GROUND ENGINEERING LIMITED

Newark Road
Peterborough
PE1 5UA
Tel: 01733 566566
e: admin@groundengineering.co.uk

UPDATED GROUND INVESTIGATION REPORT

PHASE 2 - LAND OFF FLEET ROAD HOLBEACH LINCOLNSHIRE

Report Reference C15929A

On behalf of:-

Kaplan Property Group
Unit 6
Kibworth Business Park
Nursery Court
Kibworth
LE8 0EZ

September 2023

CONTENTS

Introduction	Page 1
Location, Topography and Geology of the Site	Page 2
History of the Site	Page 3
Summary of Environmental Data	Page 6
Preliminary Risk Assessment	Page 9
Site Work	Page 13
Laboratory Work	Page 15
Ground Conditions	Page 17
Comments on the Ground Conditions in Relation to Foundation Design and Construction	Page 20
Comments on the Soil Chemical Test Results	Page 26
Soil Gas Monitoring Results	Page 31
Updated Conceptual Model	Page 32
Comments on Ground Contamination in Relation Proposed Development	Page 33

PLANS

Site Location Plan

Exploratory Hole Location Plan

Proposed Site Plan

RECORDS & RESULTS

Exploratory Hole Records

Table of Standard Penetration Test Results

Groundwater & Gas Monitoring Record

Geotechnical Laboratory Test Results

Chemical Laboratory Test Results

FIGURES

Figure 1 – SPT'N' value v depth below ground level (m)

Figure 2A – Soil Profile

APPENDICES

Historical Map Extracts	Appendix 1
Environmental Database Search	Appendix 2
Concrete Requirements Against Sulphate Attack	Appendix 3

KAPLAN PROPERTY GROUP

UPDATED GROUND INVESTIGATION REPORT

FOR

PROPOSED RESIDENTIAL DEVELOPMENT

AT

PHASE 2 - LAND OFF FLEET ROAD

FLEET

HOLBEACH

LINCOLNSHIRE

Report Reference No. C15929A **September 2023**

INTRODUCTION

The client, Kaplan Property Group, propose to build a new residential development at Phase 2, land off Fleet Road, Fleet, Holbeach near Spalding in Lincolnshire. The proposed development layout is presented on a plan following this report text.

Ground Engineering Limited was commissioned by the client to carry out a ground investigation to determine the nature and geotechnical properties of the underlying soils, and provide information for the design and construction of the foundations. A desk study checking past uses and a contamination assessment were also included within the scope of this report. Based on the findings of an initial investigation, Ground Engineering Limited report referenced C15929 dated June 2023, additional contamination investigation was proposed by the client, and this report is a summary of the combined findings. Ground Engineering Limited had previously undertaken a site investigation for the client on the adjacent site, Phase 1, report C15102A dated December 2020.

LOCATION, TOPOGRAPHY AND GEOLOGY OF THE SITE

The 1.66 hectare site lies along the south side of Fleet Road (B1515), Fleet, Holbeach, near Spalding in Lincolnshire. The site is centred at National Grid Reference TF 3740 2484. The site location is shown on plans following this report text.

The site comprises a field, immediately east of the clients' Phase 1 housing development, which was nearly complete (June 2023). The western part of the field had been churned up by builders using the area for storage for the adjacent Phase 1 development. The wedge shaped site was bounded by houses fronting Fleet Road to the north; by the new Phase 1 house to the west, and drains bordering the field to the south and east.

There were mature trees and hedges along the northern boundary of the site in the adjacent gardens.

The site stands at an elevation of approximately 3mOD, on level ground within the Lincolnshire Fens.

The geological map for the area, sheet 144 at 1:50,000 scale, shows the site to be underlain by a thick succession of Terrington Beds, more recently identified as Tidal Flat Deposits. These silt and fine sand soils are indicated to rest on the solid geology of the Ampthill Clay Formation at depth. Fleet Road to the north of the site is indicated to be the location of the 'probable Saxon coastline'. Previous work in the vicinity has found a Marine Sand and in turn glacial Boulder Clay or 'Till' beneath the surface layer of Tidal Flat Deposits. Marine Sand was found to at least 15m depth on the adjacent Phase 1 area.

HISTORY OF THE SITE

Research into the site history involved reference to historical Ordnance Survey (OS) maps, photographs and information obtained from the internet. The map extracts studied are presented in the desk study map section, Appendix 1, and are described below. Distances are approximate.

OS extract studied	*Description*
1887 Lincolnshire Sheet 135SE Scale 1:10,560 **Figure A**	The site is undeveloped within fields, with a field boundary aligned approximately north-south crossing the site. The site is on the southern side of a property fronting an east-west aligned road further north. A drain is evident along the field boundary to the south of the site.
1888 Lincolnshire Sheet 135.11 Scale 1:2500 **Figure B**	The site and its immediate surrounding area appear unchanged. A pump is shown beside the property to the north of the site.
1904 Lincolnshire Sheet 135.11 Scale 1:2500 **Figure C**	The site appears generally unchanged, however a drain is now shown along the eastern boundary of the site. The house and outbuildings have been cleared from the adjacent area to the north of the site.
1931 Lincolnshire Sheet 135.11 Scale 1:2500 **Figure D**	The site is within an orchard, with an outbuilding off-site to the north of the site. The field boundary is no longer shown crossing the site. New houses have been built off-site to the north-west fronting the opposite side of Fleet Road.
1938 Lincolnshire Sheet 135SE Scale 1:10,560 **Figure E**	The site remained undeveloped within an orchard. New buildings are shown off-site to the north fronting Fleet Road.
1950 Lincolnshire Sheet 135SE Scale 1:10,560 **Figure F**	The site area remained undeveloped and is no longer denoted as an orchard. The northern site boundary is defined by the rear gardens of housing fronting Fleet Road.
1969 Sheets TF3724 & TF3725 Scale 1:2500 **Figure G**	The site area appeared unchanged. A depot is shown approximately 35m north-west of the site fronting Fleet Road.

OS extract studied	*Description*
1981 Sheets TF3724 & TF3725 Scale 1:2500 **Figure H**	The site and its immediate surrounding area appear generally unchanged. A large new property is shown 130m south-west of the site.
1991 Sheets TF3724 & TF3725 Scale 1:2500 **Figure I**	The site area remains undeveloped and unchanged. A drain 100m west of the site is now truncated within the adjacent field.
1999 Aerial Photograph Page 12, Appendix 2	The site is within fields which are sub-divided growing a variety of crops. The depot to the north-west, and houses to the north of the site are also evident. Trees are present in the rear gardens to the north of the site.
2001 Sheets TF32SE & NE Scale 1:10,000 **Figure J**	The site and its immediate surrounding area appear unchanged.
2003 Sheet TF3724NW Scale 1:1250 **Figure K**	The site and its immediate surrounding area appear unchanged.
2007 Aerial Photograph Page 11, Appendix 2	The site is planted with a variety of crops. Approximately 45m west of the site there is what appear to be cloches. The depot site to the north-west of the site has been redeveloped with houses (Chapman Mews).
2010 Sheets TF32SE & NE Scale 1:10,000 **Figure L**	The site and its immediate surrounding area appear unchanged.
2015 Aerial Photograph Page 10, Appendix 2	The site area appears generally unchanged, however the crops within the eastern area are different.
2018 Aerial Photograph Page 9, Appendix 2	The site remains undeveloped within a field. Only one of the cloches was evident to the west of the site. A new road and houses are under construction on the northern side of Fleet Road.
2021 Aerial Photograph Page 8, Appendix 2	The site remains as a field. The last of the cloches is not evident to the west of the site.
2023 Sheet TF3724NW Not to Scale **Figure M**	The site and its immediate surrounding area appear unchanged.

Summary of Historical Information

The Ordnance Survey map of 1887 showed that the site was undeveloped within fields. The site was denoted to be an orchard in the 1930s, which was no longer shown by the 1950s. The site has remained undeveloped to the present day. The site was undeveloped, although a little churned up by the adjacent building works, at the time of this investigation in April 2023.

Off-site, a house had been built to the north before 1887, with further housing constructed to the north in the 1950s and 1960s. A depot to the north-west had been extended southwards by the late 1960s, and had been redeveloped with housing off Chapman Mews by 2010.

SUMMARY OF ENVIRONMENTAL DATA

Appendix 2 contains information derived from Environmental Databases for a radius of up to 2,000m from the site. The information covers datasets held by Groundsure with contributors including the local authority, the Environment Agency (EA), British Geological Survey, Ordnance Survey and the Coal Authority and the results, within a radius of 250m, are summarised below:

1-2. Historical Industrial Sites	**On-Site**	**0 - 250m**
Potentially Contaminative Uses (1:10,000 mapping)	1	3
Historical Tank Database	0	1
Historical Energy Features Database	0	0
Historical Petrol & Fuel Site Database	0	0
Historical Garage & Motor Vehicle Repair Database	0	2
3. Landfill and Other Waste Sites	**On-Site**	**0 - 250m**
Landfill Sites	0	0
Historical Landfill and Other Waste Sites	0	0
Waste Exemptions	0	1
4. Current Land Use	**On-Site**	**0 - 250m**
Current Industrial Sites Data	0	9
Records of Petrol and Fuel Sites	0	1
Underground Electricity, High Pressure Oil and Gas Pipelines	0	0
Sites Determined as Contaminated Land under Part IIA EPA 1990	0	0
Records of COMAH and NIHHS Sites	0	1
Environmental permits/pollution incidents/registers	0	4
5-6. Hydrogeology and Hydrology	**On-Site**	**0 - 250m**
Productive strata within superficial geology beneath the site	No	
Productive strata within solid geology	No	
Groundwater Abstraction Licences	0	0
Surface Water Abstraction Licences	0	0
Potable Water Abstraction Licences	0	0
Source Protection Zones	0	0
Water Network Entries	0	8
Surface Water Features	1	4

7-9. Flooding		
Risk of flooding from rivers & the sea (RoFRaS) rating	Low (within 50m)	
Historical flood events	0	0
Flood defences within 250m of site	No	
Any areas benefitting from flood defences within 250m of site	No	
Flood storage areas within 250m of site	No	
Environment Agency indicative Zone 2 floodplains within 50m of site	Yes	
Environment Agency indicative Zone 3 floodplains within 50m of site	Yes	
Surface water flooding on site	1 in 30 year (0.10m to 0.30m)	
Groundwater flooding on site	Negligible	
10-13. Designated Environmentally Sensitive Sites	**On Site**	**0 - 250m**
Environmentally sensitive sites	1	1
14-16. Geology		
Artificial Ground or Made Ground records	0	0
Superficial Ground and Drift Geology records beneath the site	Yes	

17. Natural Hazards (on site)

Hazard	Negligible	Very Low	Low	Moderate	High
Shrinking or Swelling Clay	-	-	On-site	-	-
Running Sand	-	-	-	On-site	-
Compressible Ground	-	-	-	On-site	-
Collapsible Rocks	On-site	-	-	-	-
Landslides	-	On-site	-	-	-
Soluble rocks	On-site	-	-	-	-

18. Mining		
Surface ground workings	0	0
Underground workings	0	0
Non coal-mining areas within 50m of site	0	0
Mining cavities	0	0
Brine affected areas on study site	No	
19. Radon		
The property is not in a Radon Affected Area, as less than 1% of properties are above the action level. No Radon Protective Measures are required for new properties or extensions.		

