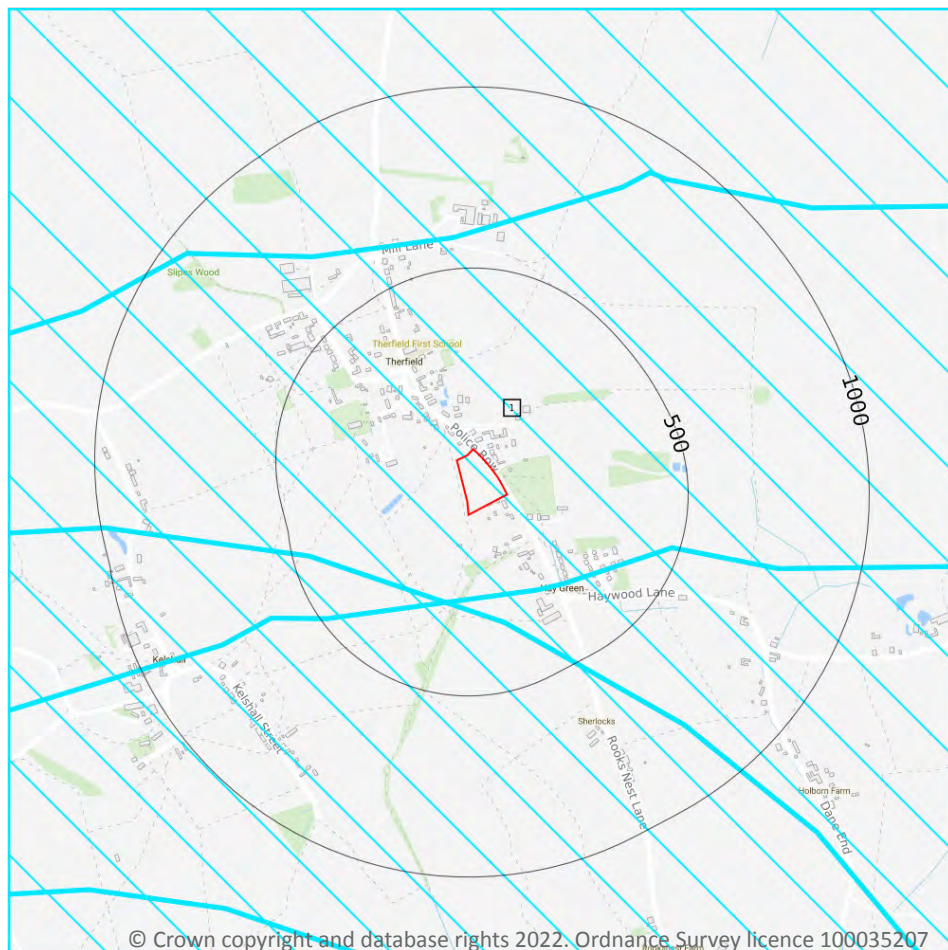
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	LEE NVZ	Surface Water	443	Existing
On site	Anglian Chalk	Groundwater	71	Existing
225m E	LEE NVZ	Surface Water	443	Existing
225m NE	Anglian Chalk	Groundwater	71	Existing
367m NW	Ely Ouse and Cut-off channel NVZ	Surface Water	390	Existing
519m W	Great Ouse NVZ	Surface Water	391	Existing
520m NE	Ely Ouse and Cut-off channel NVZ	Surface Water	390	Existing
862m SW	Anglian Chalk	Groundwater	71	Existing
862m SW	LEE NVZ	Surface Water	443	Existing
924m SE	Anglian Chalk	Groundwater	71	Existing
924m SE	LEE NVZ	Surface Water	443	Existing
1312m SW	LEE NVZ	Surface Water	443	Existing
1330m SW	Great Ouse NVZ	Surface Water	391	Existing
1679m SW	Great Ouse NVZ	Surface Water	391	Existing

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



SSSI Impact Zones and Units



- Site Outline
- Search buffers in metres (m)
- SSSI Impact Risk Zones
- SSSI Units
- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site

1

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

Features are displayed on the SSSI Impact Zones and Units map on **page 51**

ID	Location	Type of developments requiring consultation
1	On site	Infrastructure - Airports, helipads and other aviation proposals. Residential - Residential development of 25 units or more. Rural residential - Any residential development of 25 or more houses outside existing settlements/urban areas. Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 750m², manure stores > 3500t.

This data is sourced from Natural England.

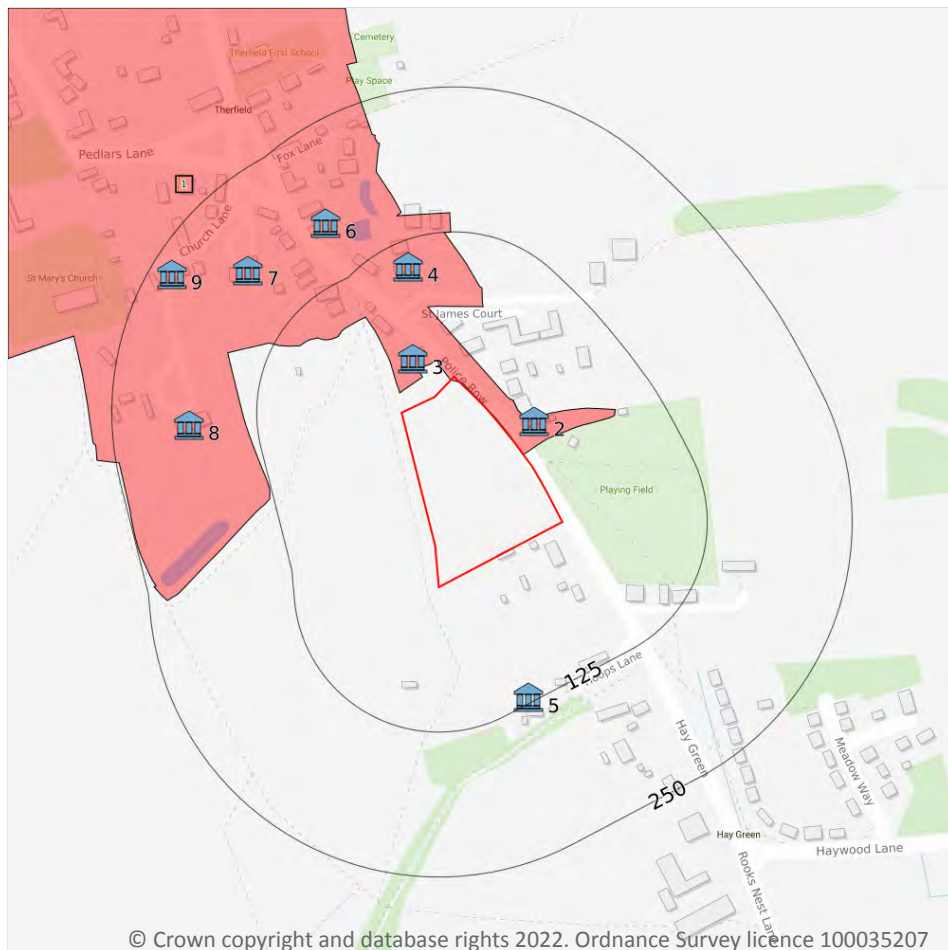
10.18 SSSI Units

Records within 2000m	0
-----------------------------	----------

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

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

11 Visual and cultural designations



- Site Outline
- Search buffers in metres (m)
- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m

0

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

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

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

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

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

11.3 National Parks

Records within 250m

0

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

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

11.4 Listed Buildings

Records within 250m

8

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

Features are displayed on the Visual and cultural designations map on **page 53**

ID	Location	Name	Grade	Reference Number	Listed date
2	25m NE	The Thatch, Therfield, North Hertfordshire, Hertfordshire, SG8	II	1307724	29/01/1986
3	36m NW	The Grange, Therfield, North Hertfordshire, Hertfordshire, SG8	II	1102620	29/01/1986
4	103m NW	Barn About 60 Metres South East of Hay Farm House, Therfield, North Hertfordshire, Hertfordshire, SG8	II	1347389	29/01/1986
5	120m SE	Smith End, Therfield, North Hertfordshire, Hertfordshire, SG8	II	1176785	29/01/1986

ID	Location	Name	Grade	Reference Number	Listed date
6	173m NW	Hay Farm House, Therfield, North Hertfordshire, Hertfordshire, SG8	II	1176814	27/05/1968
7	180m NW	The Limes, Therfield, North Hertfordshire, Hertfordshire, SG8	II	1102614	09/06/1952
8	184m W	The Old Rectory, Therfield, North Hertfordshire, Hertfordshire, SG8	II*	1102613	09/06/1952
9	232m NW	Church Gate, Therfield, North Hertfordshire, Hertfordshire, SG8	II	1307753	27/05/1968

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

11.5 Conservation Areas

Records within 250m

1

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

Features are displayed on the Visual and cultural designations map on **page 53**

ID	Location	Name	District	Date of designation
1	On site	Therfield	North Hertfordshire	06/10/1969

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

11.6 Scheduled Ancient Monuments

Records within 250m

0

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

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



11.7 Registered Parks and Gardens

Records within 250m

0

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

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



- (57)

12.2 Open Access Land

Records within 250m

11

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

Features are displayed on the Agricultural designations map on **page 57**

ID	Location	Name	Classification	Other relevant legislation
2	32m SE	Therfield Heath and Greens	Section 15 Land	POCA 1888
A	57m SE	Hay Green	Section 4 Conclusive Registered Common Land	-
B	90m SE	Hay Green	Section 4 Conclusive Registered Common Land	-
B	101m SE	Therfield Heath and Greens	Section 15 Land	POCA 1888
A	119m SE	Therfield Heath and Greens	Section 15 Land	POCA 1888
3	147m SE	Hay Green	Section 4 Conclusive Registered Common Land	-
C	159m S	Therfield Heath and Greens	Section 15 Land	POCA 1888
C	168m S	Ducks Green	Section 4 Conclusive Registered Common Land	-
4	207m NW	Therfield Heath and Greens	Section 15 Land	POCA 1888
5	227m NW	Therfield Heath and Greens	Section 15 Land	POCA 1888
6	242m NW	Therfield Heath and Greens	Section 15 Land	POCA 1888

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

12.3 Tree Felling Licences

Records within 250m

0

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

This data is sourced from the Forestry Commission.



12.4 Environmental Stewardship Schemes

Records within 250m

2

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

Location	Reference	Scheme	Start Date	End date
142m S	AG00507431	Entry Level Stewardship	01/10/2013	30/09/2018
154m S	AG00507431	Entry Level Stewardship	01/10/2013	30/09/2018

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m

2

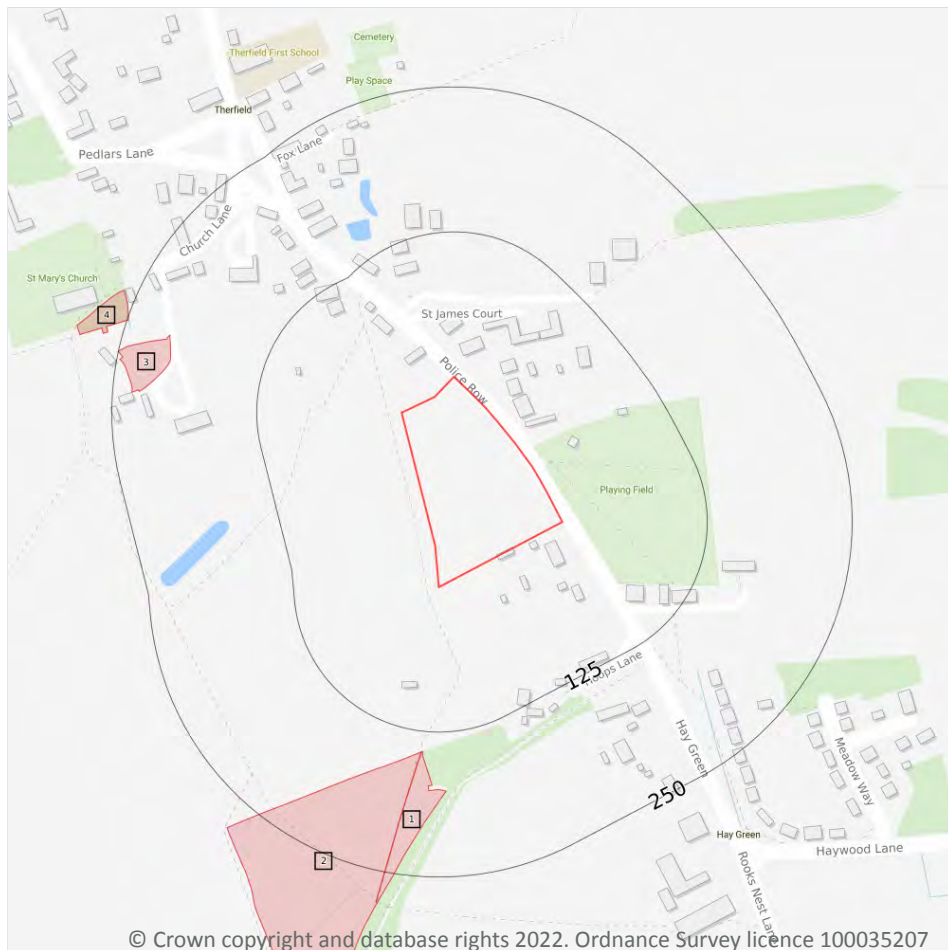
Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

Location	Reference	Scheme	Start Date	End Date
75m E	497554	Countryside Stewardship (Middle Tier)	01/01/2017	31/12/2021
207m S	807024	Countryside Stewardship (Middle Tier)	01/01/2020	31/12/2024

This data is sourced from Natural England.