Database Summary

Historical maps identify a depot 35m north-west of the site. Historical maps also identify an industrial estate 158m to the north-west, and a workhouse 197m north-west. An unspecified tank is recorded 211m west of the site at a former garage site. There are no electricity sub-stations within 250m of the site. Historical garages are recorded 152m and 224m west of the site. No areas of potentially infilled land, landfills or waste sites are recognised within 250m of the site. There is a waste exemption for use of waste in construction 77m west of the site, in the Phase 1 area.

Current land uses around the site are businesses within the industrial estate at least 158m to the north-west. An active petrol station is identified 225m west of the site. A historical COMAH site is identified within the industrial estate to the north-west, as well as a hazardous substance storage site although there are no further details available. A licensed waste oil burner is also recorded at A&J Services 235m north-west of the site.

A pollution incident for 'smoke' was recorded 190m west of the site in 2003, which had a minor impact on air and no impact on water or land.

No made ground is recorded beneath the site. Superficial Tidal Flat Deposits are recorded beneath the site, which are classified by the EA as an 'Unproductive' stratum. The underlying solid geology Ampthill Clay Formation is also classified by the Environment Agency (EA) as an 'Unproductive' stratum. There are no groundwater abstractions within 250m of the site. The site is not within a source protection zone.

Drains are recorded along the southern and eastern field boundaries of the site. The site is within a Zone 2 and Zone 3 floodplain, and has a low risk of flooding. The site is within a SSSI impact zone, an environmentally sensitive area.

There is a moderate hazard from running sand and compressible ground; a low hazard from shrinking and swelling clay; a very low hazard from landslides; and a negligible hazard from collapsible rocks and soluble rocks.

The site is not in a radon affected area and no radon protection measures are required for new dwellings on the site.

The site is not in an area where underground mining or brine extraction may have occurred.

PRELIMINARY RISK ASSESSMENT

Potential sources of contamination present on or beneath the site would relate primarily to; the historical use of the site; the presence of contaminated soil; and the potential presence of hazardous or ground gas beneath the site.

In order to assess the risks associated with the presence of ground contamination the linkages between the sources and potential receptors to contamination need to be established and evaluated. This is in accordance with the Environmental Protection Act 1990, which 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 on or under the land such that;

- *Significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *Pollution of controlled waters is being, or is likely to be, caused.*

There are three principal factors that are assessed whilst undertaking a qualitative risk assessment for any site. These are the presence of a contamination source, the existence of migration pathways and the presence of a sensitive target(s). It should be noted that it is necessary for each element of source, pathway and target to be present in order for exposure of a human or environmental receptor to occur.

UK Government guidance on the assessment of contaminated land, requires risk to human health and the environment to be reviewed using source – pathway – target relationships. If each of these elements is present, the linkage provides a potential risk to the identified targets.

Contaminants or ***potential pollutants*** identified as ***sources*** in relation to the identified previous uses are listed overleaf in Table 1.

Table 1: Identified Potential Contaminant Sources

Contaminant Source	*Comments*
Drainage	Field drains could provide a contaminant source.
Soil Beneath Site	Contamination may be present within any made ground on the site.
Soil Gas	Potential soil gas generated from made ground or natural soils.
Ground Contamination Outside Site Boundary	Ground contamination migrating from adjoining sites, such as the depot to the north-west.

A ***Pathway*** is defined as one or more routes through which a receptor is being, or could be, exposed to, or affected by, a given contaminant.

Potential ***Target or Receptors*** fall within the categories of Human Health, Water Environment, Flora and Fauna, and Building Materials.

There are a number of possible pathways for the contaminants identified on the site to impact human and/or environmental receptors and these are summarised in Tables 2 and 3.

Table 2: Human Receptors and Pathways

Human Receptor-Mechanism	*Typical Exposure Pathway*
Human Inhalation	Breathing Dust and Fumes Breathing Gas emissions
Human Ingestion	Eating -contaminated soil, for example by small children -produce grown on contaminated soil Ingesting dust or soil on vegetables Drinking contaminated water
Human Contact	Direct skin contact with contamination Direct skin contact with contaminated liquids

Table 3: Water Receptors and Pathways

Receptor-Water Environment	*Typical Exposure Pathway*
Groundwater The superficial Tidal Flat Deposits are indicated to be an 'Unproductive' stratum. The underlying solid geology Ampthill Clay Formation is also indicated to be an 'Unproductive' stratum. The site is not within a Source Protection Zone.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and migrate to underlying groundwater. Contamination leads to restriction/prevention of use as a resource, for example, drinking water, and can have secondary impacts on other resources, which depend on it.
Surface Water/Watercourses Surface water drains are present along the southern and eastern site boundaries.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and laterally migrate. Contamination leads to a restriction/prevention of use: -as drinking water resource -for amenity use Effects on aquatic life.

Preliminary Conceptual Model

Assessment of the potential linkage between ground contamination sources, human and environmental receptors have been assessed based on the desk study research documented in the preceding sections of this report.

A generalised preliminary conceptual model is presented below in Table 4.

Table 4: Preliminary Conceptual Model Relative to Residential Development

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources			
		Drainage	**Soil Beneath Site**	**Soil Gas**	**Ground Contamination Outside Site Boundary**
Human Health – ground workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low likelihood	Low likelihood	Low likelihood	Low likelihood
Human Health – end users	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Unlikely	Low likelihood	Low likelihood	Low likelihood
Water Environment	Migration through ground into surface water or surrounding groundwater	Low likelihood	Low likelihood	Unlikely	Low likelihood
Flora	Vegetation on site growing on contaminated soil	Low likelihood	Low likelihood	Low likelihood	Unlikely
Building Materials	Contact with contaminated soil	Low likelihood	Low likelihood	Low likelihood	Low likelihood

Key to Table 4 **Estimated Potential for Linkage with Contaminant Source**	**Definition**
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such an event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.
N/A	Not Applicable.

SITE WORK

The initial site work conducted between 4th and 11th April 2023 comprised two cable percussion boreholes (BH1 and BH2) and five hand augered boreholes (HA1 to HA5). Four additional hand augers (HA6 to HA9) were undertaken on 2nd August 2023. The positions are shown on the exploratory hole location plan following this report text, which were selected to provide coverage of the proposed housing development area and landscaped area to the south.

Public utility service drawings were sourced and consulted prior to determining the exploratory hole positions. Prior to excavation, a service scan was made at each position using a CAT (Cable Avoidance Tool) to check for the absence of detectable buried services that may otherwise have been damaged by the investigation. Prior to the start of boring, an inspection pit was dug to 1.20m below ground level using hand tools to ensure the absence of buried services at each cable percussion borehole location.

The exploratory hole records, presented following the plans, give the descriptions and depths of the various strata encountered, details of all samples taken, in-situ tests, installation details and the groundwater conditions observed during and on completion of boring, and subsequent monitoring.

Cable Percussion Boreholes

The boreholes BH1 and BH2 were undertaken by a standard cable percussive boring rig, using claycutter and shell boring tools within 150mm diameter casing installed to a maximum 14.30m depth. The boreholes were sunk to depths of 15.00m below ground level.

Representative small disturbed and bulk samples of soil were taken from the boring tools at regular intervals throughout the depth of the boreholes. Water samples were also taken once sufficient water had entered the boreholes.

Standard penetration tests (SPT) were undertaken in order to give an indication of the in-situ density of the soils. The tests were made by driving a split spoon (S) attachment into the soil at the base of the borehole by means of an automatic trip hammer weighing 63.50kg falling freely through 760mm. The penetration resistance was determined as the number of blows 'N' required to drive the tool the final 300mm of a total penetration of 460mm into the soil

ahead of the borehole. The SPT test is fully described in BS EN22476:3:2005, the results of these tests are presented on the borehole records, tabulated following the borehole records, and have been plotted against depth in Figure 1 and the soil profile Figure 2.

On completion of the boreholes, gas and groundwater monitoring standpipes were installed to 6.00m depth in BH1, and 7.00m depth in BH2, with clean arisings below to the base of the boreholes. The pipes were perforated to within 1.00m of ground level and the annulus backfilled with pea gravel. A bentonite seal was placed from ground surface to 1.00m depth and a gas tap fitted in each installation. Protective stopcock covers were concreted in place at ground level above the installations.

Hand Excavated Boreholes

Boreholes HA1 to HA9 were undertaken using hand tools to between 0.70m and 1.10m depth to provide coverage across the site. The exposed strata were sampled and recorded by a Geoenvironmental Engineer. Representative small disturbed and environmental jar samples of soil were taken at regular intervals throughout the depth of each borehole.

The boreholes were backfilled with compacted arisings upon completion.

Gas and Groundwater Monitoring Visits

As part of the investigation four return visits were made to site on 17th and 24th April, 2nd May, and 14th June 2023, when the standpipes installed within boreholes BH1 and BH2 were monitored for a standing groundwater level and for landfill type gases using a Gasdata GA5000 analyser. The results of the monitoring visits are presented following the exploratory records.

LABORATORY WORK

The samples were inspected in the laboratory and assessments of the soil characteristics have been taken into account during preparation of the borehole records. The soil descriptions have been made in accordance with BS5930:2015+A1:2020. The geotechnical test results, undertaken in accordance with BS1377:1990, 2016 & 2022, are presented following the exploratory hole records. The chemical test results follow the geotechnical test results.

The moisture content and index properties of selected soil samples were determined as a guide to soil classification and behaviour. The liquid limit was determined by a cone penetrometer.

The particle size distribution of selected samples of silt and sand were determined by sieve analysis. The particle size distribution passing the 63μm sieve was obtained by pipette sedimentation on selected samples. Results of these tests have been combined and are presented as particle size distribution curves at the end of this report.

California Bearing Ratio (CBR) tests were performed on selected recompacted near surface samples in accordance with Lincolnshire County Council's specification. The samples were recompacted using a 2.5kg rammer (BS light), and the test consisted of jacking into the soil a cylindrical plunger with a cross sectional area of 1935mm^2. A force of 50N was applied initially to seat the plunger on the soil surface and then the plunger was made to penetrate the soil at a uniform rate of 1mm/min. Readings of force were taken at intervals of penetration of 0.25mm to a penetration not exceeding 7.50mm. The CBR value is the ratio of the force required to achieve 2.5mm or 5.0mm penetration to standard forces expressed as a percentage.

Selected samples of soil and groundwater were analysed to determine the concentration of soluble sulphates. The pH values were also determined.

Chemical analysis of nine soil samples recovered from the exploratory holes was undertaken, by an independent laboratory, primarily for characterisation purposes. The samples were tested for a suite encompassing a wide range of potential contaminants outlined by the Environment Agency (EA) and National House Building Council (NHBC) document R&D 66;

2008 ‘Guidance for the Safe Development of Housing on Land Affected by Contamination’. In addition, the initial five tested soil samples were tested for total petroleum hydrocarbons (TPH).

GROUND CONDITIONS

The ground conditions have been plotted as a soil profile in Figure 2A. The ground conditions comprised a surface layer of made ground or topsoil to between 0.15m and 0.50m depth, underlain by superficial Tidal Flat Deposits comprising sandy, silty clay and slightly gravelly, clayey silt/sand to between 0.60m and 3.00m depth. The Tidal Flat Deposits were underlain by initially loose becoming medium dense Marine Sand, which was encountered to at least the base of the deepest boreholes at 15.00m depth. Groundwater was recorded between 0.90m and 1.46m depth during the investigation.

Made Ground/Topsoil

Made ground was encountered to between 0.15m and 0.50m depth in BH1, BH2, HA6, HA7 and HA9, located in the northern, western and southern parts of the site. The made ground comprised brown, slightly clayey, silty sand/gravel fill varying to slightly clayey, fine sandy silt fill. The gravel fraction comprised angular to rounded flint, igneous rock, limestone, concrete, brick, ash, tile, pottery and glass fragments.

Topsoil was encountered in hand auger boreholes HA1 to HA5 and HA8, to between 0.15m and 0.40m depth. The topsoil generally comprised soft, locally firm, brown and light brown, slightly sandy, silty clay.

Tidal Flat Deposits

Beneath the surface made ground and topsoil at between 0.15m and 0.50m depth, soft or firm, orange brown, light brown and brown, slightly sandy to sandy, silty clay, varying to clayey, silty fine sand, was encountered. These soils were locally slightly gravelly in BH1 and BH2, with a gravel fraction of angular to rounded flint, limestone and sandstone. These soils were considered to represent the anticipated superficial Tidal Flat Deposits, and were encountered to depths of between 0.60m (HA3) and at 1.20m (BH1 & BH2). In boreholes BH1 and BH2, from 1.20m to 3.00m below ground level, loose becoming medium dense, brown,

slightly gravelly, clayey silt/sand was encountered, which had a gravel fraction of fine and medium grained, angular and sub-angular flint. These soils were considered to represent a 'roddon' (infilled Tidal Creek) within the Tidal Flat Deposits. The shallow hand auger boreholes HA1, HA2 and HA5 were completed within the Tidal Flat Deposit soils.

Marine Sand

At depths of between 0.60m and 3.00m, light brown, orange brown and brown, slightly clayey to clayey, silty to very silty fine sand was encountered. These Marine Sand soils were initially loose in BH2 becoming medium dense below about 7.00m depth, and medium dense in BH1. Below 6.00m/7.00m depth the Marine Sand comprised a brown and grey, silty fine sand with occasional shell fragments and black carbonaceous specks, which was encountered to at least the base of the boreholes at a depth of 15.00m.

Groundwater

Groundwater seepages were recorded during boring at 0.90m (HA4), 1.08m (HA5), 2.00m rising to 1.90m (BH1) and 2.50m rising to 2.40m depth (BH2). No groundwater was recorded during boring or on completion of the shallow boreholes HA1 to HA3, and HA6 to HA9, within 0.70m to 1.05m below ground level. During monitoring of the standpipes in April to June 2023 groundwater was recorded at between 1.09m and 1.46m depth, with the water levels falling during the monitoring period.

Observations

Live roots were observed to a maximum depth of 1.20m in BH2.

Evidence of Contamination

The made ground encountered during this investigation was not noted to have olfactory or visual evidence of fuel contamination. The made ground contained occasional

fragments of concrete, brick, ash, tile, pottery and glass. No asbestos containing materials were noted in the soils during this investigation, or during testing.

COMMENTS ON THE GROUND CONDITIONS IN RELATION TO FOUNDATION DESIGN AND CONSTRUCTION

This investigation found made ground and topsoil to depths of between 0.15m and 0.50m, covering superficial soft or firm Tidal Flat Deposits, and in turn loose becoming medium dense Marine Sand to at least 15.00m depth. Groundwater was recorded as shallow as 0.90m depth during the investigation. The superficial deposits (clay, silt and sand) could offer support for lightly to modest loaded traditional foundations for the proposed housing development, however large irregular shaped buildings and heavy loads are likely to require piled foundations.

The proposed development was understood to comprise construction of new semi-detached and detached dwellings, with associated access roads and gardens. Foundations will need to extend through the root affected and cohesive Tidal Flat Deposits, into the water bearing, loose/medium dense, slightly gravelly, clayey, silt/sand varying to clayey, silty sand of the Marine Sand, or possibly piled into the Marine Sand at depth. Excavations below about 1.00m depth are likely to encounter groundwater, which will need to be controlled.

Traditional Shallow Foundations

Large scale processes of natural sedimentation allow a certain degree of confidence to be placed in the absence of important variation of the engineering properties of natural soils across sites. The made ground which had variable bearing properties and was found to a maximum depth of 0.50m, and should be avoided as bearing strata.

Samples of the near surface clay had modified plasticity indices of between 11% and 26%, and the silty clay is rated as having a low or medium volume change potential based on NHBC Standards Chapter 4.2 ‘Building near trees’ (2023). A minimum foundation depth of 0.90m in the naturally deposited clay soils beneath this site, where remote from trees, would be considered appropriate in order to penetrate the zone affected by seasonal moisture content and volume change.

In summary, foundations for the new dwellings will need to be a minimum of 0.90m deep, and preferably extended into non-shrinkable silty sand soils where present. Piled foundations may provide an economic alternative to support the proposed dwellings, particularly as foundations greater than about 1.00m deep will be problematical as they would extend below the groundwater table.

Bearing Capacity

Based on the findings of this investigation, the firm clay of the Tidal Flat Deposits at 0.90m depth would have a maximum safe bearing capacity of 80kN/m^2 beneath a 0.60m wide strip footing, with a factor of safety of 3.0 applied against shear failure, for settlement within 25mm.

Foundations should ideally be extended to bear within the non-shrinkable, loose and medium dense silty fine sand Tidal Flat Deposits/Marine Sand, encountered below 0.60m to 1.20m depth, which could provide a suitable founding stratum. The naturally deposited silty sand has an allowable bearing pressure of 80kN/m^2 for foundations up to 1.20m wide, and 75kN/m^2 for foundations up to 2.00m wide. These bearing pressures should limit immediate settlement to 25mm. Similarly, the Tidal Flat Deposits beneath a nominal 12m by 8m raft foundation would have an allowable bearing pressure of 30kN/m^2 which should limit the immediate settlement to 50mm.

Excavations

The made ground together with the underlying soils should be easily removed within excavations for the proposed buildings. The sides of excavations within any made ground, Tidal Flat Deposits and Marine Sand, may be unstable and should not be relied upon to stand unsupported.

Excavations could be expected to encounter groundwater at depths between 0.90m and 1.10m. The groundwater levels may fluctuate seasonally and such inflows would locally be accompanied by ‘running sand’ conditions and resulting side instability. Care should be taken not to excavate below the water table in the absence of suitable groundwater control, such as

dewatering via screened sumps or well points and side support by interlocking sheeting. The clays, and silty sands are prone to rapid softening, deterioration and loosening in the presence of water, with loss of their modest bearing properties. Care should be taken to keep the excavations dry.

Attention should be given where personnel are to enter deep excavations, when sides should either be safely battered back, or close side support provided, in order to comply with statutory safety requirements and prevent sidewall collapse.

Piled Foundations

If foundations are required below 1.00m deep and the groundwater table, then piled foundations may be preferable. The underlying Marine Sand would provide a suitable pile bearing stratum. The advice of a specialist piling contractor should be sought with regard to suitable methods of pile installation. The silty Marine Sand will require use of casing for bored piles and attention should be made to the possibility of 'necking' of concrete within such soils. Driven, bored or Continuous Flight Augered (CFA) piles could be used.

Preliminary working loads for a single bored pile may be estimated for preliminary cost and design purposes using the pile bearing coefficients given over page, which are based on the following assumptions;

1. The ultimate load on a pile would be the sum of the adhesion in clay, and friction in sand, acting on the shaft of the pile together with the end bearing load.
2. The adhesion acting on the shaft of a pile is a function of the values of apparent cohesion within the clay, presented on the laboratory test results.
3. The friction acting on the shaft of a pile is a function of the density of silt and sand, taken from the SPT 'N' values presented on the borehole records, plotted against depth in Figure 1 and on the soil profile in Figure 2, together with the effective overburden pressure.

4. The end bearing load in Marine Sand would be a function of the in-situ test results presented on the borehole records, plotted against depth in Figure 1, on the soil profile Figure 2, and the effective overburden pressure.
5. A factor of safety of at least 2.0 would be used to assess the working load and if test loading of selected piles were not practical, the factor of safety (F) would be increased to at least 2.5. A factor of safety of 3.0 would be used on predominantly end bearing piles, as would be the case on this site.
6. Where piles are installed in groups it will be necessary to position them at least 3.0 diameters apart, centre-to-centre, otherwise a reduction in individual working load will need to be taken into account.

Item	**Ultimate Pile Bearing Value (kN/m^2)**
Adhesion in made ground or root affected clay	Ignored
Adhesion/friction in Tidal Flat Deposits to 1.20m	20
Friction in Marine Sand to 7.00m depth	15
Friction in Marine Sand 7.00m to 15.00m depth	20
End bearing in medium dense Marine Sand below 7.00m depth	3200
End bearing in medium dense Marine Sand below 10.00m depth	5200

Based on these coefficients at BH1, it is estimated that a single 450mm diameter bored pile installed to 7m depth within the medium dense Marine Sand, would have a working load of 200kN (F=3.0), increasing to 330kN (F=3.0) at 10m depth.

Larger diameter piles would have increased working loads. For example, the same 7m and 10m length piles at 600mm diameter would have working loads of 340kN and 565kN respectively, both with a factor of safety of 3.0 applied.

The advice of a specialist piling contractor should be sought prior to design.

Floor Slabs

Ground bearing floor slabs could be adopted for the new properties where they are beyond the zones of influence from trees, and the naturally deposited clay/silt and non-shrinkable silty sand soils are present at shallow depth.

Ground bearing floor slabs should not be adopted for proposed buildings within influencing distance of neighbouring trees, particularly where buildings are proposed close to the site margins. Damaging differential heave movements could occur across such slabs, particularly where they cover any clay affected by recently severed tree roots. Suspended floor slabs will be required to avoid the anticipated large total and differential consolidation settlements, together with any volume change movements within root affected clays, providing that the sub-floor gaps recommended in Table 7 of the NHBC Standards Chapter 4.2 (2023), are adopted. Suspended floors should be considered if piled foundations are adopted as this would be necessary to prevent differential settlement between the slab and main structure.

Raft foundations should avoid problems associated with shallow root affected clays, since they will require a minimum depth of 0.75m and in areas close to trees they will need to be placed on a compacted stone blanket extending up to 1.25m below ground level.

Hardstanding

Naturally deposited, generally soft or firm, sandy, silty clays or loose, clayey, silty fine sand was encountered at sub-grade level across this site.

Based on IAN 73/06, Table 5.1 recommends a design CBR value of 1.0% for silt, and 3.0% for sandy clay with a plasticity index of 10%.

Laboratory CBR tests yielded CBR values ranging between 0.6% and 2.6%. A design CBR value of 1.0% for the naturally deposited sandy, silty clay should be adopted for hardstanding design on this site, although the pavement construction will need to be at least 450mm thick since the silty soils are considered to be potentially frost susceptible in accordance with Road Note 29, Appendix 1.

The sub-grade should be suitably compacted and inspected, with any topsoil, very soft, organic or desiccated clays being removed and replaced with suitable well-graded coarse-grained fill. Care should be taken not to allow exposed silt/clay soils at sub-grade level to become exposed to inclement weather conditions, since they are prone to rapid softening and deterioration. A permeable geotextile should be incorporated in order to prevent both loss of any sub-base material into the sub-grade and migration of sub-grade soils into the overlying sub-base.

Sulphate Conditions

Sulphate analysis of selected samples of soil and groundwater yielded soluble sulphate concentrations within Design Sulphate Classes DS-1 and DS-2 of the BRE Special Digest 1, Table C1 (2001), presented in Appendix 3. The pH results of the samples ranged between 6.9 and 8.4 indicating slightly acidic to alkaline conditions.

These results indicate an Aggressive Chemical Environment for Concrete (ACEC) Class of AC-2 for buried concrete. This ACEC Class should be considered when specifying a Design Chemical Class (DC Class) for buried concrete on this site, as detailed in the above cited BRE document.