13 Habitat designations



- Site Outline
- Search buffers in metres (m)
- Priority Habitat Inventory
- Open Mosaic Habitat
- Limestone Pavement Orders
- Habitat Networks
- Primary Habitat
- Restorable Habitat
- Associated Habitats
- Habitat Restoration-Creation
- Network Enhancement Zone 1
- Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m

4

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

Features are displayed on the Habitat designations map on **page 60**

ID	Location	Main Habitat	Other habitats
1	142m S	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
2	143m S	Good quality semi-improved grassland	Main habitat: GQSIG (INV > 50%)
3	205m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	249m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)



This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

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

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

0

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

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m

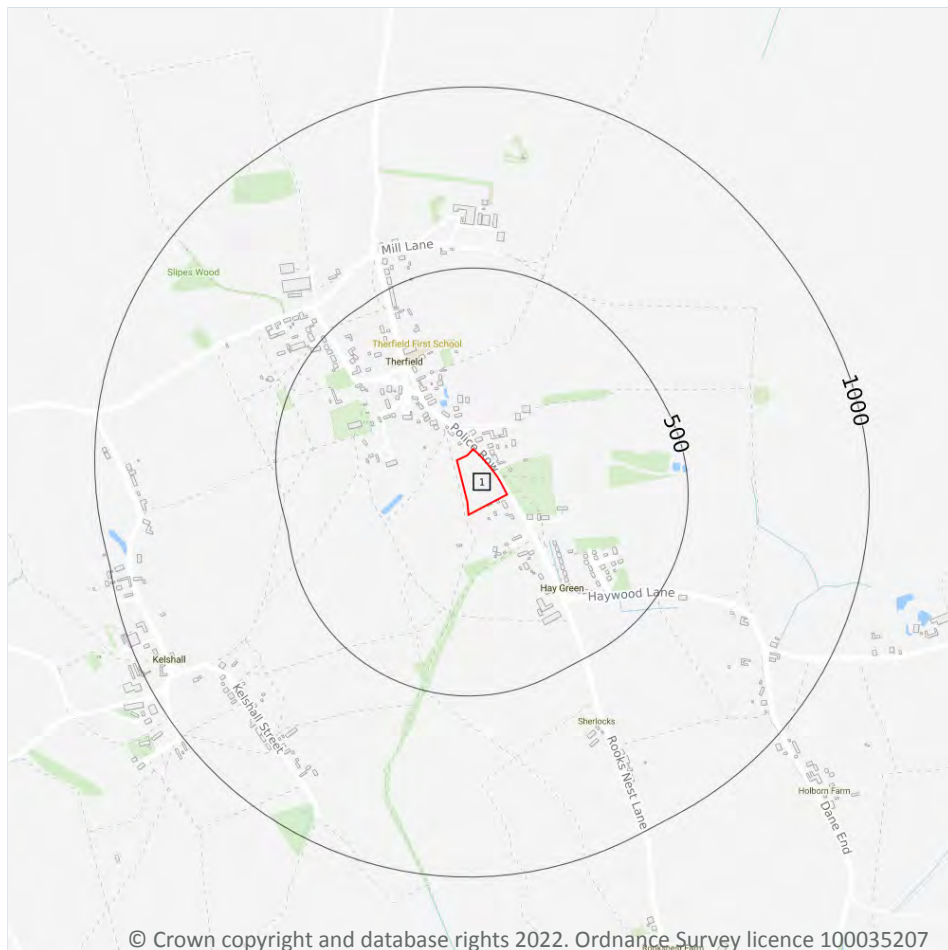
0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.



14 Geology 1:10,000 scale - Availability



- Site Outline
- Search buffers in metres (m)
- Full coverage
 - Partial coverage
 - No coverage

© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

14.1 10k Availability

Records within 500m

1

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

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 62**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	No coverage	No coverage	No coverage	NoCov

This data is sourced from the British Geological Survey.



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

14.2 Artificial and made ground (10k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial

14.3 Superficial geology (10k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock

14.5 Bedrock geology (10k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



— Site Outline

Search buffers in metres (m)

□ Geological map tile

15.1 50k Availability

Records within 500m

1

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

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 66**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	EW221_hitchin_v4

This data is sourced from the British Geological Survey.



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

15.2 Artificial and made ground (50k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

0

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

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Superficial



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

15.4 Superficial geology (50k)

Records within 500m

2

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

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 68**

ID	Location	LEX Code	Description	Rock description
1	On site	LOFT-DMTN	LOWESTOFT FORMATION	DIAMICTON
2	418m W	CWF-XCZSV	CLAY-WITH-FLINTS FORMATION	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m**1**

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

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	Moderate	Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m**0**

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

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

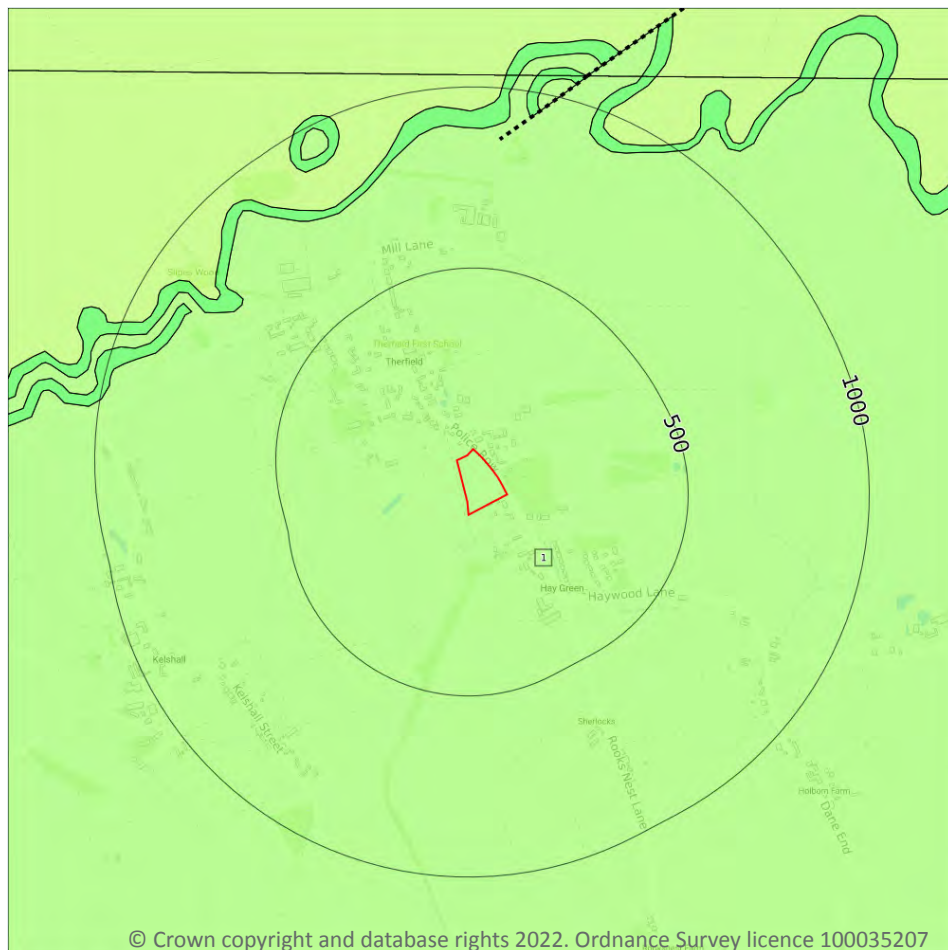
Records within 50m**0**

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

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Bedrock



— Site Outline

Search buffers in metres (m)

.... Bedrock faults and other linear features (50k)

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

15.8 Bedrock geology (50k)

Records within 500m

1

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

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 70**

ID	Location	LEX Code	Description	Rock age
1	On site	LESE-CHLK	LEWES NODULAR CHALK FORMATION AND SEAFORD CHALK FORMATION (UNDIFFERENTIATED) - CHALK	TURONIAN

This data is sourced from the British Geological Survey.



15.9 Bedrock permeability (50k)

Records within 50m

1

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

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Very High	Very High

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m

0

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

This data is sourced from the British Geological Survey.



16 Boreholes



— Site Outline
Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

16.1 BGS Boreholes

Records within 250m

3

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

Features are displayed on the Boreholes map on **page 72**

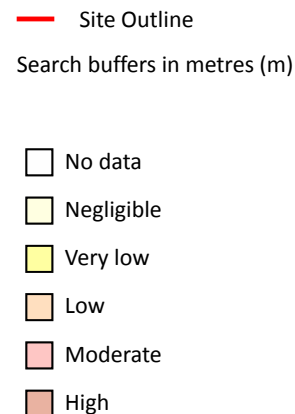
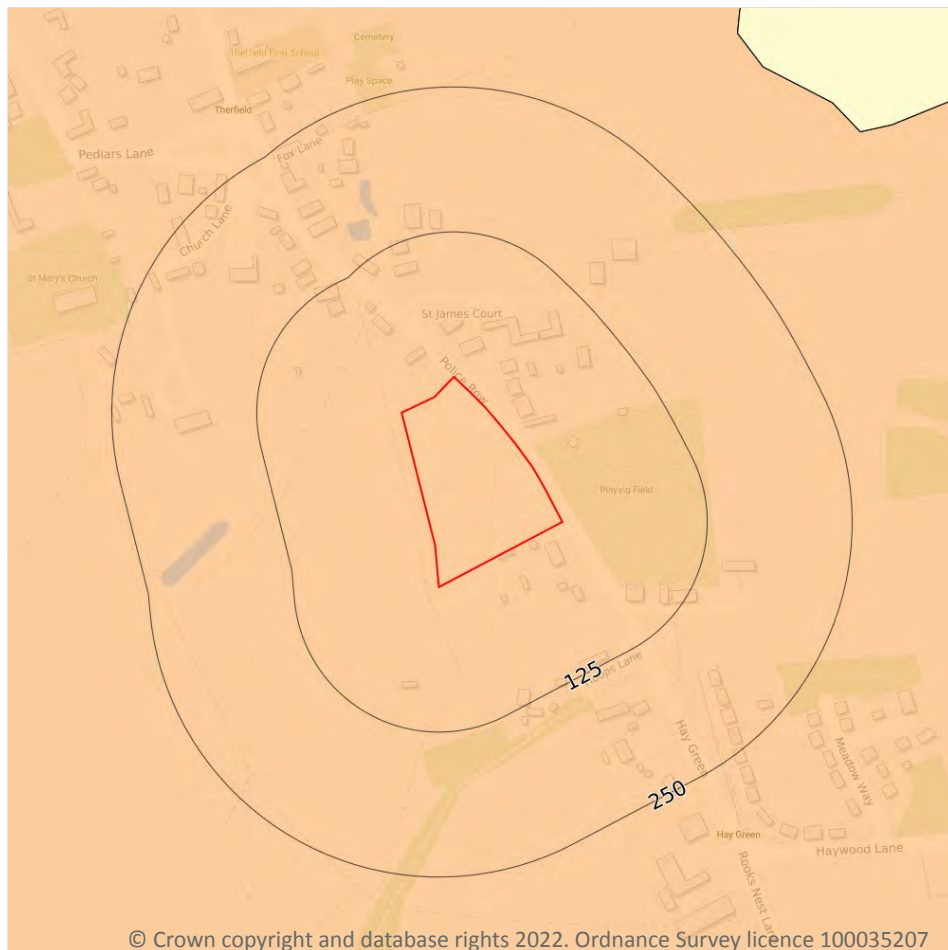
ID	Location	Grid reference	Name	Length	Confidential	Web link
1	113m NE	533870 237090	THERFIELD OBH	125.5	N	538573
2	180m W	533550 236970	THE RECTORY, THERFIELD	84.12	N	538558
3	234m NW	533600 237190	PUBLIC WELL, THERFIELD	-2.0	N	538559



This data is sourced from the British Geological Survey.



17 Natural ground subsidence - Shrink swell clays



17.1 Shrink swell clays

Records within 50m

1

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

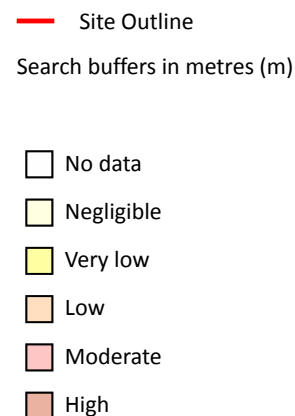
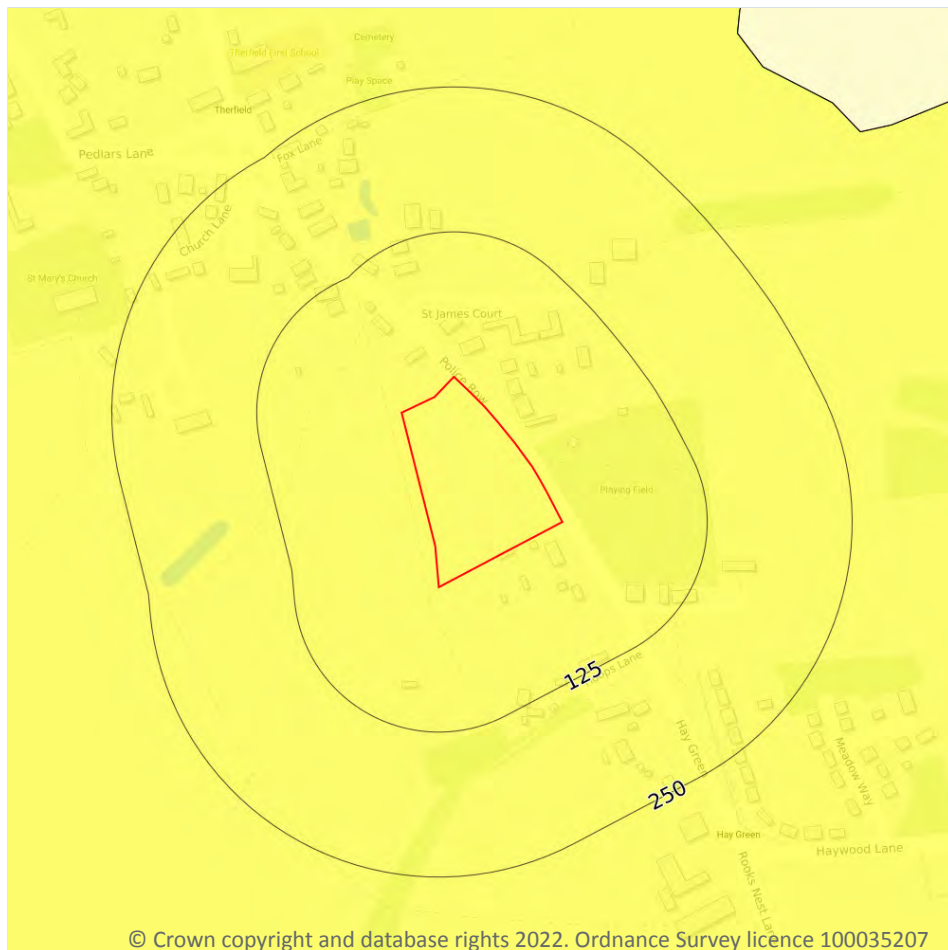
Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 74**

Location	Hazard rating	Details
On site	Low	Ground conditions predominantly medium plasticity.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Running sands