COMMENTS ON THE SOIL CHEMICAL TEST RESULTS

The results of the laboratory chemical testing on near surface soil samples have primarily been compared to soil screening values (SSVs) produced by Land Quality Management Limited (LQM) and the Chartered Institute for Environmental Health (CIEH) presented in their document 'The LQM/CIEH S4ULs for Human Health Risk Assessment: 2015 (Publication Number S4UL3608)'. The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and are transparently-derived and cautious 'trigger values' above which further assessment of the risks or remedial action may be needed. The S4ULs (Suitable for Use Levels) have been derived, in accordance with UK legislation and Environment Agency policy, using a modified version of the Environment Agency CLEA 1.06 software.

Reference has also been given to ATRISKsoil soil screening values produced by Atkins Limited and provided under licence to Ground Engineering Limited. Atkins SSVs have been derived in line with the Environment Agency 2009 guidance using the CLEA 1.071 software. With the absence of a S4UL for cyanide the ATRISKsoil SSV has been used as the soil screening criteria within this report.

In 2014 the Department for Environment Food and Rural Affairs (DEFRA) published, in their document SP1010, Category 4 Screening Levels (C4SL) for several contaminants including lead. The C4SL represent screening levels below which the land could be considered suitable for a specified use and definitely not contaminated land in respect of those determinands. With the absence of S4UL for lead the C4SL has been used as the soil screening criteria within this report.

For each contaminant the adopted soil screening criteria have been calculated for the following land uses:

- Residential use with home grown produce
- Residential use without home grown produce
- Commercial and industrial usage

The intended purpose of the SSVs are as “intervention values” in the regulatory framework for assessment of human health risks in relation to land use. These values are not binding standards, but are intended to inform judgements about the need for action to ensure that a new use of land does not pose any unacceptable risks to the health of the intended users.

Table 5 compares the test results for the made ground with the SSVs in relation to the specified uses. The number of test results, which exceed these values, are also provided. Statistical analysis has also been undertaken on this data-set.

Table 5: Comparison of Chemical Test Results with SSVs for Near Surface Soils

Determinand	Number of Samples	Min Value mg/kg	Max Value mg/kg	Number of Samples Exceeding SSV for			Measured 95th Percentile mg/kg	Assessment Method	Soil Screening Criteria 1.0% SOM		
				Residential with home grown produce	Residential without home grown produce	Commercial/ Industrial			Residential with home grown produce mg/kg	Residential without home grown produce mg/kg	Commercial/ Industrial mg/kg
Organic Matter	9	1.3%	6.8%	-	-	-	-	-	-	-	-
Arsenic	9	12	54	2	2	0	30.39	S4UL	37	40	640
Cadmium	9	<0.10	1.0	0	0	0	0.56	S4UL	11	85	190
Chromium	9	18	41	0	0	0	29.14	S4UL	910	910	8600
Chromium (VI)	9	<0.50	<0.50	0	0	0	<0.50	S4UL	6	6	33
Lead	9	16	400	2	2	0	88.89	C4SL	200	310	2330
Mercury	9	0.06	0.53	0	0	0	0.37	S4UL	11	15	320
Selenium	9	0.59	1.4	0	0	0	1.03	S4UL	250	430	12,000
Nickel	9	15	39	0	0	0	27.21	S4UL	130	180	980
Phenols	9	<0.10	<0.10	0	0	0	<0.10	S4UL	120	440	440
Benzo[a]pyrene	9	<0.10	6.5	3	3	0	3.13	S4UL	0.79	1.2	15
Copper	9	13	62	0	0	0	37.46	S4UL	2400	7100	68,000
Zinc	9	40	400	0	0	0	203.40	S4UL	3700	40,000	730,000
Free Cyanide	9	<0.50	<0.50	0	0	0	<0.50	ATRISK	34	34	34

Notes
S4UL and C4SL for metals were derived using 6% SOM. These values are not sensitive to SOM and would also be applicable for 1% SOM and 2.5% SOM.
LQM/CIEH S4ULs 'Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3608. All rights reserved'.
ATRISKsoil SSVs produced by Atkins Limited and provided under licence to Ground Engineering Limited.

Discussion of Soil Results

The results of the laboratory analysis indicate that the made ground and topsoil contained elevated concentrations of arsenic, benzo[a]pyrene and lead, which exceeded the residential with home grown produce and residential without home grown produce soil screening values. None of the elevated concentrations of arsenic, benzo[a]pyrene and lead exceeded the associated soil screening value for a commercial/industrial end use. All of the elevated concentrations were from samples in HA1, HA2 and HA3, along the eastern edge of the site close to the boundary ditch, and were considered related to spreading of sediment on the field from periodic clearing of the ditch.

Levels of all remaining elements and compounds were within the associated soil screening values for both residential and commercial/industrial end uses.

Statistical analysis, using the mean value test, indicates the US95 value for benzo[a]pyrene exceeds the screening values for the residential end uses. The US95 value for benzo[a]pyrene does not exceed the screening value for commercial or industrial usage.

Statistical analysis, with the exception of benzo[a]pyrene, indicates that none of the other US95 values, including arsenic and lead, exceeded the screening values for the most sensitive residential with home grown produce end use; the residential without home grown produce end use; nor the screening values for commercial or industrial usage.

The made ground encountered during this investigation was not noted to have olfactory or visual evidence of fuel contamination. Total petroleum hydrocarbon concentrations in the samples tested were below the laboratory detection limit of 10mg/kg, which is not considered significant.

No asbestos containing materials (ACM) were observed within the made ground soils during site work.

In conclusion, the near surface soils along the eastern edge of the site, would not be considered suitable in the proposed gardens and landscaped areas of the residential development, although if geotechnically suitable could be used beneath buildings and areas of permanent hardstanding.

The near surface soils in the northern and southern areas of public open space, and in the proposed gardens in the central/western part of the site, would be considered suitable for retention or re-use in the proposed gardens and landscaped areas of the residential development.

SOIL GAS MONITORING RESULTS

The results of soil gas monitoring of the installations within BH1 and BH2 during the return visits in April to June 2023, found up to 4.5% methane and up to 16.3% carbon dioxide, with locally reduced atmospheric oxygen levels. The in-situ measurements recorded flow rates of less than 0.1l/hr. The results are tabulated following the borehole records. These in-situ measurements indicate a gas screening value (GSV) of 0.0045l/h for methane, and 0.0163l/h for carbon dioxide.

These GSVs fall within Characteristic Situation CS1 as defined by BS8485:2015+A1:2019 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings', however with methane concentrations exceeding 1.0% volume on all four visits (BH1), and carbon dioxide exceeding 5.0% volume on the last two visits (BH2), it is recommended that Characteristic Situation CS2 is adopted. Based on these levels, gas protectionary measures are required for the proposed dwellings on this site. It is recommended that at least two additional gas monitoring visits are undertaken, preferably with at least one visit during a period of low and falling atmospheric pressure, to further characterise the gas regime on the site.

These results indicate a low hazard potential, and that gas protection measures such as reinforced floor slabs and ventilation protection measures should be adopted, with further details provided in BS8485:2015.

UPDATED CONCEPTUAL MODEL

Assessment of the potential linkage between ground contamination sources, human and environmental receptors have been assessed based on the desk study research and the intrusive ground investigation documented in the preceding sections of this report.

A generalised conceptual model relative to the existing site and proposed residential use of the site is presented in Table 6 below.

Table 6: General Conceptual Model Relative to Future Residential Development

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources			
		Drainage	**Soil Beneath Site**	**Soil Gas**	**Ground Contamination Outside Site Boundary**
Human Health – ground workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low	Low	Moderate	Very Low
Human Health – users of completed development	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	N/A	Low	Low	Very Low
Water Environment	Migration through ground into surface water or groundwater	Low	Very Low	Very Low	Low
Flora	Vegetation on site growing on contaminated soil	Very Low	Very Low	Very Low	Very Low
Building Materials	Contact with contaminated soil	Very Low	Very Low	Very Low	Very Low

Key to Table 6 Risk	**Definition**
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or, there is evidence that severe harm to a designated receptor is currently happening. The risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) and remedial works may be necessary in the short term and likely over the long term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.
N/A	Not Applicable because the proposed development will remove the source.

COMMENTS ON GROUND CONTAMINATION IN RELATION TO PROPOSED DEVELOPMENT

Anticipated exposure scenarios relating to the existing site, the site history and proposed residential end use of the site, in the context of the conceptual model, are discussed as follows.

This investigation may not have revealed the full extent of contamination on the site and appropriate professional advice should be sought if subsequent site work reveals materials that may appear to be contaminated.

Contaminated Soil

On the basis of the ground investigation, the site is underlain by between 0.15m and 0.50m of made ground and topsoil. The chemical testing along the eastern edge of the site has identified elevated concentrations of arsenic, benzo[a]pyrene and lead in the soils tested, with respect to the proposed gardens and soft landscaping around the residential development. The made ground and topsoil in the northern, central/western and southern parts of the site did not contain any elevated concentrations of contaminants, and would be considered suitable for retention or re-use within the proposed gardens and landscaped areas of the residential development. The contaminants in the made ground indicates that there is a low risk of contaminants affecting groundworkers during any construction works, and there will be a low risk of affecting future end users of the site.

The made ground could be considered for re-use beneath proposed buildings and permanent hardstanding, if suitable for engineering purposes, where it is unlikely to affect future users of the site.

The underlying naturally deposited soils encountered beneath the site would be considered suitable for retention and re-use within the development if required.

Existing Drainage

Redundant foul or surface water drain runs, if present, should be removed where encountered from beneath the site and precautions should ensure that any remaining effluent or sediment is directly disposed off-site. The integrity of the existing drains should be checked, and where they are to be retained, any damaged sections should be replaced prior to development.

Soil Gas

According to the environmental database there are no landfills recorded within 250m of the site. The site is generally underlain by a thin layer of made ground, covering variable Tidal Flat Deposits and in turn Marine Sand at depth.

There is a moderate risk that hazardous gases would affect groundworkers during the construction phase and a low risk of hazardous gases affecting future users of the site.

Consideration should be given to gas monitoring within deep or confined spaces, particularly where thick made ground and organic soils are present, to ensure safety of personnel entering them, since carbon dioxide and methane could accumulate within excavations, service chambers or sub-structures.

The site is not in a radon affected area, and no radon protection measures are required for new properties on the site.

Human Health - Construction Workers

Based on the chemical test results, no special precautions would be required during the development of the site by workers who may come into contact with the soil during groundworks, providing standard precautions are adopted which should generally include the procedures given by the Health and Safety Executive (The Blue Book) HS(G)66.

For the protection of workers during groundworks the following is recommended:

a) Limit repeated or prolonged skin contact with soils by wearing gloves with sleeves rolled down.

b) Washing facilities should be made available to groundworkers, so as to minimise the potential for inadvertent ingestion of soil.

c) If any soils are revealed which are different to those encountered by this ground investigation, the advice of a specialist should be sought in view of classifying the material and ascertaining its risk to groundworkers.

d) Consideration should be given to gas monitoring within deep or confined spaces to ensure safety of personnel entering them, since carbon dioxide and methane generated from the made ground soils beneath this site could accumulate within confined excavations, service chambers or sub-structures.

Human Health - Users of Completed Development

The results of the chemical analysis indicate that the made ground and topsoil along the eastern side of the Phase 2 area should not be considered suitable for retention or re-use at the surface within any new garden or landscaped areas. Within the eastern part of the Phase 2 area, the new front garden and landscaped areas, the made ground and topsoil should either be completely removed, or removed and replaced with a surface covering of at least 0.60m of certified 'clean' topsoil, which would be considered to provide a suitable pathway break. This should be increased to at least 1.00m of made ground or topsoil in private rear garden areas. Where the made ground and buried topsoil is less than 0.60m or 1.00m thick, only the made ground and topsoil would need to be removed. This would reduce the risk to future users of the development to very low.

The results of the chemical analysis indicate that the made ground and topsoil in the northern, central/western and southern parts of the site would be considered suitable for retention and re-use within gardens and landscaped areas of the residential development.

The made ground could be considered for re-use beneath proposed buildings and permanent hardstanding, if suitable for engineering purposes, where there is a very low risk to affect future users of the site.

Any soil imported to site must be certified as "suitable for use".

Water Environment

Superficial Tidal Flat Deposits are recorded beneath the site, which are classified by the EA as an 'Unproductive' stratum. The underlying solid geology Ampthill Clay Formation is also classified by the EA as an 'Unproductive' stratum. The Marine Sand is likely to be classified as a 'Secondary' Aquifer. There are no groundwater abstractions within 250m of the site. The site is not within a source protection zone.

Surface water drains are recorded along the southern and eastern field boundaries of the site. The site is within a Zone 2 and Zone 3 floodplain, and has a low risk of flooding. The site is within a SSSI impact zone, an environmentally sensitive area.

Groundwater seepages were recorded as shallow as 0.90m below ground level during the investigation.

There is a very low risk that the proposed development and contaminants within the made ground soils would impact the quality of the water environment.

Effects on Building Materials and Buried Services

The sulphate requirements for buried concrete have been discussed in the previous section of this report.

The local water supply company should be consulted if new buried plastic water pipes are to be installed within the made ground soils on this site.

Off-Site Disposal of Soil Arisings

The results of chemical analysis are provided following the exploratory hole records and can be used within the information necessary for basic characterisation of the soil destined for landfill. The Environment Agency publication Hazardous Waste, Technical Guidance WM3 outlines the methodology for classifying wastes and should be referenced for guidance. The test results (total metals, hydrocarbons and cyanide) should be compared to the relevant thresholds to determine whether they fall into the primary categories of non-hazardous

or hazardous waste and will help indicate the likely European Waste Catalogue (EWC) code which is determined by the waste type.

Excavated material and excess spoil should always be classified prior to removal from site as required by 'Duty of Care' (Environmental Protection Act, 1990) legislation. This means that material has to be given a proper description and waste classification prior to removal. Basic characterisation is the responsibility of the waste producer, whilst compliance checking and on-site verification are generally the responsibility of the landfill operator. The landfill operator will need to liaise with the waste producer, as the approach relies on the information from basic characterisation.

It is expected that arisings of natural soils from the excavations across this site would fall into the inert category under the European Waste Catalogue description 'Soil and Stones', EWC code 17 05 04 with restrictions excluding topsoil and peat.

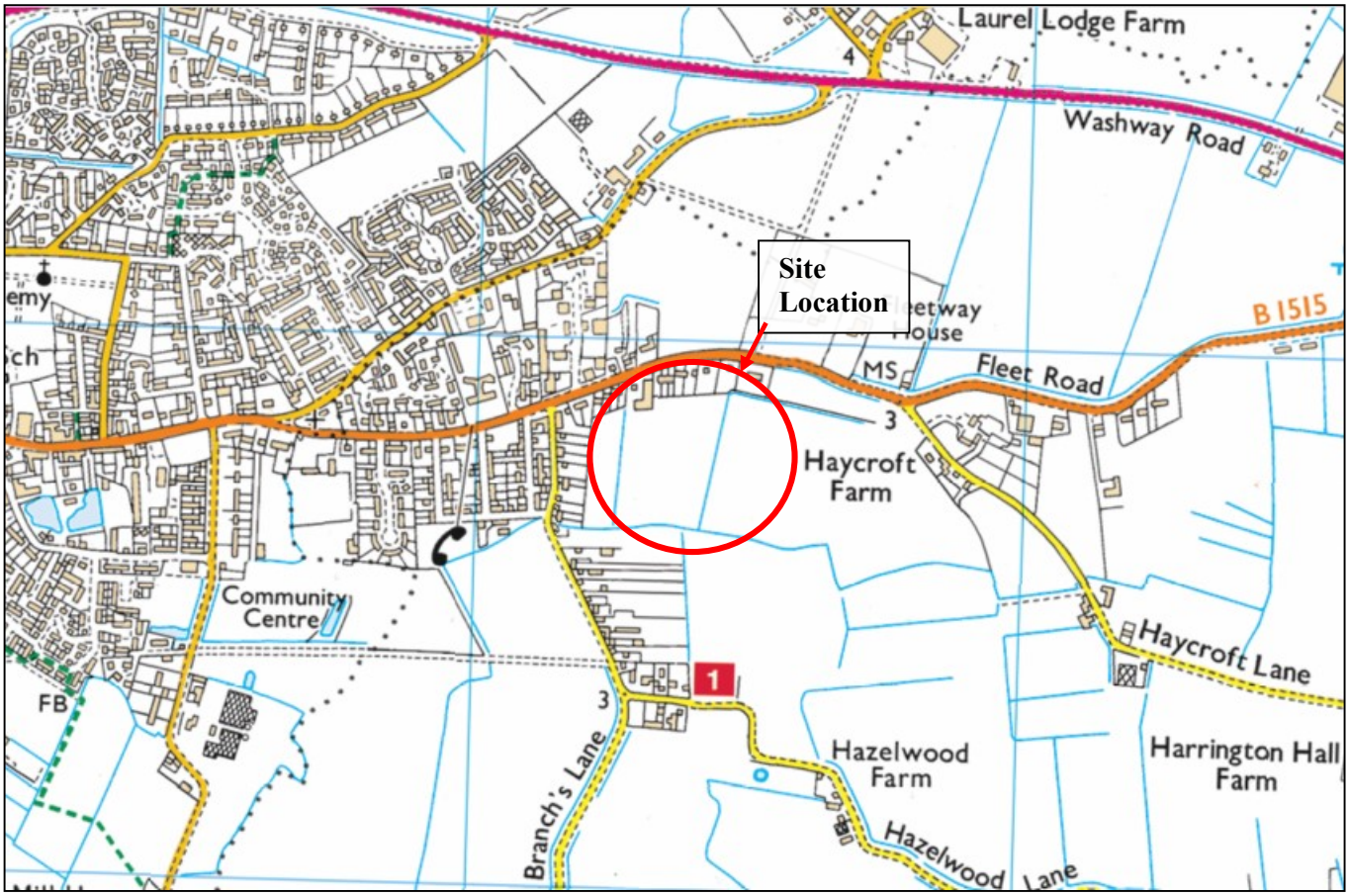
GROUND ENGINEERING LIMITED

S. WEATHERLEY
B.Eng.(Hons.),
C.Geol., F.G.S.
Associate

S. J. FLEMING
M.Sc., M.S.C.M.,
C.Geol., F.G.S.
Director

Site Location Plan

© Crown Copyright (2023). Licence number AL100005523

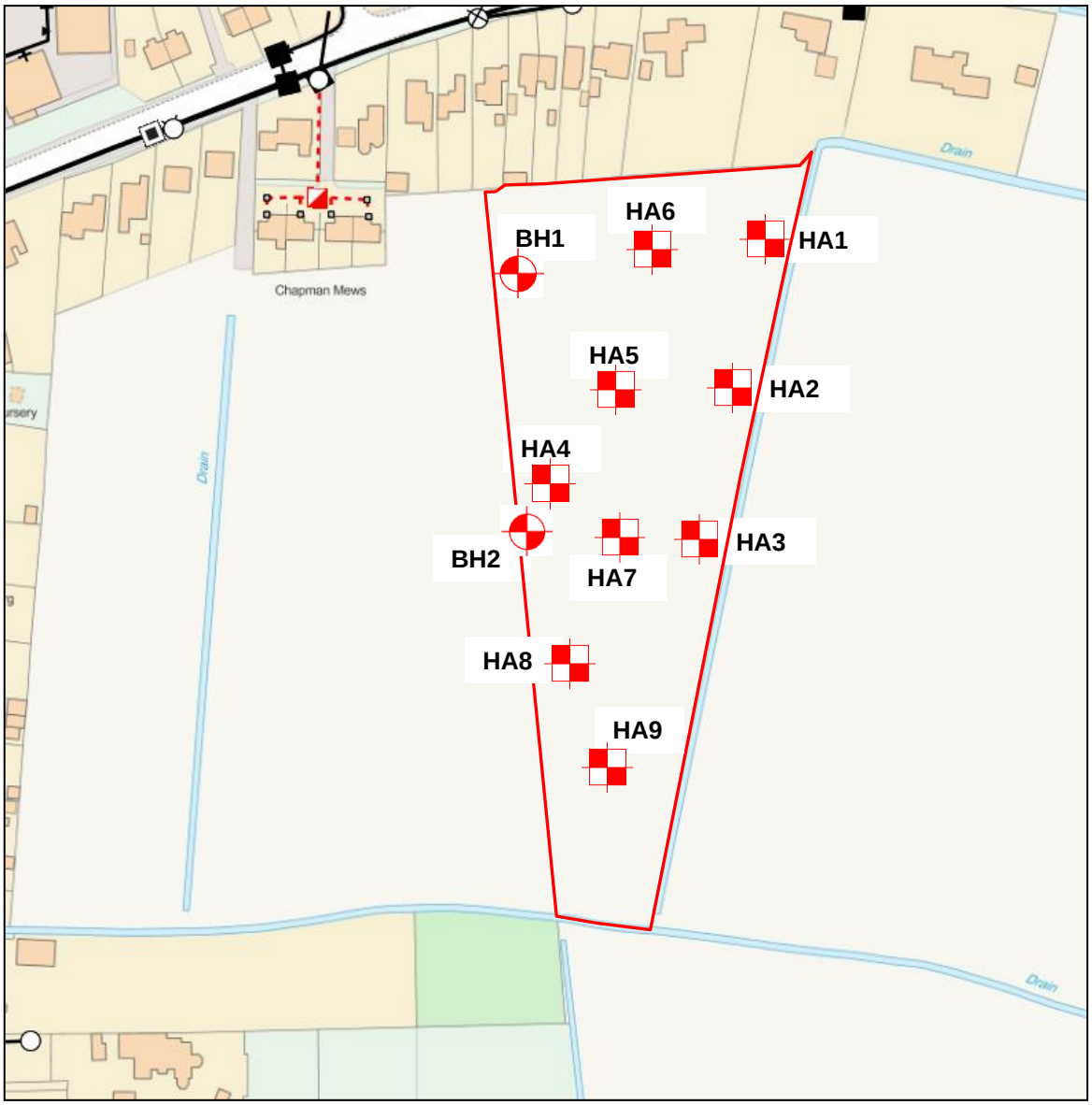


Not To Scale

Project : Phase 2 - Land off Fleet Road, Fleet, Holbeach **Client : Kaplan Property Group**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Exploratory Hole Location Plan