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

17.2 Running sands

Records within 50m

1

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

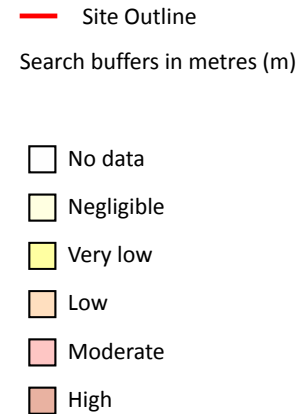
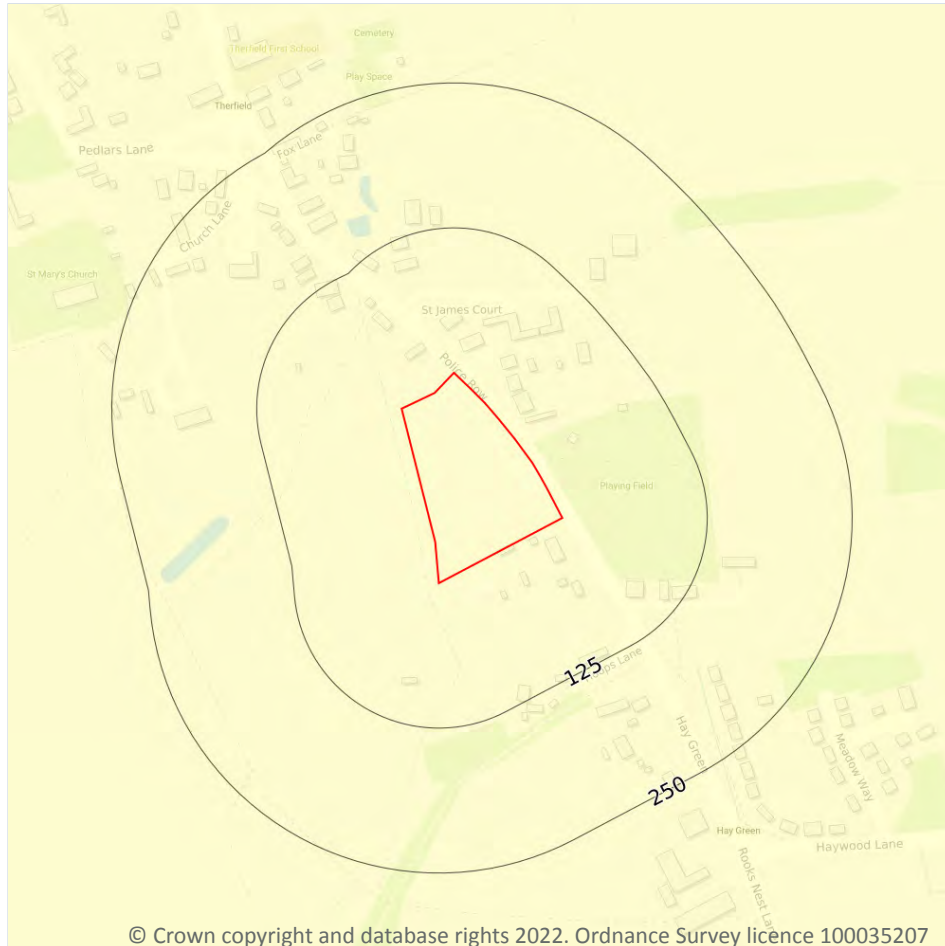
Features are displayed on the Natural ground subsidence - Running sands map on **page 75**

Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m

1

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

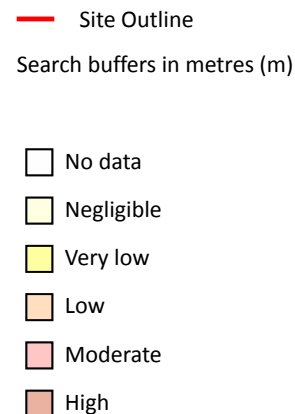
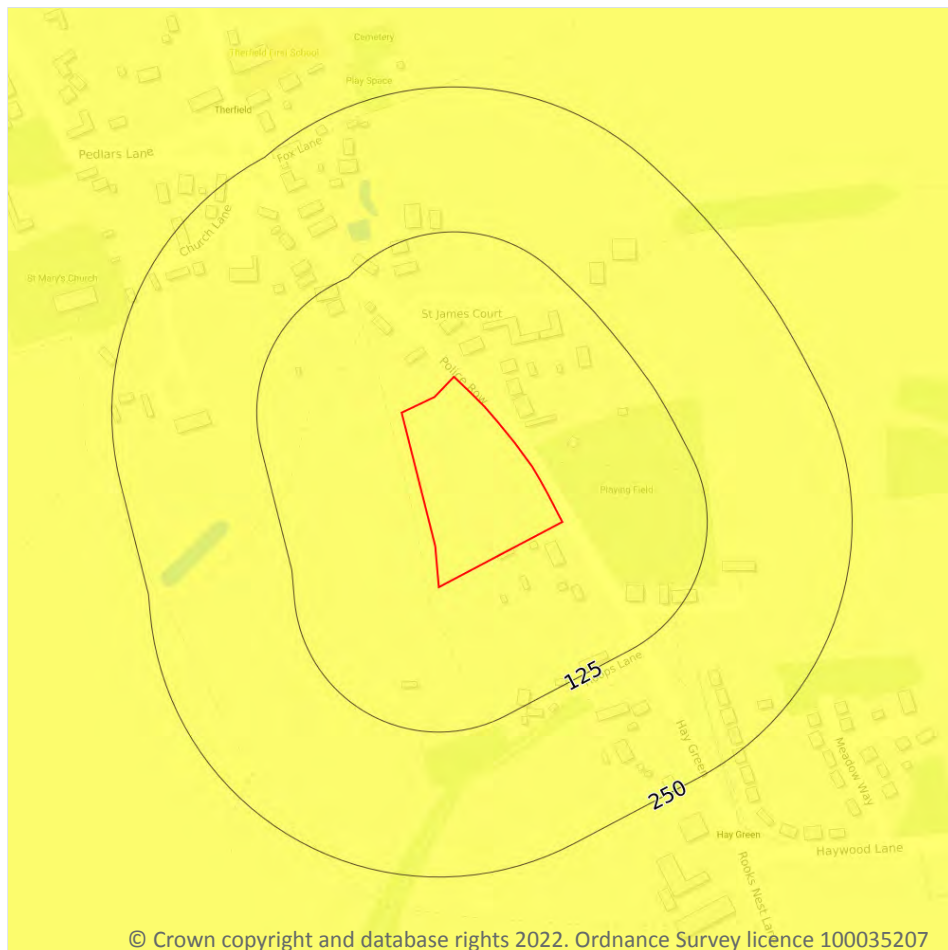
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 76**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Collapsible deposits



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

17.4 Collapsible deposits

Records within 50m

1

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

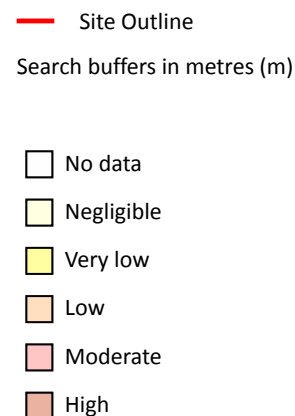
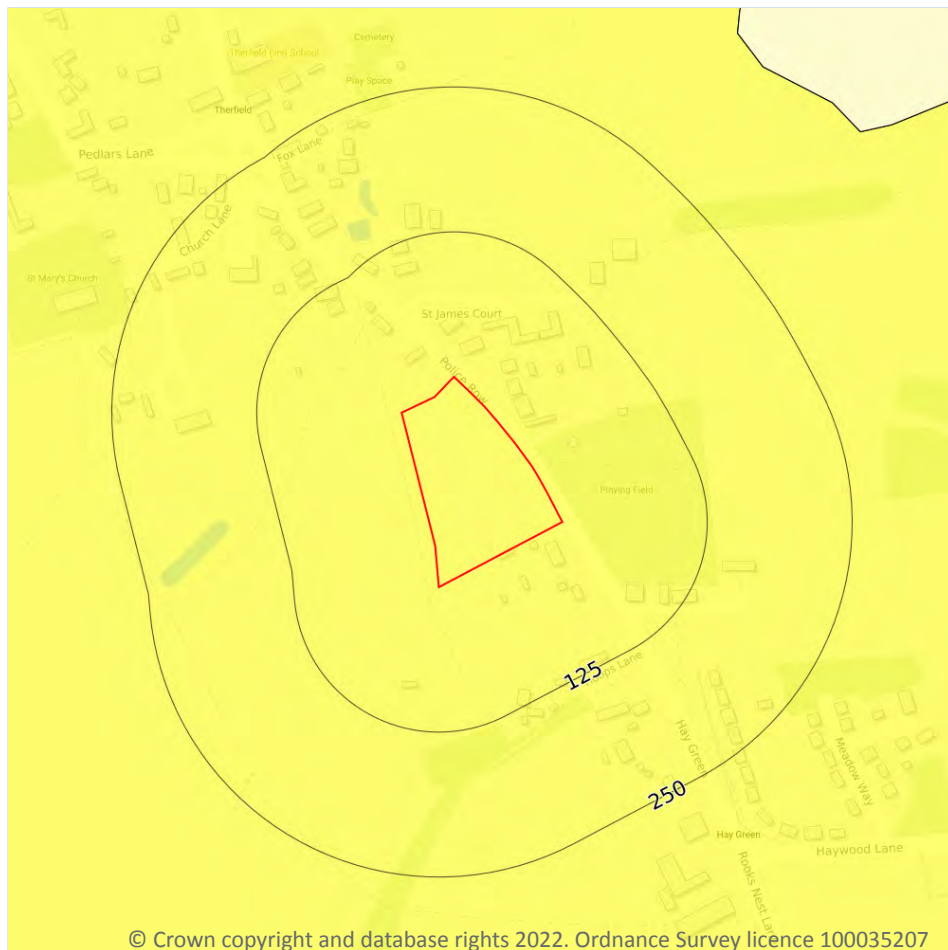
Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 77**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Landslides



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

17.5 Landslides

Records within 50m

1

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

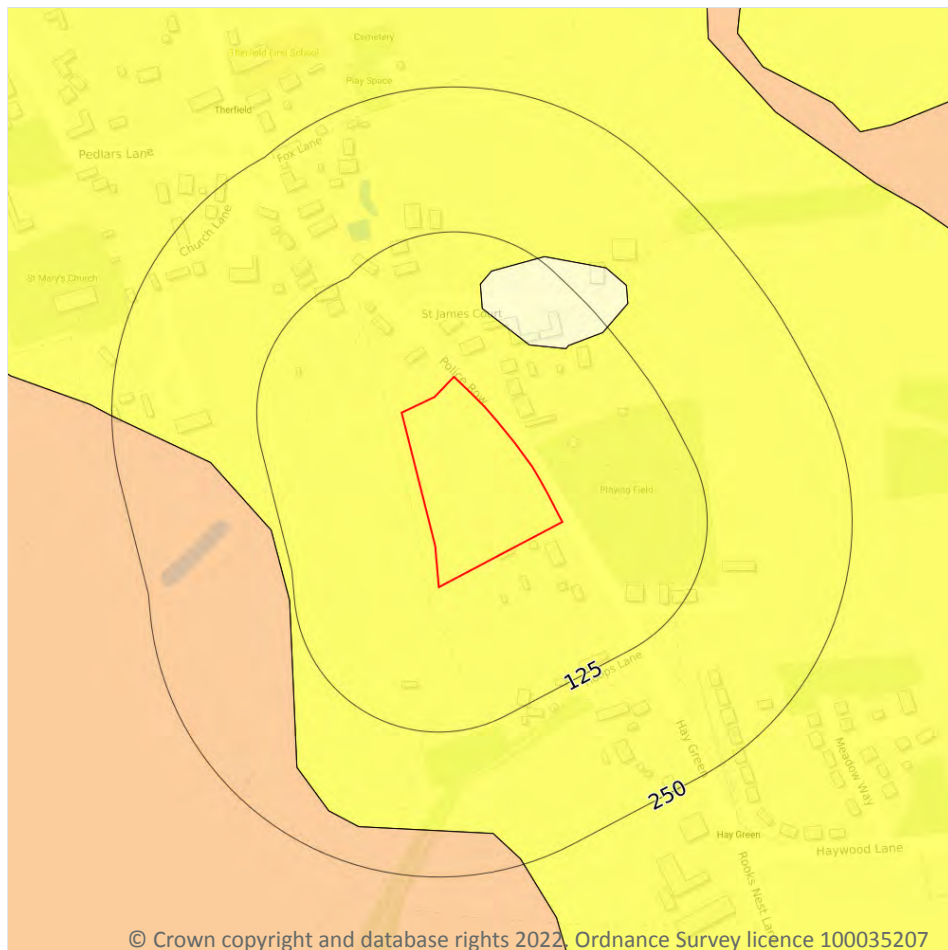
Features are displayed on the Natural ground subsidence - Landslides map on **page 78**

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

This data is sourced from the British Geological Survey.



Natural ground subsidence - Ground dissolution of soluble rocks



- Site Outline
- Search buffers in metres (m)
- No data
 - Negligible
 - Very low
 - Low
 - Moderate
 - High

17.6 Ground dissolution of soluble rocks

Records within 50m

1

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

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 79**

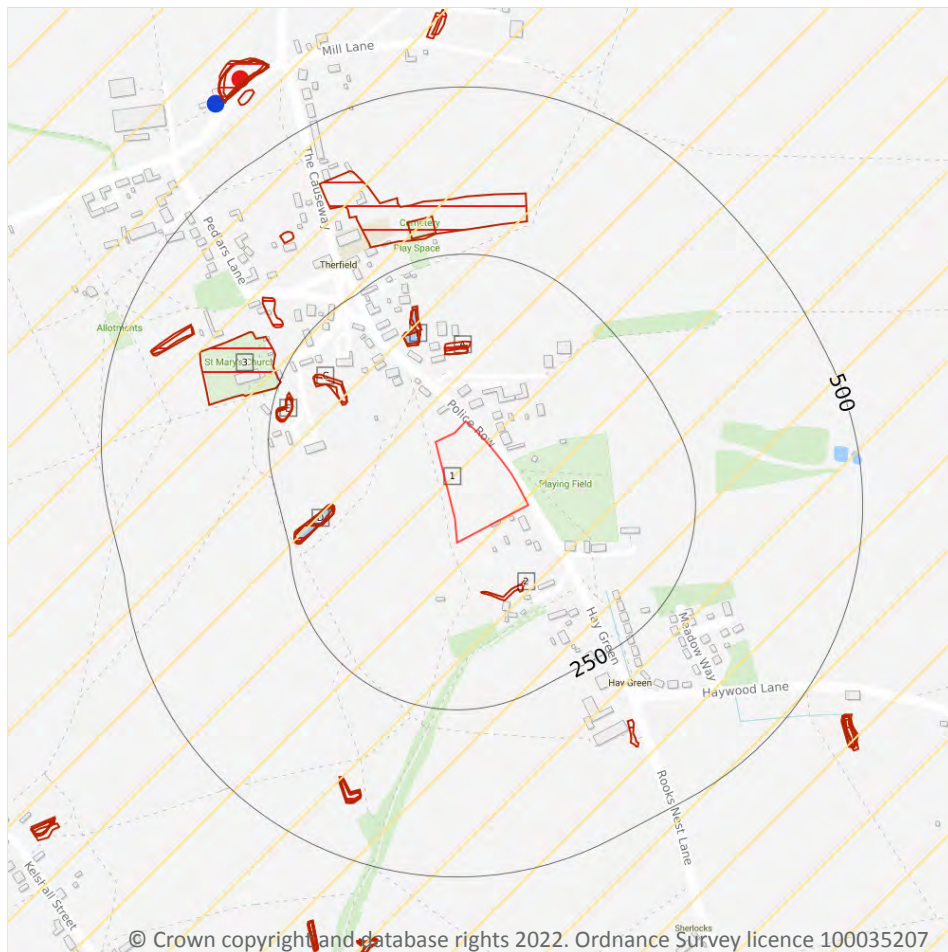
Location	Hazard rating	Details
On site	Very low	Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.