Based on BT plan. © Crown Copyright.
Licence number AL100005523

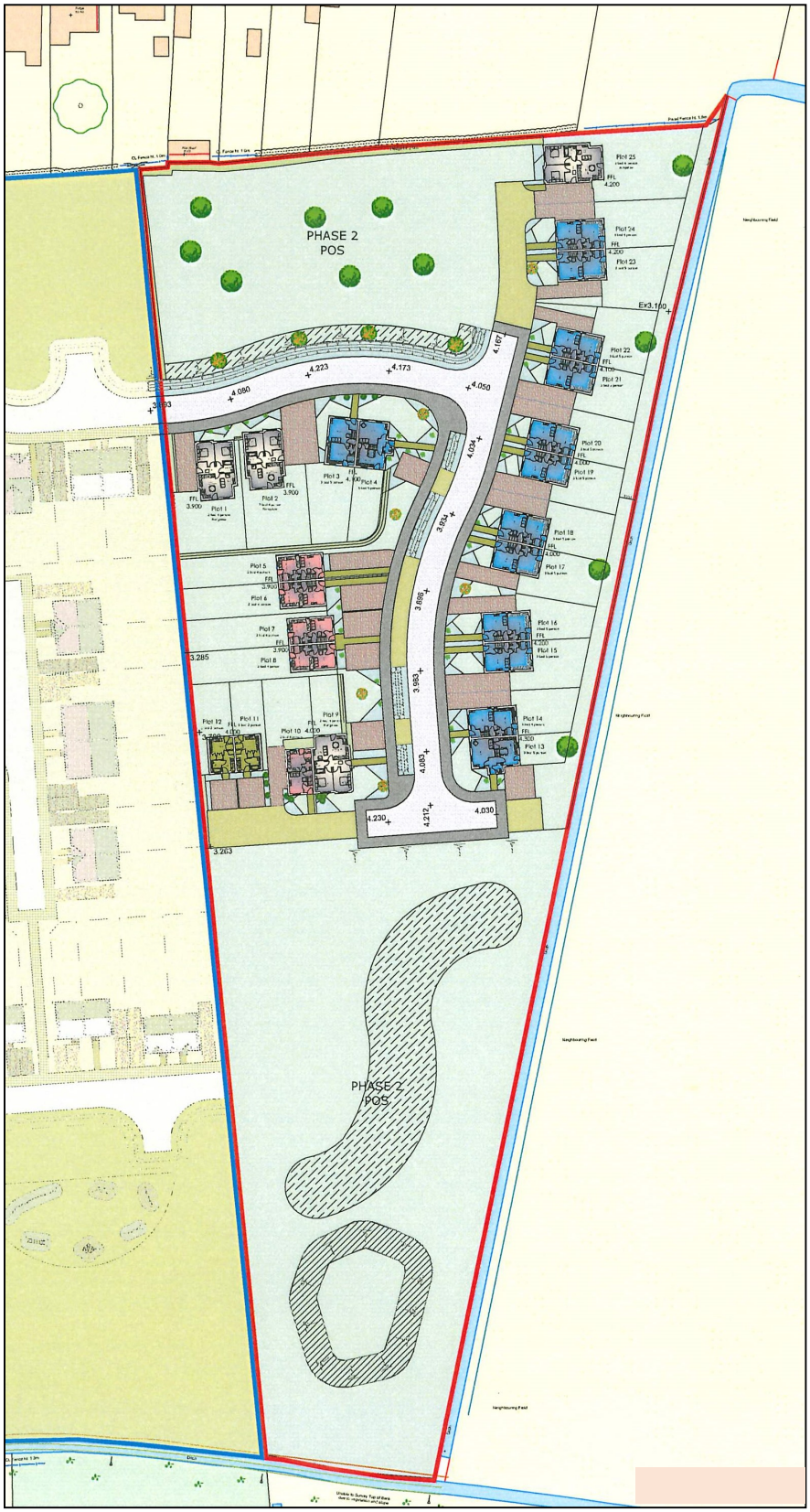


Not To Scale

Project : Phase 2 – Land off Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929A**

Proposed Site Plan

Based on plan provided by the client. © Crown Copyright.
Licence number AL100005523



Not To Scale

N

Project : Phase 2 - Land off Fleet Road, Fleet, Holbeach **Client : Kaplan Property Group**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No. C15929**

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

BOREHOLE BH1

Date: 04/04/23

Hole Size: 150mm dia to 15.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
0.00-0.50	B1				MADE GROUND - Brown, slightly clayey, silty, gravelly SAND. Gravel is angular to rounded flint, brick, concrete and glass.			
0.50-1.00	B2						0.50	
					Firm, friable, brown and orange brown, slightly sandy, slightly gravelly, silty CLAY. Gravel is angular to sub-rounded limestone, flint and sandstone. (TIDAL FLAT DEPOSIT)			
1.20-1.70	B3						1.20	
1.35-1.65	S	N8			Loose, becoming medium dense below 2.00m depth, brown, slightly gravelly, clayey SILT/SAND. Gravel is fine grained sub-angular flint.			
1.65	D1							
2.00-2.50	B4							
2.15-2.45	S	N15	1.50		(TIDAL FLAT DEPOSIT)			
2.45	D2							
3.00-3.50	B5						3.00	
3.15-3.45	S	N12	3.00		Medium dense, brown, slightly clayey, very silty SAND. Sand is fine grained.			
3.45	D3							
					...With occasional shell fragments and black carbonaceous specks below 4.00m depth.			
4.20-4.70	B6							
4.35-4.65	S	N19	4.20					
4.65	D4							
5.00-5.50	B7				(MARINE SAND)			
5.00	W1							
5.15-5.45	S	N12	4.70					
5.45	D5							
6.00-6.50	B8						6.00	
6.15-6.45	S	N14	6.00	BENEATH INSTALLATION	Medium dense, brown and grey, silty SAND. Sand is fine grained.			
6.45	D6			BENEATH INSTALLATION				
7.00-7.50	B9			BENEATH INSTALLATION				
7.15-7.45	S	N12	7.00	BENEATH INSTALLATION				
7.45	D7			BENEATH INSTALLATION				
				BENEATH INSTALLATION				
				BENEATH INSTALLATION	(MARINE SAND)			
8.50-9.00	B10			BENEATH INSTALLATION				
8.65-8.95	S	N13	8.50	BENEATH INSTALLATION				
8.95	D8			BENEATH INSTALLATION				
				BENEATH INSTALLATION				
				BENEATH INSTALLATION			10.00	

REMARKS
1. Excavating a pit from 0.00m to 1.20m for 1.25 hours
2. Roots observed to 0.50m depth
3. Water added from 2.50m to 14.50m
4. Borehole cased to 14.00m depth
5. Gas monitoring standpipe installed to 6.00m depth

Project No 15929

Scale 1:50

Page 1/2

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/* - SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes

No	Depth m Struck	Rose to	Rate	Cased	Sealed
1	2.00	1.90	slow	1.50	not

Groundwater Observations

Date	Depth m Hole	Casing	Water
04/04/23	15.00	14.00	0.00
17/04/23	6.00	1.00	1.09
24/04/23	6.00	1.00	1.29
02/05/23	6.00	1.00	1.46
14/06/23	6.00	1.00	1.99

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

BOREHOLE BH1

Date: 04/04/23

Hole Size: 150mm dia to 15.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
10.20-10.70	B11			BENEATH INSTALLATION	Medium dense, brown and grey, silty SAND with occasional shell fragments. Sand is fine grained.		10.00	
10.35-10.65	S	N11	10.00	BENEATH INSTALLATION				
10.65	D9			BENEATH INSTALLATION				
11.50-12.00	B12			BENEATH INSTALLATION				
11.65-11.95	S	N18	11.50	BENEATH INSTALLATION				
11.95	D10			BENEATH INSTALLATION	(MARINE SAND)			
13.00-13.50	B13			BENEATH INSTALLATION				
13.00	W2			BENEATH INSTALLATION				
13.15-13.45	S	N20	13.00	BENEATH INSTALLATION				
13.45	D11			BENEATH INSTALLATION				
14.50-15.00	B14			BENEATH INSTALLATION				
14.65-14.95	S	N20	14.00	BENEATH INSTALLATION				
15.00	D12						15.00	
					Borehole completed at 15.00m depth			

REMARKS

Project No 15929

Scale 1:50

Page 2/2

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/* - SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

BOREHOLE BH2

Date: 05/04/23

Hole Size: 150mm dia to 15.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
0.00-0.15	B1				MADE GROUND - Brown, slightly clayey, slightly sandy GRAVEL of angular to rounded flint, igneous rock and limestone.		0.15	
0.15-0.50	B2							
0.50-1.20	B3				Firm, brown, slightly sandy, slightly gravelly, silty CLAY. Gravel is angular to rounded flint.			
					(TIDAL FLAT DEPOSIT)		1.20	
1.20-1.70	B4				Loose, brown, slightly gravelly, slightly clayey SILT/SAND. Sand is fine grained. Gravel is fine and medium grained, angular and sub-angular flint.			
1.35-1.65	S	N6						
1.65	D1							
2.00-2.50	B5				(TIDAL FLAT DEPOSIT)			
2.15-2.45	S	N8	2.00					
2.45	D2							
3.00-3.50	B6						3.00	
3.15-3.45	S	N7	3.00		Loose, brown and grey, slightly clayey, very silty SAND. Sand is fine grained.			
3.45	D3							
4.00-4.50	B7							
4.15-4.45	S	N8	4.00					
4.45	D4				...With occasional shell fragments and black carbonaceous specks below 4.50m depth.			
5.00-5.50	B8							
5.00	W1							
5.15-5.45	S	N9	5.00					
5.45	D5							
6.00-6.50	B9				(MARINE SAND)			
6.15-6.45	S	N9	6.00					
6.45	D6							
7.00-7.50	B10						7.00	
7.15-7.45	S	N10	7.00	BENEATH INSTALLATION	Medium dense, brown and grey, silty SAND. Sand is fine grained.			
7.45	D7			BENEATH INSTALLATION				
				BENEATH INSTALLATION				
8.50-9.00	B11			BENEATH INSTALLATION				
8.65-8.95	S	N11	8.50	BENEATH INSTALLATION				
8.95	D8			BENEATH INSTALLATION				
				BENEATH INSTALLATION	(MARINE SAND)			
10.00-10.50	B12			BENEATH INSTALLATION			10.00	

REMARKS
1. Excavating a pit from 0.00m to 1.20m for 1.25 hours
2. Roots observed to 1.20m depth
3. Water added from 2.50m to 14.50m
4. Borehole cased to 14.30m depth
5. Gas monitoring standpipe installed to 7.00m depth

Project No 15929

Scale 1:50

Page 1/2

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/*- SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes

No	Struck (Depth m)	Rose to (Depth m)	Rate	Cased	Sealed
1	2.50	2.40	slow	2.00	not

Groundwater Observations

Date	Depth m Hole	Depth m Casing	Depth m Water
05/04/23	15.00	14.30	2.00
17/04/23	7.00	1.00	1.10
24/04/23	7.00	1.00	1.20
02/05/23	7.00	1.00	1.39
14/06/23	7.00	1.00	1.95

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

BOREHOLE
BH2

Date: 05/04/23

Hole Size: 150mm dia to 15.00m

Ground Level:

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
10.15-10.45	S	N10	10.00	BENEATH INSTALLATION	Medium dense, brown and grey, silty SAND with occasional shell fragments. Sand is fine grained.		10.00	
10.45	D9			BENEATH INSTALLATION				
				BENEATH INSTALLATION				
11.50-12.00	B13			BENEATH INSTALLATION				
11.65-11.95	S	N11	11.50	BENEATH INSTALLATION				
11.95	D10							
12.00	W2			BENEATH INSTALLATION	(MARINE SAND)			
				BENEATH INSTALLATION				
13.00-13.50	B14							
13.15-13.45	S	N14	13.00	BENEATH INSTALLATION				
13.45	D11			BENEATH INSTALLATION				
				BENEATH INSTALLATION				
				BENEATH INSTALLATION				
14.60-15.00	B15							
14.75-15.05	S	N16	14.30	BENEATH INSTALLATION			15.00	
15.05	D12				Borehole completed at 15.00m depth			

REMARKS

Project No 15929

Scale 1:50 | Page 2/2

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/*- SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water

GROUND ENGINEERING LIMITED

Results of Standard/Cone Penetration Tests

C15929 Phase 2 - Land off Fleet Road, Fleet, Holbeach

Bh.No.	Depth (m)	Casing Depth (m)	Depth to Water (m)	Type of Test *	Seating Drive Blows/ Penetration (mm)	Test Drive: 300mm Blows for each successive 75mm Penetration	N Value	Extra-polated N Value
BH1	1.20-1.65			S	2/150	1 2 2 3	8	
	2.00-2.45	1.50		S	4/150	3 4 4 4	15	
	3.00-3.45	3.00	1.00	S	3/150	2 3 3 4	12	
	4.20-4.65	4.20	2.50	S	3/150	4 4 5 6	19	
	5.00-5.45	4.70	3.00	S	2/150	2 3 3 4	12	
	6.00-6.45	6.00	3.00	S	3/150	3 3 4 4	14	
	7.00-7.45	7.00	1.00	S	3/150	2 3 3 4	12	
	8.50-8.95	8.50	2.00	S	3/150	2 3 4 4	13	
	10.20-10.65	10.00	6.00	S	3/150	2 2 3 4	11	
	11.50-11.95	11.50	1.00	S	3/150	3 4 5 6	18	
	13.00-13.45	13.00	1.00	S	3/150	3 5 5 7	20	
	14.50-14.95	14.00	0.00	S	4/150	3 4 5 8	20	
BH2	1.20-1.65			S	2/150	1 1 2 2	6	
	2.00-2.45	2.00		S	2/150	1 2 2 3	8	
	3.00-3.45	3.00	1.00	S	2/150	1 2 2 2	7	
	4.00-4.45	4.00	2.00	S	2/150	1 2 2 3	8	
	5.00-5.45	5.00	2.00	S	2/150	2 2 2 3	9	
	6.00-6.45	6.00	0.00	S	2/150	2 2 2 3	9	
	7.00-7.45	7.00	1.00	S	2/150	2 2 2 4	10	
	8.50-8.95	8.50	0.30	S	2/150	2 2 3 4	11	
	10.00-10.45	10.00	1.00	S	2/150	1 2 3 4	10	
	11.50-11.95	11.50	0.50	S	3/150	2 2 3 4	11	
	13.00-13.45	13.00	0.50	S	3/150	3 2 4 5	14	
	14.60-15.05	14.30	2.00	S	3/150	2 3 5 6	16	

*** C denotes test using a solid cone**
S denotes using a split barrel sampler

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA1

Date: 11/04/23

Hole Size: 200mm dia to 1.05m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			TOPSOIL - Soft, dark brown and brown, slightly sandy, silty CLAY. Sand is fine grained.			
0.10	ES1					0.30	
0.40	D2			Firm, brown and orange brown, slightly sandy, silty CLAY. Sand is fine grained.			
0.40	ES2						
0.70	D3			(TIDAL FLAT DEPOSIT)			
0.70	ES3						
1.00	D4					1.05	
1.00	ES4			Hole completed at 1.05m depth			

REMARKS 1. Roots observed to 0.70m depth
2. Hole sides stable

Project No 15929

Scale 1:25

Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▽c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						11/04/23	1.05		dry

GROUND ENGINEERING LIMITED
Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA2

Date: 11/04/23

Hole Size: 150mm dia to 1.00m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			TOPSOIL - Soft, brown, slightly sandy, silty CLAY. Sand is fine grained.			
0.10	ES1					0.30	
0.40	D2			Orange brown and brown, clayey, silty fine SAND. (TIDAL FLAT DEPOSIT)			
0.40	ES2					0.60	
0.70	D3			Soft, brown and orange brown, sandy, silty CLAY. Sand is fine grained. (TIDAL FLAT DEPOSIT)			
0.70	ES3						
0.90	D4						
0.90	ES4					1.00	
				Hole completed at 1.00m depth			

REMARKS 1. Roots observed to 0.70m depth
2. Hole sides stable

Project No 15929

Scale 1:25

Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▽c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						11/04/23	1.00		dry

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA3

Date: 11/04/23

Hole Size: 150mm dia to 1.00m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.20	D1			TOPSOIL - Soft, brown, slightly sandy, silty CLAY. Sand is fine grained.			
0.20	ES1					0.30	
0.50	D2			Soft, brown, light brown and orange brown, sandy, silty CLAY. Sand is fine grained. (TIDAL FLAT DEPOSIT)			
0.50	ES2					0.60	
0.90	D3			Brown and light brown, clayey, silty SAND. Sand is fine grained. (MARINE SAND)			
0.90	ES3					1.00	
				Hole completed at 1.00m depth			

REMARKS 1. Roots observed to 0.60m depth
2. Hole sides stable

Project No 15929

Scale 1:25 | Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▼c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						11/04/23	1.00		dry

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA4

Date: 11/04/23

Hole Size: 150mm dia to 1.00m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.30 0.30	D1 ES1			TOPSOIL - Soft, locally firm, brown, slightly sandy, silty CLAY. Sand is fine grained.		0.40	
0.60 0.60	D2 ES2			Soft, light brown, sandy, silty CLAY. Sand is fine grained. (TIDAL FLAT DEPOSIT)		0.70	
0.90 0.90	D3 ES3		1 ▽	Brown and orange brown, clayey, silty SAND. Sand is fine grained. (MARINE SAND)		1.00	
				Hole completed at 1.00m depth			

REMARKS 1. Roots observed to 0.70m depth
2. Hole sides stable

Project No 15929

Scale 1:25

Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▼c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
1	0.90					11/04/23	1.00		dry

GROUND ENGINEERING LIMITED
Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA5

Date: 11/04/23

Hole Size: 150mm dia to 1.10m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.30 0.30	D1 ES1			TOPSOIL - Soft, locally firm, brown, slightly sandy, silty CLAY. Sand is fine grained.		0.40	
0.60 0.60	D2 ES2			Soft, brown and orange brown, sandy, silty CLAY. Sand is fine grained. (TIDAL FLAT DEPOSIT)			
0.90 0.90	D3 ES3		1 ▽			1.10	
				Hole completed at 1.10m depth			

REMARKS 1. Roots observed to 0.60m depth
2. Hole sides stable

Project No 15929

Scale 1:25

Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▽c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
1	1.08					11/04/23	1.10		dry

GROUND ENGINEERING LIMITED
Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA6

Date: 02/08/23

Hole Size: 150mm dia to 0.70m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			MADE GROUND - Brown, fine sandy SILT with rare fine brick fragments.		0.15	
0.10	ES1			Brown, very silty fine SAND. (TIDAL FLAT DEPOSIT)		0.30	
0.25	D2			Firm becoming soft, brown, slightly sandy, silty CLAY. Sand is fine grained. (TIDAL FLAT DEPOSIT)		0.70	
0.25	ES2			Hole completed at 0.70m depth			
0.50	D3						
0.50	ES3						

REMARKS 1. Roots observed to 0.25m depth
2. Hole sides stable

Project No 15929A

Scale 1:25

Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▼c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes

No	Struck	Rose to	Depth m Rate	Cased	Sealed

Groundwater Observations

Date	Depth m Hole	Casing	Water
02/08/23	0.70		dry

GROUND ENGINEERING LIMITED
Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA7

Date: 02/08/23

Hole Size: 150mm dia to 0.90m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			MADE GROUND - Firm, friable, dark brown and brown, slightly sandy, slightly gravelly, slightly clayey SILT. Gravel is angular tile and pottery fragments.		0.15	
0.10	ES1						
0.20	D2			MADE GROUND - Firm, brown, slightly sandy, slightly gravelly, silty CLAY. Gravel is angular brick fragments and igneous rock.		0.40	
0.20	ES2						
0.35	D3						
0.35	ES3						
0.45	D4			Firm, brown, slightly sandy, silty CLAY with rare fine angular flint gravel. (TIDAL FLAT DEPOSIT)		0.50	
0.45	ES4						
0.55	D5			Soft, brown, sandy SILT/CLAY. Sand is fine grained.			
0.55	ES5						
				(TIDAL FLAT DEPOSIT)			
0.85	D6						
						0.90	
				Hole completed at 0.90m depth			

REMARKS 1. Roots observed to 0.65m depth
2. Hole sides stable

Project No 15929A

Scale 1:25 | Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▼c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						02/08/23	0.90		dry

GROUND ENGINEERING LIMITED
Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 - LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA8

Date: 02/08/23

Hole Size: 150mm dia to 0.75m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			TOPSOIL - Firm, dark brown, slightly sandy, silty CLAY with occasional ash.		0.15	
0.10	ES1						
0.30	D2			Brown, very silty, fine SAND. (TIDAL FLAT DEPOSIT)		0.40	
0.30	ES2						
0.50	D3			Soft, brown, slightly sandy, silty CLAY. Sand is fine grained. (TIDAL FLAT DEPOSIT)			
0.70	D4					0.75	
				Hole completed at 0.75m depth			

REMARKS 1. Roots observed to 0.40m depth
2. Hole sides stable

Project No 15929A

Scale 1:25

Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▼c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
		Depth m					Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						02/08/23	0.75		dry

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: PHASE 2 – LAND OFF FLEET ROAD, FLEET, HOLBEACH

HAND AUGER
HA9

Date: 02/08/23

Hole Size: 150mm dia to 1.00m

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
0.10	D1			MADE GROUND – Brown, slightly clayey, fine sandy SILT with rare glazed pottery fragments.		0.15	
0.10	ES1						
0.25	D2			Brown, silty SAND with occasional ash. (TIDAL FLAT DEPOSIT)		0.30	
0.25	ES2						
				Firm, brown and light brown, slightly sandy, silty CLAY. Sand is fine grained. (TIDAL FLAT DEPOSIT)			
0.50	D3					0.60	
0.50	ES3						
				Brown, slightly clayey, fine sandy SILT.			
0.80	D4			(TIDAL FLAT DEPOSIT)			
0.80	ES4						
0.95	D5					1.00	
				Hole completed at 1.00m depth			

REMARKS 1. Roots observed to 0.90m depth
2. Hole sides stable

Project No 15929A

Scale 1:25

Page 1/1

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
R - Root Sample
▽ Water Strike
▼c Level on completion
MP - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
ES - Environmental Sample
▼ Water Rise
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
		Depth m					Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						02/08/23	1.00		dry

Groundwater & Gas Monitoring Record

Site **Phase 2 - Land off Fleet Road, Fleet, Holbeach**

Report Ref: **C15929**

Date	Borehole No.	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Flow Rate (l/hr)	Atmosph. Pressure (mb)	Depth of Well (mbgl)	Depth to Groundwater (mbgl)	Comments
		Peak	Steady	Peak	Steady	Min.	Max.					
17/04/23	BH1	1.9	1.9	2.9	2.9	13.4	13.4	<0.1	1030	6.00	1.09	
	BH2	<0.1	<0.1	<0.1	<0.1	20.5	20.5	<0.1	1031	7.00	1.10	
24/04/23	BH1	1.3	1.3	3.1	3.1	14.4	14.4	<0.1	1011	6.00	1.29	
	BH2	<0.1	<0.1	0.1	0.1	20.2	20.2	<0.1	1011	7.00	1.20	
02/05/23	BH1	1.1	1.1	4.2	4.2	13.6	13.6	<0.1	1029	6.00	1.46	
	BH2	<0.1	<0.1	10.8	10.8	0.8	0.8	<0.1	1029	7.00	1.39	
14/06/23	BH1	4.5	4.3	11.8	11.8	4.4	4.4	<0.1	1019	6.00	1.99	
	BH2	0.1	0.1	16.3	16.3	0.3	0.3	<0.1	1019	7.00	1.95	