This data is sourced from the British Geological Survey.



18 Mining, ground workings and natural cavities



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities
- Non Coal Mining
- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m

0

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

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m

0

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

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m

25

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 81**

ID	Location	Land Use	Year of mapping	Mapping scale
2	83m SE	Ponds	1960	1:10560
A	102m N	Pond	1947	1:10560
A	102m N	Pond	1922	1:10560
A	102m N	Pond	1896	1:10560
A	108m N	Pond	1877	1:10560
B	135m NW	Ponds	1982	1:10000
B	135m NW	Ponds	1960	1:10560
B	137m NW	Ponds	1877	1:10560
C	145m NW	Ponds	1960	1:10560
C	146m NW	Ponds	1877	1:10560
D	171m W	Fish Pond	1982	1:10000
D	171m W	Pond	1960	1:10560
D	171m W	Pond	1877	1:10560
D	172m W	Pond	1922	1:10560
D	173m W	Pond	1896	1:10560
D	201m W	Pond	1877	1:10560
D	201m W	Pond	1896	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
D	201m W	Pond	1947	1:10560
D	201m W	Pond	1922	1:10560
E	220m W	Pond	1960	1:10560
E	220m W	Pond	1877	1:10560
E	220m W	Pond	1947	1:10560
E	220m W	Pond	1922	1:10560
E	220m W	Pond	1896	1:10560
3	248m W	Grave Yard	1877	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m

0

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

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

0

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

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

1

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

Features are displayed on the Mining, ground workings and natural cavities map on **page 81**



ID	Location	Name	Commodity	Class	Likelihood
1	On site	Not available	Chalk	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0
----------------------	---

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

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	0
-----------------	---

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

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0
-----------------	---

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

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0
-----------------	---

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

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

18.11 Gypsum areas

Records on site	0
-----------------	---

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0
-----------------	---

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

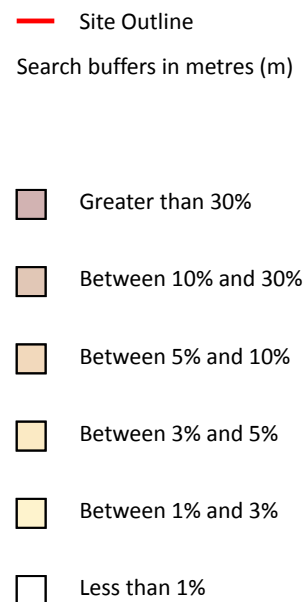
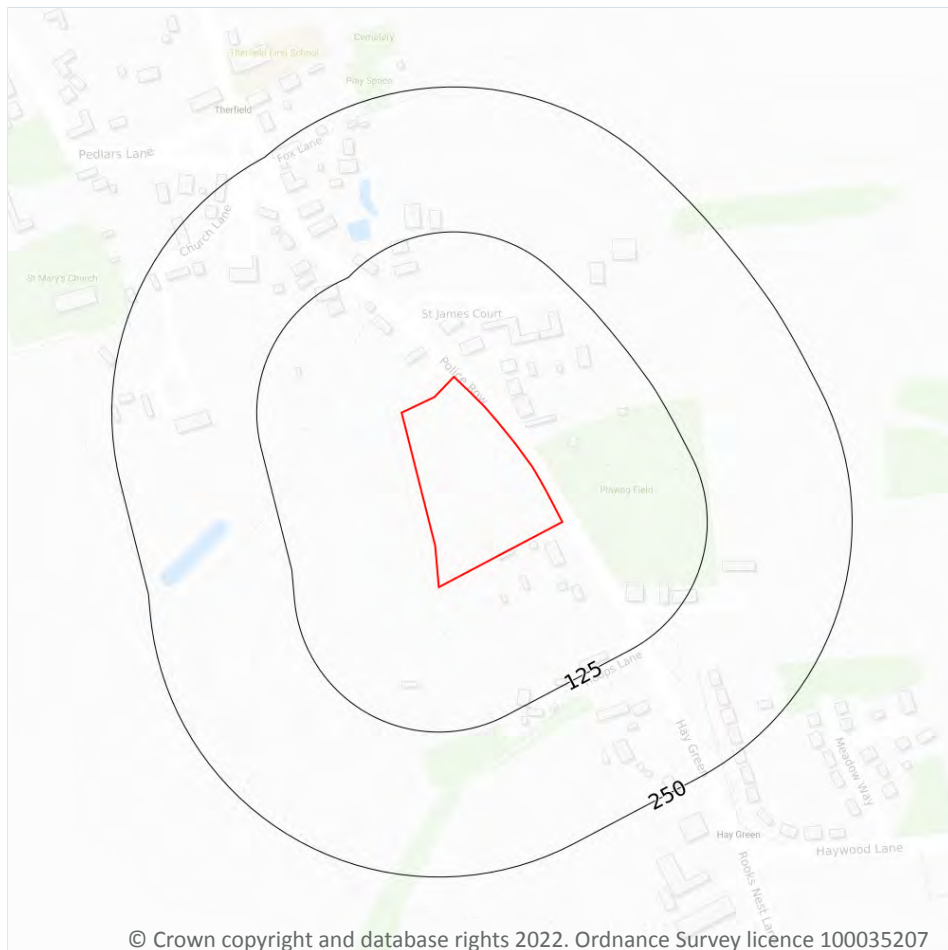
18.13 Clay mining

Records on site	0
-----------------	---

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

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

19 Radon



19.1 Radon

Records on site

1

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

Features are displayed on the Radon map on **page 86**

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

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



20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

3

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m

0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.



21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m**0**

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

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m**0**

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

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m**0**

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m**0**

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

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m**0**

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



This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m

0

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

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m

0

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

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m

0

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

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m

0

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

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m

0

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

This data is sourced from HS2 Ltd.



Data providers

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

Terms and conditions

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



Appendix D

ENVIRONMENTAL RECEPTORS

Pollution to controlled waters.

'Section 78A(9) of the EPA 1990 defines the pollution of controlled waters as: "the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter".' (A35)

'Before determining that pollution of controlled water is being, or is likely to be, caused, the local authority should be satisfied that a substance is continuing to enter controlled waters or is likely to enter controlled waters. The local authority should regard something as being "likely" to be caused when the local authority judge it more likely than not to occur.' (A36)

'Land should **not** be designated as contaminated land where:

- (a) a substance is already present in controlled waters;
- (b) entry into controlled waters of that substance from land has ceased; and
- (c) it is not likely that further entry will take place.' (A37)

'Substances should be regarded as having entered controlled waters where:

- (a) they are dissolved or suspended in those waters; or
- if they are immiscible with water, they have direct contact with those waters on or beneath the surface of the water.' (A38)

The term 'continuing to enter' should be taken to mean any entry additional to any which has already occurred. (A39)

Reproduced from DETR (2000) Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990 Circular 2/2000 and Scottish Executive Rural Affairs Department (2000) Circular 1/2000. Environmental Protection Act 1990: Part IIA – Contaminated Land.

Significant harm to various receptors.

Type of receptor	Description of harm to that type of receptor that is to be regarded as significant harm
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. In the Guidance, this description of significant harm is referred to as a 'human health effect'.
Any ecological system, or living organism forming part of such a system, within a location which is: - an area notified as an area of Special Scientific Interest under Section 28 of the Wildlife and Countryside Act 1981. - any land declared a National Nature Reserve under Section 35 of that Act - any area designated as a Marine Nature Reserve under Section 36 of that Act - an area of Special Protection of Birds, established under Section 3 of that Act - any European Site within the meaning of regulation 10 of the Conservation (Natural Habitats etc.) Regulations 1994 (i.e. Special Areas of Conservation and Special protection Areas) - any candidate Special Areas of Conservation or potential Special Protection Areas given equivalent protection	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. In addition, in the case of a protected location, which is a European Site (or a candidate Special Area of Conservation or a potential Special Protection Area), harm which is incompatible with the favourable conservation status of natural habitats at that location or species typically found there. In determining what constitutes such harm, the local authority should have regard to the advice of English nature and to the requirements of the Conservation

Type of receptor	Description of harm to that type of receptor that is to be regarded as significant harm
- any habitat or site afforded policy protection under paragraph 13 of Planning Policy Guidance Note 9 (PPG9) on nature conservation (i.e. candidate Special Areas of Conservation, potential Special protection Areas and listed Ramsar sites); or - any nature reserve established under Section 21 of the National Parks and Access to the Countryside Act 1949.	(Natural Habitats etc Regulations 1994. In the Guidance this description of significant harm is referred to as an 'ecological system effect'.
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 their 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. The local authority should regard a substantial loss in value as occurring only when a substantial proportion of the animals or crops are dead or otherwise no longer fit for their intended purpose. Food should be regarded as being no longer fit for purpose when it fails to comply with the provisions of the Food Safety Act 1990. Where a diminution in yield or loss in value is caused by a pollutant linkage, a 20% diminution or loss should be regarded as a benchmark for what constitutes a substantial diminution or loss. In the Guidance this description of significant harm is referred to as an 'animal or crop effect'.
Property in the form of buildings. For this purpose 'building' means any structure or erection and any part of a building, including any part below ground level, but does not include plant or machinery comprised in a building.	Structural failure, substantial damage or substantial interference with any right of occupation. For this purpose, the local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended. Additionally, in the case of a scheduled Ancient Monument, substantial damage should be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason of which the monument was scheduled in the Guidance this description of significant harm is referred to as a 'building effect'.

Reproduced from DETR (2000) Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990. Circular 2/2000 and Scottish Executive Rural Affairs Department (2000) Circular 1/2000. Environmental Protection Act 1990: Part IIA – Contaminated Land.

Appendix E RISK RATING MATRIX

Risk rating for contaminated land qualitative risk assessment.

Risk in this context is a combination of the pollution probability, or frequency and the magnitude of the pollution.

Level of Scale and Seriousness (severity or magnitude)	Probability/Frequency		
	Most Likely	Reasonably Foreseeable	Unlikely
Severed pollution and high magnitude	High	High	Low
Moderately severe pollution and moderate magnitude	Medium	Medium	Low
Low severity of pollution and low magnitude	Low	Low	Low

Part IIA Amended Regulations 2012 Guidance

High Risk = Category 1

Medium Risk = Category 2-3

Low Risk = Category 4

Appendix F

EXPLORATORY HOLE LOGS

BOREHOLE LOG

Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS1	
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Nott Group				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.05	ES					(0.26) 0.26	Grass over stiff brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to coarse angular to sub angular flint and fine to medium angular to sub angular chalk. (Topsoil).		
0.60	ES						Stiff light brown, cream and grey sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk.		
1.00	S	N27							
1.50	D					(2.79)			
2.00	D								
2.00	S	N19							
2.50	D								
3.00	S	N27				3.05	Stiff dark grey gravelly silty CLAY. Gravel is fine to medium sub angular to sub rounded chalk.		
3.50	D						3.50 becoming very stiff.		
4.00	S	N50				(1.40)			
						4.45			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.

All dimensions in metres Scale 1:28.4375	Client Wheatley Group Development Limited	Method/ Plant Used Window Sample Rig	Logged By MJH
---	---	--	------------------

BOREHOLE LOG



Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS2	
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Nott Group				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.10	ES					(0.37)	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).		
0.20	ES					0.37			
0.55	ES						Very stiff light brown, cream and grey sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and medium to coarse angular to sub angular flint.		
1.00	S	N32				(2.08)			
1.50	D								
2.00	S	N20				2.45	2.00 becoming stiff.		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.

All dimensions in metres Scale 1:15.9375	Client Wheatley Group Development Limited	Method/ Plant Used Window Sample Rig	Logged By MJH
---	---	--	------------------

AGS3 UK BH POLICE ROW, THERFIELD.GPJ GINT STD AGS 3 1.GDT 22/8/22

BOREHOLE LOG

Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS3	
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Nott Group				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
1.00	D ES S	N22				(0.21) 0.21	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).		
1.00							Stiff light brown, cream and grey sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and medium to coarse angular to sub angular flint.		
1.00									
1.50	D								
2.00	S	N29				(3.08)			
2.50	D								
3.00	S	N50/ 135 mm				3.29			
							Possible Obstruction.		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.
All dimensions in metres Scale 1:21.1875			Client Wheatley Group Development Limited			Method/ Plant Used Window Sample Rig			Logged By MJH		

BOREHOLE LOG



Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS4
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()	
Contractor Nott Group				Sheet 1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.05 0.10	ES ES					(0.21) 0.21	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).		
1.00	S	N24				(2.24)	Stiff light brown, cream and grey sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and medium to coarse angular to sub angular flint.		
1.50	D								
2.00	S	N24				2.45			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.

All dimensions in metres Scale 1:15.9375	Client Wheatley Group Development Limited	Method/ Plant Used Window Sample Rig	Logged By MJH
---	---	--	------------------

AGS3 UK BH POLICE ROW, THERFIELD.GPJ GINT STD AGS 3_1.GDT 22/8/22

BOREHOLE LOG



Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS5	
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Nott Group				Sheet 1 of 1	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
0.60	D					0.19		
1.00	S	N24						
1.50	D							
1.50	ES							
2.00	S	N20						
2.50	D					(4.26)		
3.00	S	N21						
3.50	D							
4.00	S	N24				4.45		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.

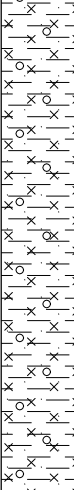
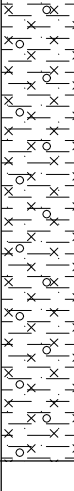
All dimensions in metres Scale 1:28.4375	Client Wheatley Group Development Limited	Method/ Plant Used Window Sample Rig	Logged By MJH
---	---	--	------------------

AGS3 UK BH POLICE ROW, THERFIELD.GPJ GINT STD AGS 3 1.GDT 22/8/22

BOREHOLE LOG



Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS6
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()	
Contractor Nott Group				Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION			
0.05	ES	N34				(0.20) 0.20	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).			
							(0.20) 0.40	Stiff brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and fine to medium sub angular to sub rounded flint.		
0.55	ES						(2.05)	Very stiff light brown, cream and grey slightly sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk.		
1.00	S	N30				2.45				
1.50	D									
2.00	S									

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.
All dimensions in metres Scale 1:15.9375			Client Wheatley Group Development Limited			Method/ Plant Used Window Sample Rig			Logged By MJH		

AGS3 UK BH POLICE ROW, THERFIELD.GPJ GINT STD AGS 3 1.GDT 22/8/22

BOREHOLE LOG



Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS7	
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Nott Group				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.05 0.10 0.15	ES ES ES					(0.22) 0.22	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).		
0.40 0.60 1.00 1.50 2.00	ES ES S D S	N16 N24				(2.23) 2.45	Stiff light brown, cream and grey slightly sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and fine sub angular flint.		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.
All dimensions in metres Scale 1:15.9375			Client Wheatley Group Development Limited			Method/ Plant Used Window Sample Rig			Logged By MJH		

AGS3 UK BH POLICE ROW, THERFIELD.GPJ GINT STD AGS 3_1.GDT 22/8/22

BOREHOLE LOG

Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS8
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()	
Contractor Nott Group				Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		
						0.18	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).	
0.60	ES	N22					Stiff light brown, cream and grey sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk.	
0.90	D							
0.90	ES							
1.00	S							
1.50	D							
								
								
						(3.43)		
2.00	S	N18						
								
								
2.50	D							
								
								
3.00	S	N20						
								
								
3.50	D					3.61		
								
								
4.00	S	N27					Stiff dark grey gravelly silty CLAY. Gravel is fine to coarse angular to sub rounded chalk.	
								
								
4.50	D					(1.84)		
								
								
5.00	S	N41					5.00 becoming very stiff.	
								
								
						5.45		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.
All dimensions in metres Scale 1:34.6875			Client Wheatley Group Development Limited			Method/ Plant Used Window Sample Rig			Logged By MJH		

BOREHOLE LOG

Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS9	
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Nott Group				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION			
0.10	ES	N17				0.16	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).			
0.40	ES					(0.30)	0.46	Stiff brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and fine to medium sub angular to sub rounded flint.		
						(0.54)	1.00	Stiff light brown, cream and grey slightly sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and fine sub angular flint.		
1.00	S							Stiff brown, grey and reddish brown slightly sandy gravelly silty CLAY. Gravel is fine to medium sub angular to sub rounded chalk and fine to coarse angular flint.		
1.25	D					(0.64)	1.64			
1.50	D	N32					Structureless CHALK composed of slightly sandy silty angular to sub angular GRAVEL. Clasts are moderately strong, very high density, cream and fine to coarse. Matrix is cream and dark orange brown. (Grade Dc).			
1.75	ES									
2.00	D									
2.00	S									
										
2.50	D	N11				(1.81)				
										
										
3.00	S									
								3.45		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.

All dimensions in metres Scale 1:22.1875	Client Wheatley Group Development Limited	Method/ Plant Used Window Sample Rig	Logged By MJH
---	---	--	------------------

BOREHOLE LOG

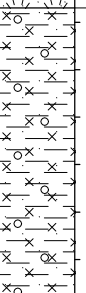
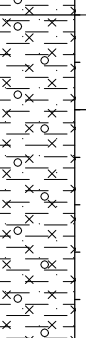
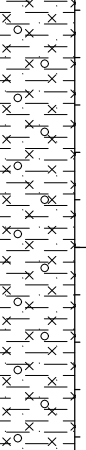
Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS10	
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()		
Contractor Nott Group				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.05	ES					(0.22)	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).		
0.20	ES					0.22	Stiff light brown, cream and grey slightly sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and fine angular flint.		
0.55	ES								
1.00	S	N22							
1.50	D					(2.27)			
2.00	S	N20							
2.50	D					2.49			
3.00	S	N31							
3.50	D					(1.96)			
4.00	S	N40				4.45			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.
All dimensions in metres Scale 1:28.4375			Client Wheatley Group Development Limited			Method/ Plant Used Window Sample Rig			Logged By MJH		

BOREHOLE LOG

Project Land to the West of Police Row, Therfield, Hertfordshire				BOREHOLE No WS11
Job No 73792	Date 25-07-22	Ground Level (m)	Co-Ordinates ()	
Contractor Nott Group				Sheet 1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.05	ES					(0.17) 0.17	Grass over firm dark brown sandy gravelly CLAY with occasional roots and rootlets. Gravel is fine to medium angular flint and fine angular to sub angular chalk. (Topsoil).		
0.35	ES					(0.63) 0.80	Stiff light brown, cream and grey slightly sandy gravelly silty CLAY. Gravel is fine to medium angular to sub angular chalk and fine angular flint.		
1.00	S	N17				(1.65) 2.45	Stiff dark brown and grey slightly sandy gravelly silty CLAY. Gravel is fine to medium sub angular to sub rounded chalk and fine to coarse angular flint.		
1.50	D								
2.00	S	N18							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											1. No groundwater encountered.
All dimensions in metres Scale 1:15.9375			Client Wheatley Group Development Limited			Method/ Plant Used Window Sample Rig			Logged By MJH		

Appendix G

CHEMICAL TESTING RESULTS



2183

Final Report

Report No.:	22-28441-1		
Initial Date of Issue:	02-Aug-2022		
Client	Nott Group		
Client Address:	Unit L26 Hastingwood Industrial Park Wood Lane Birmingham West Midlands B24 9QR		
Contact(s):	Mark Hiatt		
Project	73792 Land to the West of Police Row, Therfield		
Quotation No.:	Q20-20842	Date Received:	27-Jul-2022
Order No.:	73792	Date Instructed:	27-Jul-2022
No. of Samples:	23		
Turnaround (Wkdays):	5	Results Due:	02-Aug-2022
Date Approved:	02-Aug-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: 73792 Land to the West of Police Row, Therfield

Client: Nott Group	Chemtest Job No.:				22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441
Quotation No.: Q20-20842	Chemtest Sample ID.:				1476105	1476106	1476107	1476108	1476109	1476110	1476111	1476112
	Sample Location:				WS1	WS1	WS2	WS2	WS3	WS4	WS4	WS5
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.05	0.60	0.10	0.55	1.00	0.05	0.10	1.50
	Date Sampled:				25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022
	Asbestos Lab:				NEW-ASB						NEW-ASB	
Determinand	Accred.	SOP	Units	LOD								
ACM Type	U	2192		N/A	-						-	
Asbestos Identification	U	2192		N/A	No Asbestos Detected						No Asbestos Detected	
Moisture	N	2030	%	0.020		6.1	10	11	6.1	9.7		14
pH	U	2010		4.0		9.5	8.7	8.5	9.0			8.3
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40		0.42	5.2	2.0				
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		0.023			< 0.010			0.025
Total Sulphur	U	2175	%	0.010		0.030			0.024			0.086
Arsenic	U	2455	mg/kg	0.5		2.0	7.3	4.5				4.0
Barium	U	2455	mg/kg	0			36	23				22
Beryllium	U	2455	mg/kg	0.5			0.6	< 0.5				< 0.5
Cadmium	U	2455	mg/kg	0.10		< 0.10	0.18	< 0.10				< 0.10
Chromium	U	2455	mg/kg	0.5		4.3	15	9.3				9.6
Copper	U	2455	mg/kg	0.50		3.5	13	8.2				9.2
Mercury	U	2455	mg/kg	0.05		< 0.05	0.15	0.10				0.05
Nickel	U	2455	mg/kg	0.50		5.6	18	11				9.2
Lead	U	2455	mg/kg	0.50		6.5	26	16				17
Selenium	U	2455	mg/kg	0.25		< 0.25	0.66	0.43				0.35
Vanadium	U	2455	mg/kg	0.5			24	15				15
Zinc	U	2455	mg/kg	0.50		14	56	34				36
Chromium (Hexavalent)	N	2490	mg/kg	0.50			< 0.50	< 0.50				< 0.50
Organic Matter	U	2625	%	0.40			8.1	9.1				8.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0						< 1.0		
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0						< 1.0		
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0						< 1.0		
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0						< 1.0		
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0						< 1.0		
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0						< 1.0		
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0						< 1.0		
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0						< 1.0		
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0						< 5.0		
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0						< 1.0		
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0						< 1.0		
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0						< 1.0		
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0						< 1.0		
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0						< 1.0		
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0						< 1.0		
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0						< 1.0		

Results - Soil

Project: 73792 Land to the West of Police Row, Therfield

Client: Nott Group	Chemtest Job No.:				22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441
Quotation No.: Q20-20842	Chemtest Sample ID.:				1476105	1476106	1476107	1476108	1476109	1476110	1476111	1476112	1476113
	Sample Location:				WS1	WS1	WS2	WS2	WS3	WS4	WS4	WS5	WS6
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.05	0.60	0.10	0.55	1.00	0.05	0.10	1.50	0.05
	Date Sampled:				25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022
	Asbestos Lab:				NEW-ASB						NEW-ASB		
Determinand	Accred.	SOP	Units	LOD									
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0						< 1.0			
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0						< 5.0			
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0						< 10			
Naphthalene	U	2700	mg/kg	0.10						< 0.10			
Acenaphthylene	U	2700	mg/kg	0.10						< 0.10			
Acenaphthene	U	2700	mg/kg	0.10						< 0.10			
Fluorene	U	2700	mg/kg	0.10						< 0.10			
Phenanthrene	U	2700	mg/kg	0.10						< 0.10			
Anthracene	U	2700	mg/kg	0.10						< 0.10			
Fluoranthene	U	2700	mg/kg	0.10						0.67			
Pyrene	U	2700	mg/kg	0.10						0.49			
Benzo[a]anthracene	U	2700	mg/kg	0.10						< 0.10			
Chrysene	U	2700	mg/kg	0.10						< 0.10			
Benzo[b]fluoranthene	U	2700	mg/kg	0.10						< 0.10			
Benzo[k]fluoranthene	U	2700	mg/kg	0.10						< 0.10			
Benzo[a]pyrene	U	2700	mg/kg	0.10						< 0.10			
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10						< 0.10			
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10						< 0.10			
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10						< 0.10			
Total Of 16 PAH's	U	2700	mg/kg	2.0						< 2.0			
Benzene	U	2760	µg/kg	1.0						< 1.0			
Toluene	U	2760	µg/kg	1.0						< 1.0			
Ethylbenzene	U	2760	µg/kg	1.0						< 1.0			
m & p-Xylene	U	2760	µg/kg	1.0						< 1.0			
o-Xylene	U	2760	µg/kg	1.0						< 1.0			
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0						< 1.0			

Results - Soil

Project: 73792 Land to the West of Police Row, Therfield

Client: Nott Group	Chemtest Job No.:				22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441
Quotation No.: Q20-20842	Chemtest Sample ID.:				1476114	1476115	1476116	1476117	1476118	1476119	1476120	1476121	1476122
	Sample Location:				WS6	WS7	WS7	WS7	WS7	WS7	WS8	WS9	WS9
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.55	0.05	0.10	0.15	0.40	0.60	0.90	0.10	0.40
	Date Sampled:				25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022
	Asbestos Lab:					NEW-ASB							
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A		-							
Asbestos Identification	U	2192		N/A		No Asbestos Detected							
Moisture	N	2030	%	0.020	6.7		8.3	10	8.6	7.1	15	8.8	13
pH	U	2010		4.0	7.7			7.8		9.3	9.4		
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40			3.5		0.87		< 0.40	1.7
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010							0.030		
Total Sulphur	U	2175	%	0.010							0.037		
Arsenic	U	2455	mg/kg	0.5	11			6.7		1.8		8.0	7.1
Barium	U	2455	mg/kg	0	44			43		11			
Beryllium	U	2455	mg/kg	0.5	0.5			< 0.5		< 0.5			
Cadmium	U	2455	mg/kg	0.10	< 0.10			0.13		< 0.10		0.14	0.15
Chromium	U	2455	mg/kg	0.5	25			12		4.4		21	15
Copper	U	2455	mg/kg	0.50	15			26		4.0		12	13
Mercury	U	2455	mg/kg	0.05	0.06			0.08		< 0.05		< 0.05	0.15
Nickel	U	2455	mg/kg	0.50	23			11		5.9		26	18
Lead	U	2455	mg/kg	0.50	27			38		6.5		15	26
Selenium	U	2455	mg/kg	0.25	0.96			0.46		< 0.25		0.68	0.63
Vanadium	U	2455	mg/kg	0.5	29			16		6.3			
Zinc	U	2455	mg/kg	0.50	56			78		16		53	57
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50			< 0.50		< 0.50			
Organic Matter	U	2625	%	0.40	2.6			6.2		0.62			
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0					< 1.0				
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0					< 1.0				
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0					< 1.0				
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0					< 1.0				
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0					< 1.0				
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0					< 1.0				
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0					< 1.0				
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0					< 1.0				
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0					< 5.0				
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0					< 1.0				
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0					< 1.0				
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0					< 1.0				
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0					< 1.0				
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0					< 1.0				
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0					< 1.0				
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0					< 1.0				

Results - Soil

Project: 73792 Land to the West of Police Row, Therfield

Client: Nott Group	Chemtest Job No.:				22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441	22-28441
Quotation No.: Q20-20842	Chemtest Sample ID.:				1476114	1476115	1476116	1476117	1476118	1476119	1476120	1476121
	Sample Location:				WS6	WS7	WS7	WS7	WS7	WS7	WS8	WS9
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.55	0.05	0.10	0.15	0.40	0.60	0.90	0.10
	Date Sampled:				25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022
	Asbestos Lab:					NEW-ASB						
Determinand	Accred.	SOP	Units	LOD								
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0					< 1.0			
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0					< 5.0			
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0					< 10			
Naphthalene	U	2700	mg/kg	0.10			< 0.10					
Acenaphthylene	U	2700	mg/kg	0.10			< 0.10					
Acenaphthene	U	2700	mg/kg	0.10			< 0.10					
Fluorene	U	2700	mg/kg	0.10			< 0.10					
Phenanthrene	U	2700	mg/kg	0.10			< 0.10					
Anthracene	U	2700	mg/kg	0.10			< 0.10					
Fluoranthene	U	2700	mg/kg	0.10			< 0.10					
Pyrene	U	2700	mg/kg	0.10			< 0.10					
Benzo[a]anthracene	U	2700	mg/kg	0.10			< 0.10					
Chrysene	U	2700	mg/kg	0.10			< 0.10					
Benzo[b]fluoranthene	U	2700	mg/kg	0.10			< 0.10					
Benzo[k]fluoranthene	U	2700	mg/kg	0.10			< 0.10					
Benzo[a]pyrene	U	2700	mg/kg	0.10			< 0.10					
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10			< 0.10					
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10			< 0.10					
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10			< 0.10					
Total Of 16 PAH's	U	2700	mg/kg	2.0			< 2.0					
Benzene	U	2760	µg/kg	1.0				< 1.0				
Toluene	U	2760	µg/kg	1.0				< 1.0				
Ethylbenzene	U	2760	µg/kg	1.0				< 1.0				
m & p-Xylene	U	2760	µg/kg	1.0				< 1.0				
o-Xylene	U	2760	µg/kg	1.0				< 1.0				
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0				< 1.0				

Results - Soil

Project: 73792 Land to the West of Police Row, Therfield

Client: Nott Group	Chemtest Job No.:				22-28441	22-28441	22-28441	22-28441	22-28441
Quotation No.: Q20-20842	Chemtest Sample ID.:				1476123	1476125	1476126	1476127	1476128
	Sample Location:				WS9	WS10	WS10	WS11	WS11
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				1.75	0.20	0.55	0.05	0.35
	Date Sampled:				25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022
	Asbestos Lab:							NEW-ASB	
Determinand	Accred.	SOP	Units	LOD					
ACM Type	U	2192		N/A				-	
Asbestos Identification	U	2192		N/A				No Asbestos Detected	
Moisture	N	2030	%	0.020	15	12	10	6.1	8.0
pH	U	2010		4.0	9.0	8.7	9.0		
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40		1.2	0.68		0.52
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.012				
Total Sulphur	U	2175	%	0.010	0.020				
Arsenic	U	2455	mg/kg	0.5		9.7	3.2		4.1
Barium	U	2455	mg/kg	0		58	19		
Beryllium	U	2455	mg/kg	0.5		1.0	< 0.5		
Cadmium	U	2455	mg/kg	0.10		0.22	< 0.10		< 0.10
Chromium	U	2455	mg/kg	0.5		27	8.0		9.1
Copper	U	2455	mg/kg	0.50		18	10		10
Mercury	U	2455	mg/kg	0.05		0.07	0.05		0.05
Nickel	U	2455	mg/kg	0.50		35	12		14
Lead	U	2455	mg/kg	0.50		19	8.4		10
Selenium	U	2455	mg/kg	0.25		0.83	0.26		< 0.25
Vanadium	U	2455	mg/kg	0.5		38	12		
Zinc	U	2455	mg/kg	0.50		64	22		26
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50		
Organic Matter	U	2625	%	0.40		3.1	0.88		
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0					
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0					
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0					
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0					
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0					
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0					
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0					
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0					
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0					
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0					
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0					
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0					
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0					
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0					
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0					
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0					

Results - Soil

Project: 73792 Land to the West of Police Row, Therfield

Client: Nott Group	Chemtest Job No.:				22-28441	22-28441	22-28441	22-28441	22-28441
Quotation No.: Q20-20842	Chemtest Sample ID.:				1476123	1476125	1476126	1476127	1476128
	Sample Location:				WS9	WS10	WS10	WS11	WS11
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				1.75	0.20	0.55	0.05	0.35
	Date Sampled:				25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022	25-Jul-2022
	Asbestos Lab:							NEW-ASB	
Determinand	Accred.	SOP	Units	LOD					
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0					
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0					
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0					
Naphthalene	U	2700	mg/kg	0.10				< 0.10	
Acenaphthylene	U	2700	mg/kg	0.10				< 0.10	
Acenaphthene	U	2700	mg/kg	0.10				< 0.10	
Fluorene	U	2700	mg/kg	0.10				< 0.10	
Phenanthrene	U	2700	mg/kg	0.10				< 0.10	
Anthracene	U	2700	mg/kg	0.10				< 0.10	
Fluoranthene	U	2700	mg/kg	0.10				< 0.10	
Pyrene	U	2700	mg/kg	0.10				< 0.10	
Benzo[a]anthracene	U	2700	mg/kg	0.10				< 0.10	
Chrysene	U	2700	mg/kg	0.10				< 0.10	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10				< 0.10	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10				< 0.10	
Benzo[a]pyrene	U	2700	mg/kg	0.10				< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10				< 0.10	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10				< 0.10	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10				< 0.10	
Total Of 16 PAH's	U	2700	mg/kg	2.0				< 2.0	
Benzene	U	2760	µg/kg	1.0					
Toluene	U	2760	µg/kg	1.0					
Ethylbenzene	U	2760	µg/kg	1.0					
m & p-Xylene	U	2760	µg/kg	1.0					
o-Xylene	U	2760	µg/kg	1.0					
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0					

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Final Report

Report No.:	22-28436-1		
Initial Date of Issue:	02-Aug-2022		
Client	Nott Group		
Client Address:	Unit L26 Hastingwood Industrial Park Wood Lane Birmingham West Midlands B24 9QR		
Contact(s):	Mark Hiatt		
Project	73792 Land to the West of Police Row, Therfield		
Quotation No.:	Q20-20842	Date Received:	27-Jul-2022
Order No.:	73792	Date Instructed:	27-Jul-2022
No. of Samples:	2		
Turnaround (Wkdays):	5	Results Due:	02-Aug-2022
Date Approved:	02-Aug-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Single Stage WAC

Project: 73792 Land to the West of Police Row, Therfield

Chemtest Job No: 22-28436					Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 1476090					Limits		
Sample Ref:					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:							
Sample Location: WS2							
Top Depth(m): 0.20							
Bottom Depth(m):							
Sampling Date: 25-Jul-2022							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	M	%	4.7	3	5	6
Loss On Ignition	2610	M	%	13	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--	--
pH	2010	M		8.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.018	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1455	U	0.0057	0.057	0.5	2	25
Barium	1455	U	0.009	0.087	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	0.0016	0.016	0.5	10	70
Copper	1455	U	0.017	0.17	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0027	0.027	0.5	10	30
Nickel	1455	U	0.010	0.10	0.4	10	40
Lead	1455	U	0.0012	0.013	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	0.0021	0.021	0.1	0.5	7
Zinc	1455	U	0.009	0.094	4	50	200
Chloride	1220	U	1.4	14	800	15000	25000
Fluoride	1220	U	0.33	3.3	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	91	910	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	23	230	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	10

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 73792 Land to the West of Police Row, Therfield

Chemtest Job No: 22-28436					Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 1476091					Limits		
Sample Ref:					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:							
Sample Location: WS8							
Top Depth(m): 0.60							
Bottom Depth(m):							
Sampling Date: 25-Jul-2022							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	M	%	0.27	3	5	6
Loss On Ignition	2610	M	%	2.2	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--	--
pH	2010	M		8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.033	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1455	U	0.0009	0.0086	0.5	2	25
Barium	1455	U	< 0.005	< 0.050	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	0.0017	0.017	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0004	0.0038	0.5	10	30
Nickel	1455	U	0.0020	0.020	0.4	10	40
Lead	1455	U	0.0006	0.0056	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455	U	0.003	0.027	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.65	6.5	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	65	650	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.2	< 50	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	11

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Appendix H GEOTECHNICAL TESTING RESULTS

GEOLABS Limited
Unit D3 HRS Business Park
Granby Avenue
Birmingham
B33 0SJ

Tel: +44(0) 121 296 4600
Fax: +44(0) 121 296 4599
email: admin@geolabs.co.uk
web: www.geolabs.co.uk

Nott Group Limited
Unit L26
Hastingwood Industrial Park
Wood Lane
Birmingham
B24 9QR

09 August 2022

Report No : GEO/35977/01

Page 1 of 1

For the attention of Mr M Hiatt

Our ref **GEO / 35977**
Your Ref **73792**

Date samples received 26/07/2022
Date written instructions received 26/07/2022
Date testing commenced 27/07/2022
Date of sample disposal 06/09/2022

Project **LAND TO THE WEST OF POLICE ROW, THERFIELD**

Further to your instructions we have pleasure in enclosing the results of the tests you requested in the attached figures.

LABORATORY TEST REPORT

Item No	Test Quantity	Description
1	~	Liquid & Plastic Limits Summary
~	6	Water Content
2	6	Liquid & Plastic Limits
3	1	Saturation Moisture Content

Any opinions or interpretations expressed herein are outside the scope of UKAS accreditation. All results contained in this report are provisional unless signed by an approved signatory. The results contained in this report relate only to samples received in the laboratory and are tested 'as received' unless otherwise stated. This report should not be reproduced, except in full, without the written approval of the laboratory. The results reported are applicable only to the test items received by the laboratory.

All the necessary data required by the documented test procedures has been recorded and will be stored for a period of not less than 6 years. This data will be issued to yourselves at your request. All samples will be disposed of after the date shown above. Written confirmation will be required to retain the samples beyond this period and a storage charge may be applied.

We trust that the above meets your requirements and should you require any further information or assistance, please do not hesitate to contact us.

Yours faithfully
on behalf of **GEOLABS Limited**



J A Reynolds
Director



SUMMARY OF LIQUID AND PLASTIC LIMIT TESTS

Location	Depth m	Sample Ref	Sample Type	Description	Water Content BS EN ISO 17892-1 : 2014 %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Percentage Passing 425µm %	Atterberg Classification	Test Type	Sample Condition
WS1	2.00		D	Light grey mottled brownish grey very sandy CLAY with much fine to medium chalk gravel.	3.0	37	17	20	96	CI	2	3
WS10	1.50		D	Brown mottled light grey very sandy CLAY with some fine to medium chalk gravel.	17.3	40	18	22	94	CI	2	3
WS3	1.00		D	Brown mottled light grey very sandy CLAY with much fine to medium chalk gravel.	11.3	42	18	24	95	CI	2	3
WS5	0.60		D	Greyish brown very sandy CLAY with some fine to medium chalk gravel.	8.8	44	18	26	94	CI	2	3
WS8	0.90		D	Light brown mottled light grey and cream very sandy CLAY with some fine to medium chalk gravel.	3.1	37	17	20	94	CI	2	3
WS9	1.25		D	Brown mottled dark brown very sandy CLAY with some fine to medium chalk gravel.	15.9	51	17	34	90	CH	2	3

Test Type:

- 1 - 1 point 80g / 30° fall cone method.
 2 - 4 point 80g / 30° fall cone method.
 3 - Non plastic determination.

Sample condition:

- 1 - As Received
 2 - Air Dried
 3 - Washed & Air Dried

Checked and Approved by:



J A Reynolds - Director
 09/08/2022

Project Number:

GEO / 35977

Project Name:

LAND TO THE WEST OF POLICE ROW, THERFIELD
73792

GEOLABS®



LIQUID AND PLASTIC LIMITS

Location	WS1
Depth (m)	2.00
Sample Type	D

Description:

Light grey mottled brownish grey very sandy CLAY with much fine to medium chalk gravel.

Preparation : Particles >425µm removed by wet sieving and air drying.

Water Content : (BS EN ISO 17892-1:2014) 3.0 %

Measured percentage passing 425 μ m sieve : 96 %

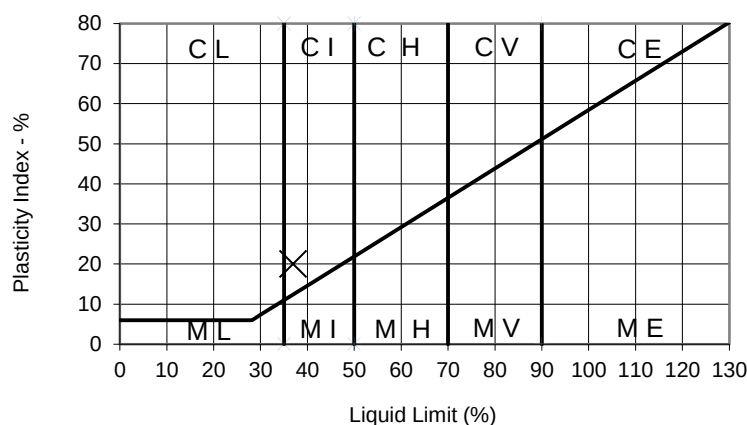
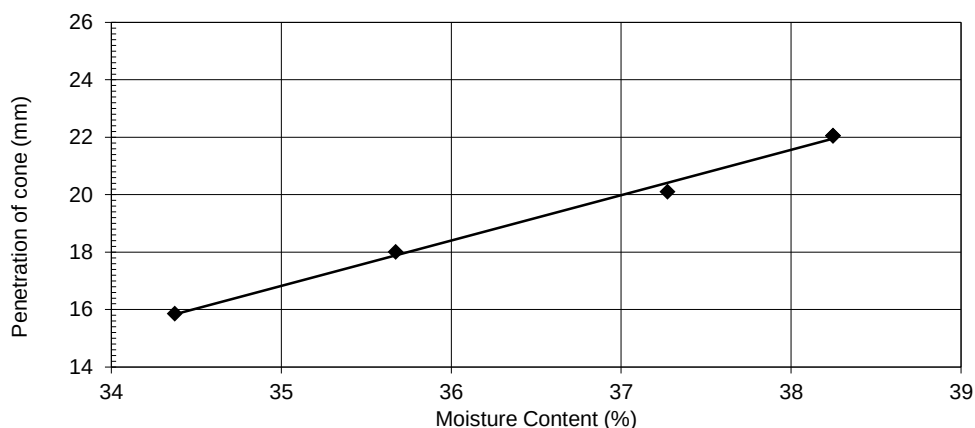
Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 37 %

Plastic Limit : 17 %

Plasticity Index : 20 %

Equivalent Water Content of material passing 425µm sieve : 3.1 %

Liquidity Index : -0.70



Tested by AD
Checked and Approved by

J. A. Reynolds

J A Reynolds - Director
09/08/2022

Project Number:

GEO / 35977

Project Name:

**LAND TO THE WEST OF POLICE ROW, THERFIELD
73792**

GEOLABS

LIQUID AND PLASTIC LIMITS

Location WS10
 Depth (m) 1.50
 Sample Type D

Description:

Brown mottled light grey very sandy CLAY with some fine to medium chalk gravel.

Preparation : Particles >425µm removed by wet sieving and air drying.

Water Content : (BS EN ISO 17892-1:2014) 17.3 %

Measured percentage passing 425µm sieve : 94 %

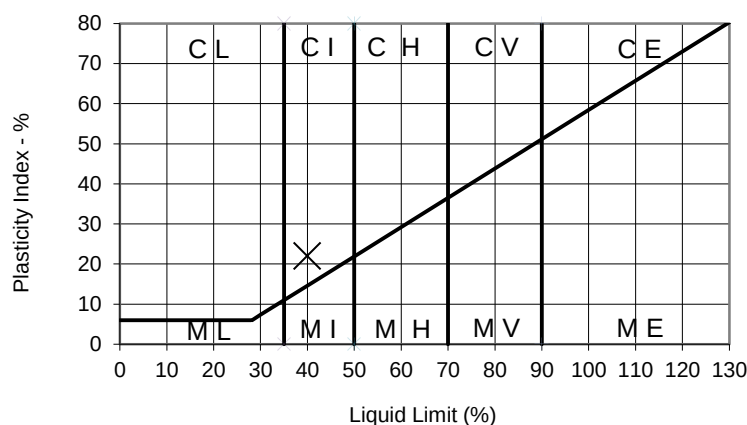
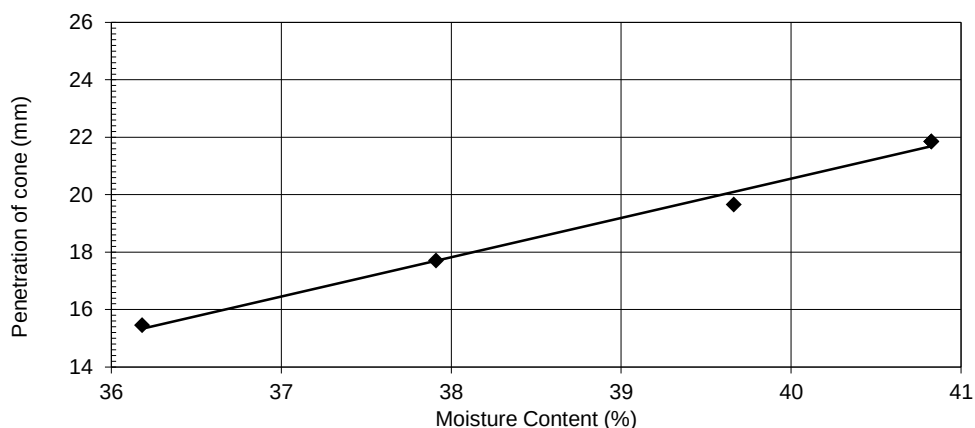
Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 40 %

Plastic Limit : 18 %

Plasticity Index : 22 %

Equivalent Water Content of material passing 425µm sieve : 18.3 %

Liquidity Index : 0.01



Tested by AD
 Checked and Approved by

J A Reynolds

J A Reynolds - Director
 09/08/2022

Project Number:

GEO / 35977

Project Name:

**LAND TO THE WEST OF POLICE ROW, THERFIELD
 73792**

GEOLABS



LIQUID AND PLASTIC LIMITS

Location	WS3
Depth (m)	1.00
Sample Type	D

Description:

Brown mottled light grey very sandy CLAY with much fine to medium chalk gravel.

Preparation : Particles >425µm removed by wet sieving and air drying.

Water Content : (BS EN ISO 17892-1:2014) 11.3 %

Measured percentage passing 425µm sieve : 95 %

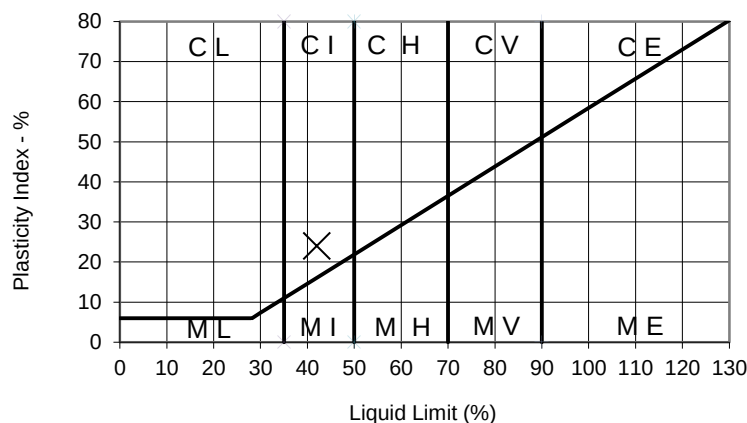
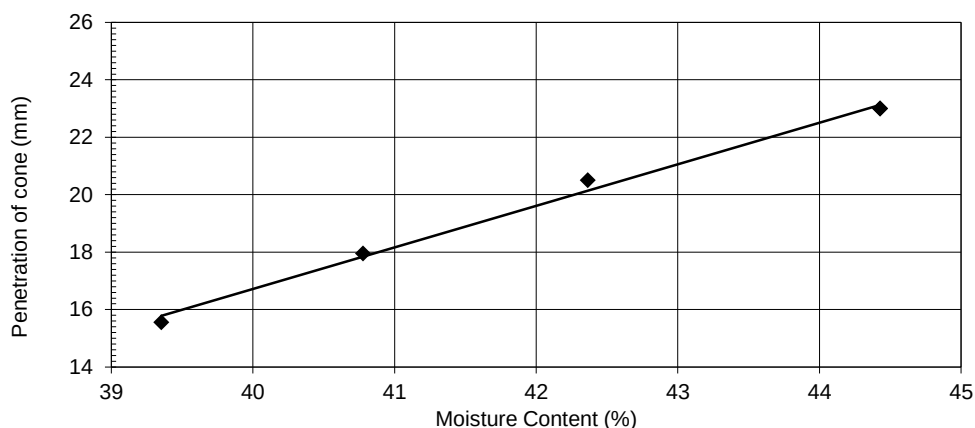
Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 42 %

Plastic Limit : 18 %

Plasticity Index : 24 %

Equivalent Water Content of material passing 425µm sieve : 11.9 %

Liquidity Index : -0.25



Tested by AD
Checked and Approved by

J. A. Genovese

J A Reynolds - Director
09/08/2022

Project Number:

GEO / 35977

Project Name:

LAND TO THE WEST OF POLICE ROW, THERFIELD
73792

GEOLABS

LIQUID AND PLASTIC LIMITS

Location	WS5
Depth (m)	0.60
Sample Type	D

Description:

Greyish brown very sandy CLAY with some fine to medium chalk gravel.

Preparation : Particles >425µm removed by wet sieving and air drying.

Water Content : (BS EN ISO 17892-1:2014) 8.8 %

Measured percentage passing 425µm sieve : 94 %

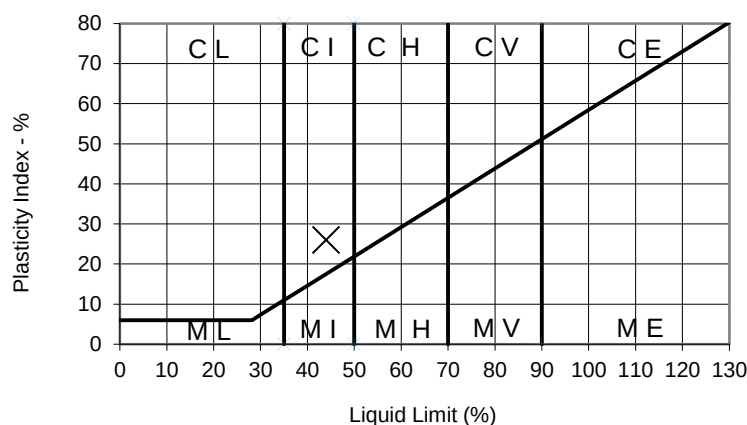
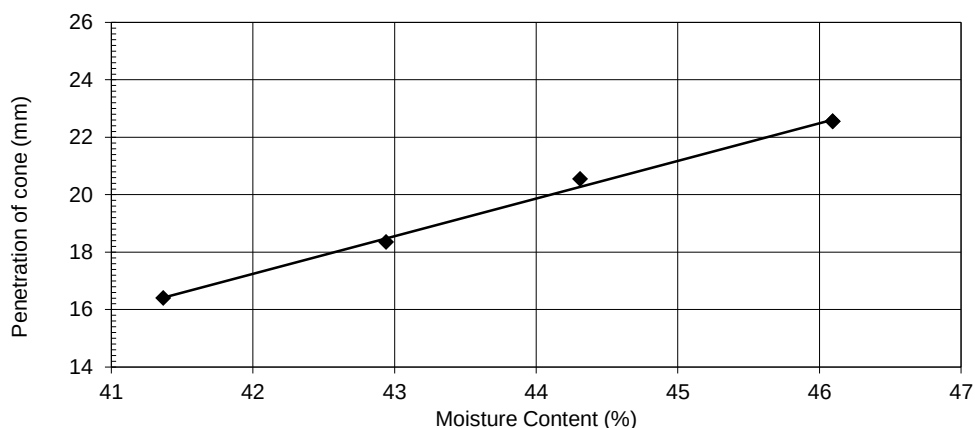
Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 44 %

Plastic Limit : 18 %

Plasticity Index : 26 %

Equivalent Water Content of material passing 425µm sieve : 9.3 %

Liquidity Index : -0.33



Tested by AD
Checked and Approved by

J. A. Genovese

J A Reynolds - Director
09/08/2022

Project Number:

GEO / 35977

Project Name:

LAND TO THE WEST OF POLICE ROW, THERFIELD
73792

GEOLABS

LIQUID AND PLASTIC LIMITS

Location	WS8
Depth (m)	0.90
Sample Type	D

Description:

Light brown mottled light grey and cream very sandy CLAY with some fine to medium chalk gravel.

Preparation : Particles >425µm removed by wet sieving and air drying.

Water Content : (BS EN ISO 17892-1:2014) 3.1 %

Measured percentage passing 425 μ m sieve : 94 %

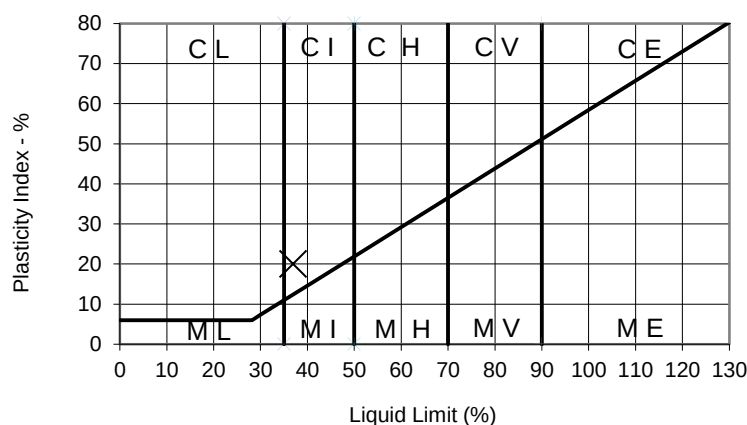
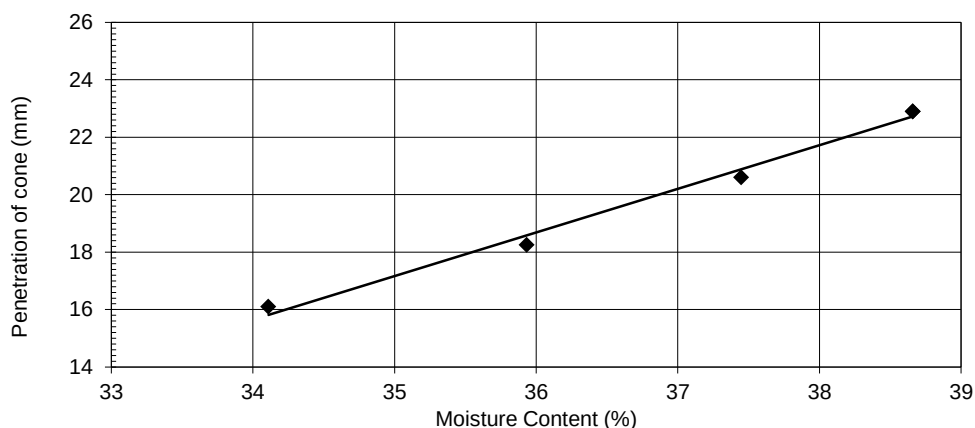
Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 37 %

Plastic Limit : 17 %

Plasticity Index : 20 %

Equivalent Water Content of material passing 425µm sieve : 3.3 %

Liquidity Index : -0.69



Tested by AD
Checked and Approved by

J. A. Reynolds

J A Reynolds - Director
09/08/2022

Project Number:

GEO / 35977

Project Name:

LAND TO THE WEST OF POLICE ROW, THERFIELD
73792

GEOLABS

LIQUID AND PLASTIC LIMITS

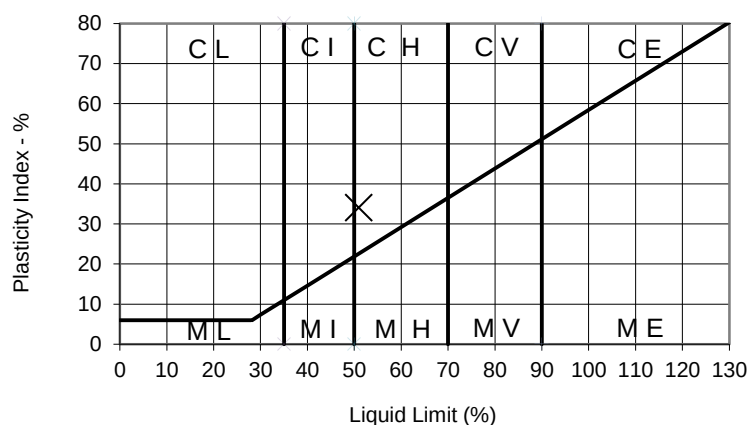
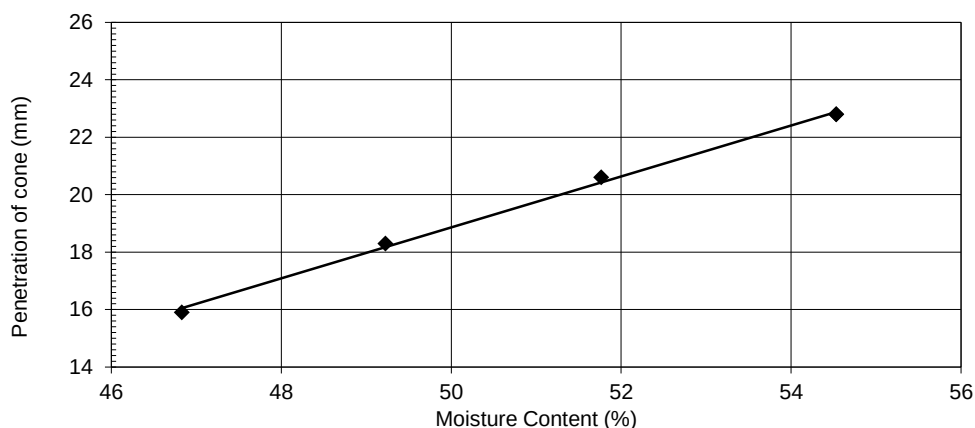
Location WS9
Depth (m) 1.25
Sample Type D

Description:

Brown mottled dark brown very sandy CLAY with some fine to medium chalk gravel.

Preparation : Particles >425µm removed by wet sieving and air drying.

Water Content : (BS EN ISO 17892-1:2014) 15.9 %
 Measured percentage passing 425µm sieve : 90 %
 Liquid Limit - Fall Cone 4 point Method (cone angle 30°) with increasing water content : 51 %
 Plastic Limit : 17 %
 Plasticity Index : 34 %
 Equivalent Water Content of material passing 425µm sieve : 17.6 %
 Liquidity Index : 0.02



Tested by AD
Checked and Approved by

J A Reynolds

J A Reynolds - Director
09/08/2022

Project Number:

GEO / 35977

Project Name:

**LAND TO THE WEST OF POLICE ROW, THERFIELD
73792**

GEOLABS



Checked and Approved by:  J A Reynolds - Director 09/08/2022	Project Number: GEO / 35977 Project Name: LAND TO THE WEST OF POLICE ROW, THERFIELD 73792	
---	---	---

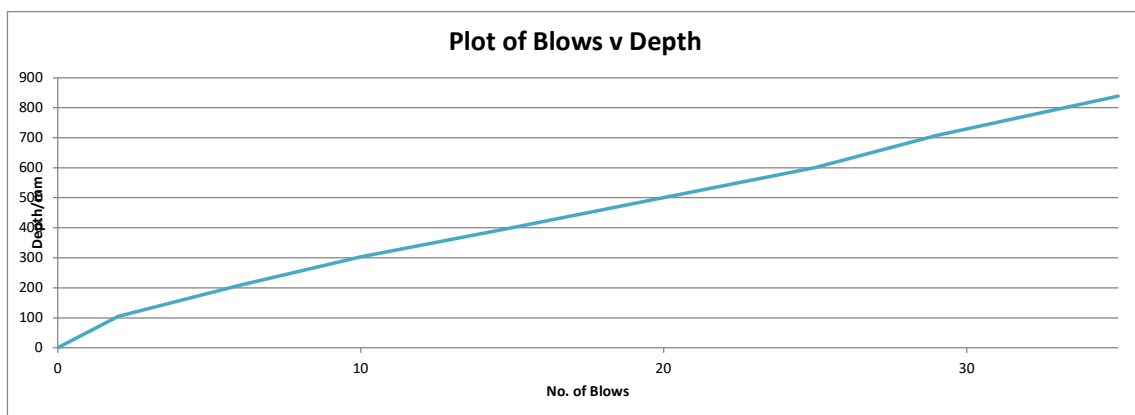
Appendix I IN-SITU DYNAMIC CONE PENETROMETER TESTING RESULTS

Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP1
Date: 25/07/2022

Title	DCP1					
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)	
0	100	0	2	2	3.5	
100	200	2	6	4	10	
200	300	6	10	4	10	
300	400	10	15	5	13	
400	500	15	20	5	13	
500	600	20	25	5	13	
600	700	25	29	4	10	
700	800	29	33	4	10	
800	900	33	38	5	13	

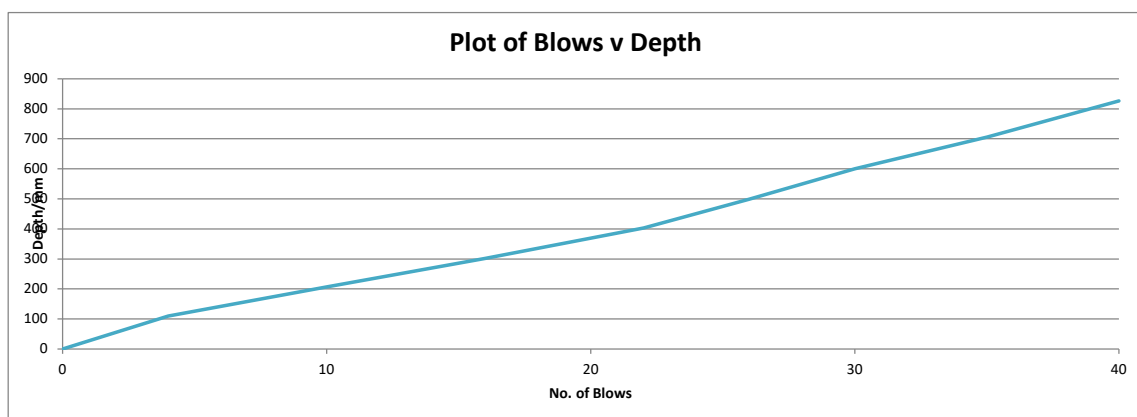


Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP2
Date: 25/07/2022

Title	DCP2					
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)	
0	100	0	4	4	10	
100	200	4	10	6	16	
200	300	10	16	6	16	
300	400	16	22	6	16	
400	500	22	26	4	10	
500	600	26	30	4	10	
600	700	30	35	5	13	
700	800	35	39	4	10	
800	900	39	43	4	10	

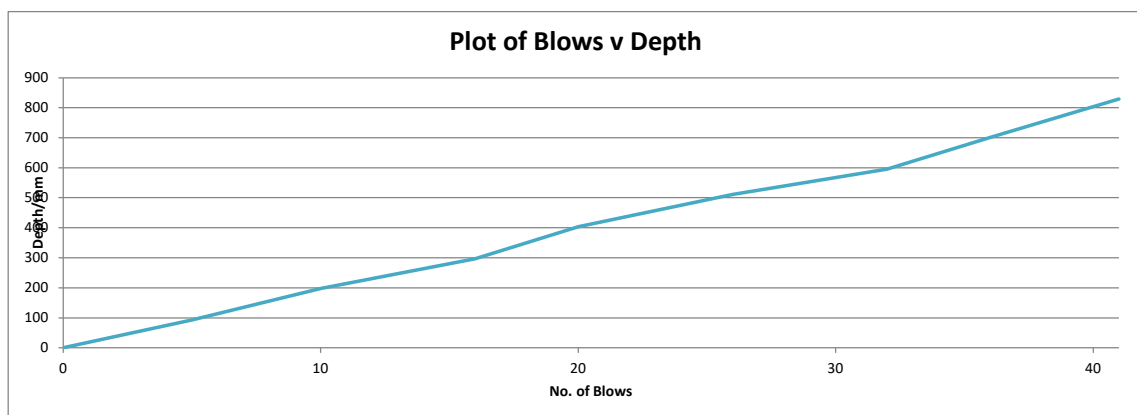


Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP3
Date: 25/07/2022

Title	DCP3					
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)	
0	100	0	5	5	13	
100	200	5	10	5	13	
200	300	10	16	6	16	
300	400	16	20	4	10	
400	500	20	25	5	13	
500	600	25	32	7	18	
600	700	32	36	4	10	
700	800	36	40	4	10	
800	900	40	43	3	6	

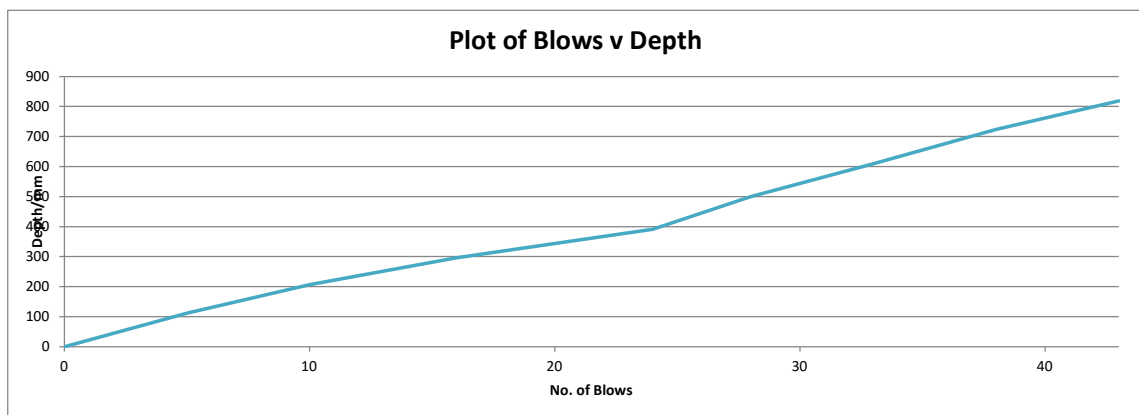


Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP4
Date: 25/07/2022

Title	DCP4					
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)	
0	100	0	5	5	13	
100	200	5	10	5	13	
200	300	10	16	6	16	
300	400	16	24	8	22	
400	500	24	28	4	10	
500	600	28	33	5	13	
600	700	33	37	4	10	
700	800	37	42	5	13	
800	900	42	47	5	13	

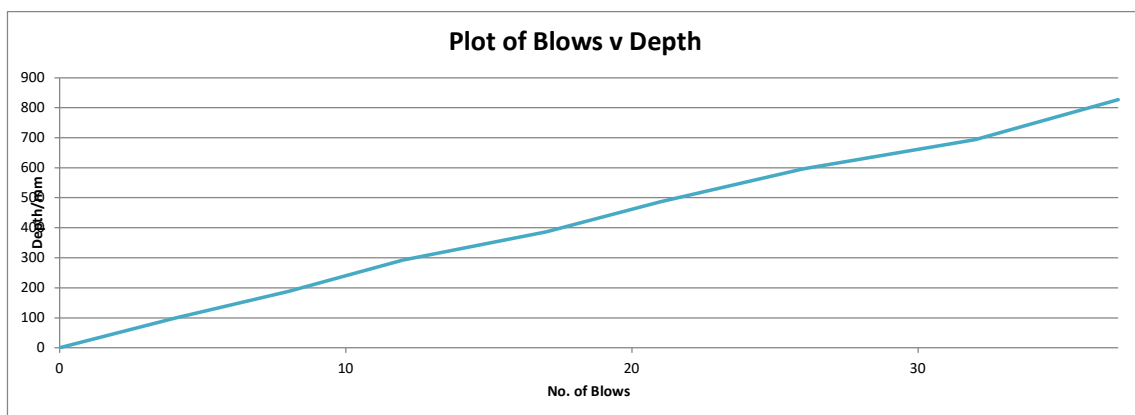


Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP5
Date: 25/07/2022

Title	DCP5				
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)
0	100	0	4	4	10
100	200	4	8	4	10
200	300	8	12	4	10
300	400	12	18	6	16
400	500	18	22	4	10
500	600	22	26	4	10
600	700	26	32	6	16
700	800	32	36	4	10
800	900	36	39	3	6

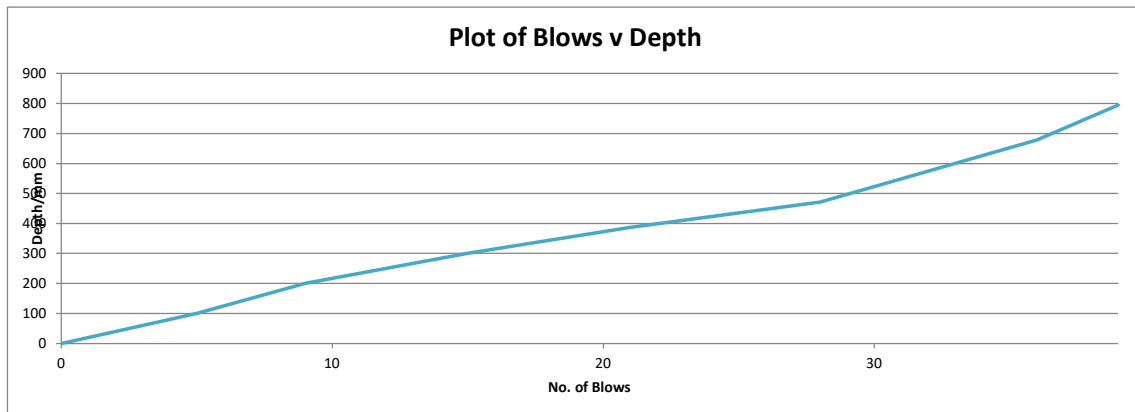


Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP6
Date: 25/07/2022

Title	DCP6				
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)
0	100	0	5	5	13
100	200	5	9	4	10
200	300	9	15	6	16
300	400	15	22	7	18
400	500	22	29	7	18
500	600	29	33	4	10
600	700	33	37	4	10

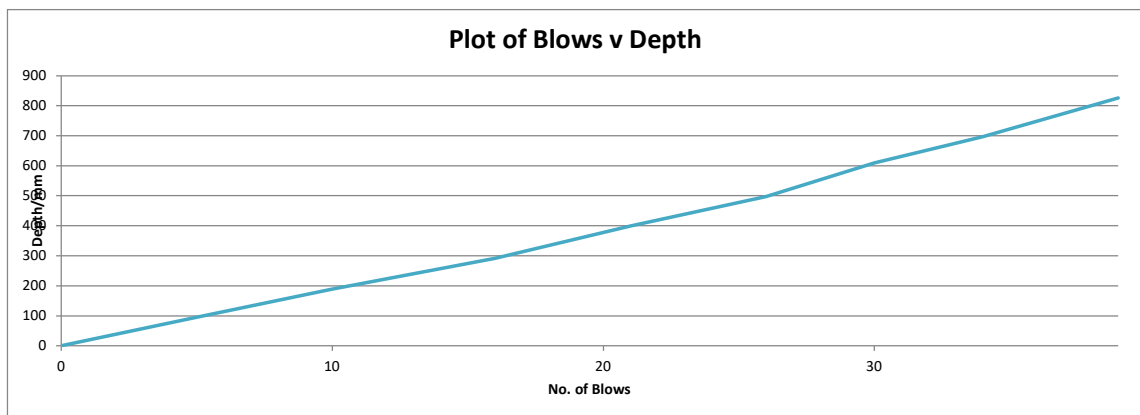


Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP7
Date: 25/07/2022

Title	DCP7				
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)
0	100	0	5	5	13
100	200	5	11	6	16
200	300	11	16	5	13
300	400	16	21	5	13
400	500	21	26	5	13
500	600	26	30	4	10
600	700	30	34	4	10
700	800	34	38	4	10
800	900	38	42	4	10

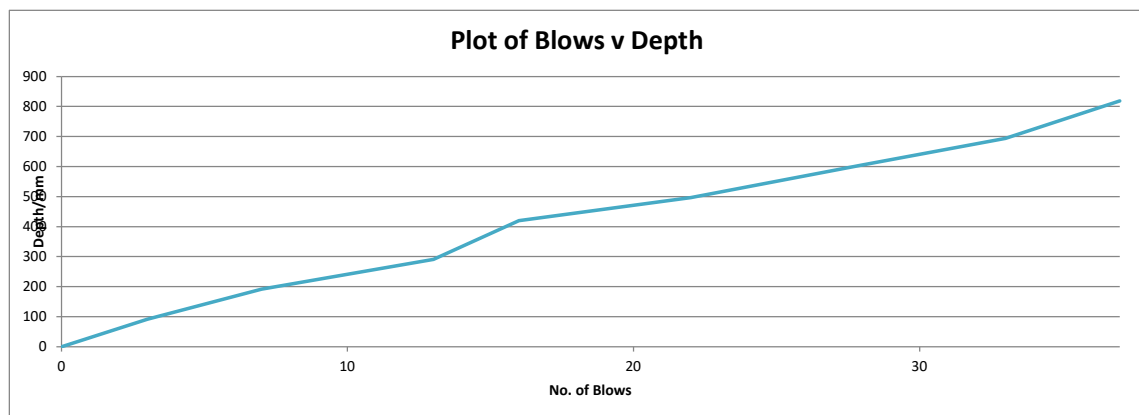


Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP8
Date: 25/07/2022

Title	DCP8					
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)	
0	100	0	3	3	6	
100	200	3	8	5	13	
200	300	8	13	5	13	
300	400	13	16	3	6	
400	500	16	22	6	16	
500	600	22	28	6	16	
600	700	28	33	5	13	
700	800	33	36	3	6	
800	900	36	42	6	16	



Dynamic Cone Penetration Test (DCPT) for Subgrade Assessment



Project No: 73792
Site: Land West of Police Row, Therfield
Test Location: DCP9
Date: 25/07/2022

Title	DCP9					
start (mm bgl)	finish (mm bgl)	start	finish	DCP Blows	CBR (%)	
0	100	0	6	6	16	
100	200	6	12	6	16	
200	300	12	17	5	13	
300	400	17	26	9	23	
400	500	26	31	5	13	
500	600	31	35	4	10	
600	700	35	38	3	6	
700	800	38	42	4	10	
800	900	42	45	3	6	