LEL – Lower Explosive Limit

LABORATORY TEST RESULTS

CONTRACT PHASE 2 – LAND OFF FLEET ROAD, FLEET, HOLBEACH

Bore-hole	Sample	Depth m	Classification				Density		Triaxial Compression					Sulphates (SO_4)				C.B.R.		Remarks
			Liquid Limit %	Plastic Limit %	Plasticity Index %	Moisture Content %	Bulk Mg/m^3	Dry Mg/m^3	Type	Principal Stress Difference kPa	Cell Pressure kPa	Shear Strength kPa	Angle of Shear Resistance degrees	Soil Total % Dry Wt.	Soil Aqueous Extract mg/l	Water mg/l	pH	Top %	Base %	
BH1	B2	0.50 – 1.00				20	2.01	1.67										2.0	2.6	1% retained on 20mm sieve
	D1	1.65													181		7.9			
	D2	2.45													41		8.4			
	D3	3.45													99		8.4			
	W1	5.00														280	7.6			
BH2	B3	0.50 – 1.20				24	1.98	1.60										0.6	0.7	0% retained on 20mm sieve
	W1	5.00														436	7.8			

U – UNDISTURBED SAMPLE
D – DISTURBED SAMPLE
B – BULK SAMPLE
W – WATER SAMPLE

C.U. – CONSOLIDATED UNDRAINED
C.D. – CONSOLIDATED DRAINED
Q. – IMMEDIATE UNDRAINED
Q.M. – IMMEDIATE UNDRAINED MULTISTAGE

Aqueous Extract 2:1 Water:Soil

C.B.R. – CALIFORNIA BEARING RATIO

15929

GROUND ENGINEERING LIMITED
Tel: 01733-566566
www.groundengineering.co.uk

LABORATORY TEST RESULTS

CONTRACT PHASE 2 – LAND OFF FLEET ROAD, FLEET, HOLBEACH

Bore-hole	Sample	Depth m	Classification				Density		Triaxial Compression					Sulphates (SO_4)				Remarks
			Liquid Limit %	Plastic Limit %	Plasticity Index %	Moisture Content %	Bulk Mg/m^3	Dry Mg/m^3	Type	Principal Stress Difference kPa	Cell Pressure kPa	Shear Strength kPa	Angle of Shear Resistance degrees	Soil: Total % Dry Wt.	Soil: Aqueous Extract mg/l	Water mg/l	pH	
HA1	D4	1.00	48	22	26	28												SOIL CLASSIFICATION = CI 0% retained on 425μm sieve
HA2	D4	0.90	33	22	11	25												SOIL CLASSIFICATION = CL 0% retained on 425μm sieve
HA3	D3	0.90													33		8.3	
HA4	D3	0.90													33		8.3	
HA5	D3	0.90	38	20	18	28												SOIL CLASSIFICATION = CI 0% retained on 425μm sieve

U – UNDISTURBED SAMPLE
D – DISTURBED SAMPLE
B – BULK SAMPLE
W – WATER SAMPLE

C.U. – CONSOLIDATED UNDRAINED
C.D. – CONSOLIDATED DRAINED
Q. – IMMEDIATE UNDRAINED
Q.M. – IMMEDIATE UNDRAINED MULTISTAGE

Aqueous Extract 2:1 Water:Soil

15929

GROUND ENGINEERING LIMITED
Tel: 01733-566566
www.groundengineering.co.uk

8180

GROUND ENGINEERING

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Particle Size Distribution

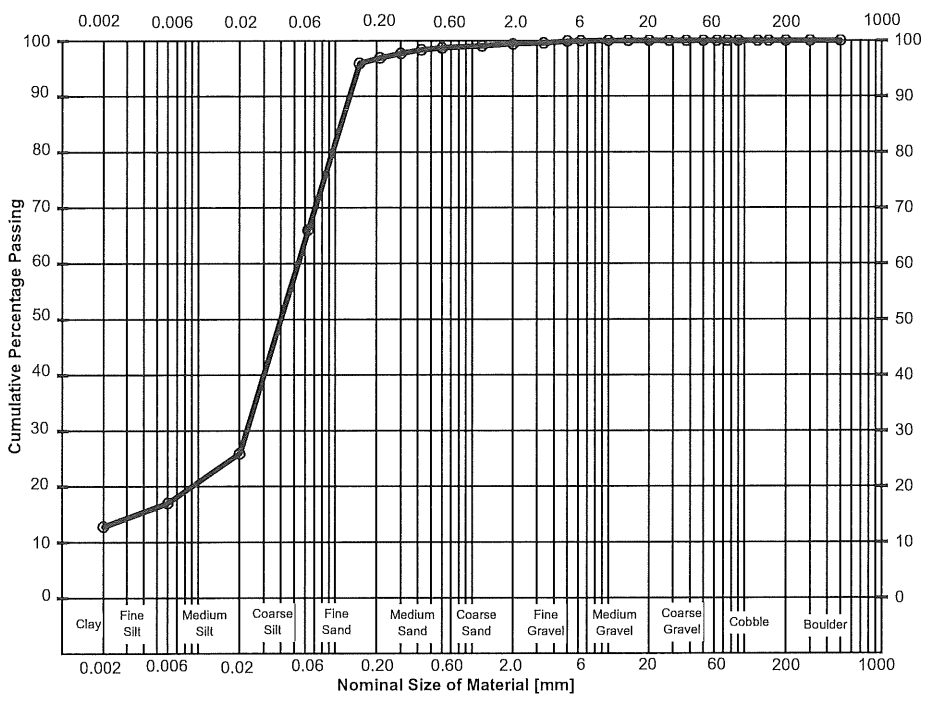
Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4
Wet Sieving Method and Sedimentation by Pipette

Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/2/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8244-1/2 **Pre-treatment for organic material:** No
Client Reference: B3

Sample Description: Brown grey clayey SILT/SAND with rare fine to medium sub-angular flint.

Material Specification: Not Required **Depth Top:** 1.20m
Location: BH1 **Depth Base:** 1.70m
Source: **Supplier:**



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	99
1.18	99
0.600	99
0.425	98
0.300	98
0.212	97
0.150	96
0.063	66
0.020	**26**
0.006	**17**
0.002	**13**

Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

GROUND ENGINEERING LIMITED
Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

UKAS TESTING
8180

TEST CERTIFICATE

Determination of Particle Size Distribution

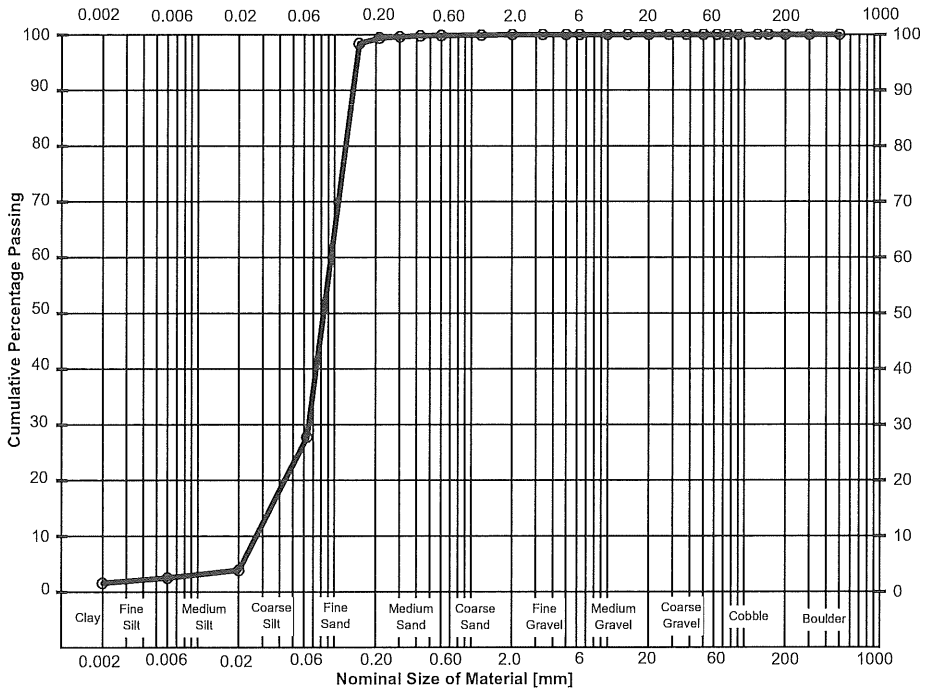
Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4
Wet Sieving Method and Sedimentation by Pipette

Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/6/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8244-1/6 **Pre-treatment for organic material:** No
Client Reference: B6

Sample Description: Grey slightly clayey silty SAND.

Material Specification: Not Required **Depth Top:** 4.20m
Location: BH1 **Depth Base:** 4.70m
Source: **Supplier:**



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	99
0.150	98
0.063	28
0.020	**4**
0.006	**3**
0.002	**2**

Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

GROUND ENGINEERING LIMITED

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

UKAS TESTING
8180

TEST CERTIFICATE

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2
Wet Sieving Method

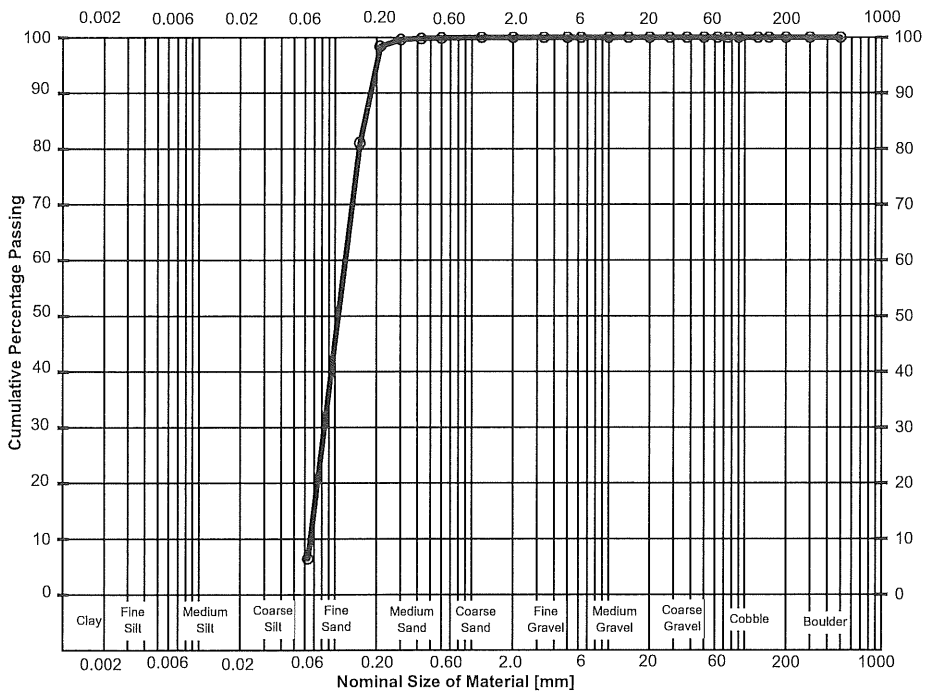
Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/8/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS

Laboratory Reference: PL8244-1/8
Client Reference: B10
Pre-treatment for organic material: N/A

Sample Description: Grey slightly silty SAND.

Material Specification: Not Required
Location: BH1
Source:
Depth Top: 8.50m
Depth Base: 8.90m
Supplier:



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	98
0.150	81
0.063	6
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

GROUND ENGINEERING

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

8180

TEST CERTIFICATE

Determination of Particle Size Distribution

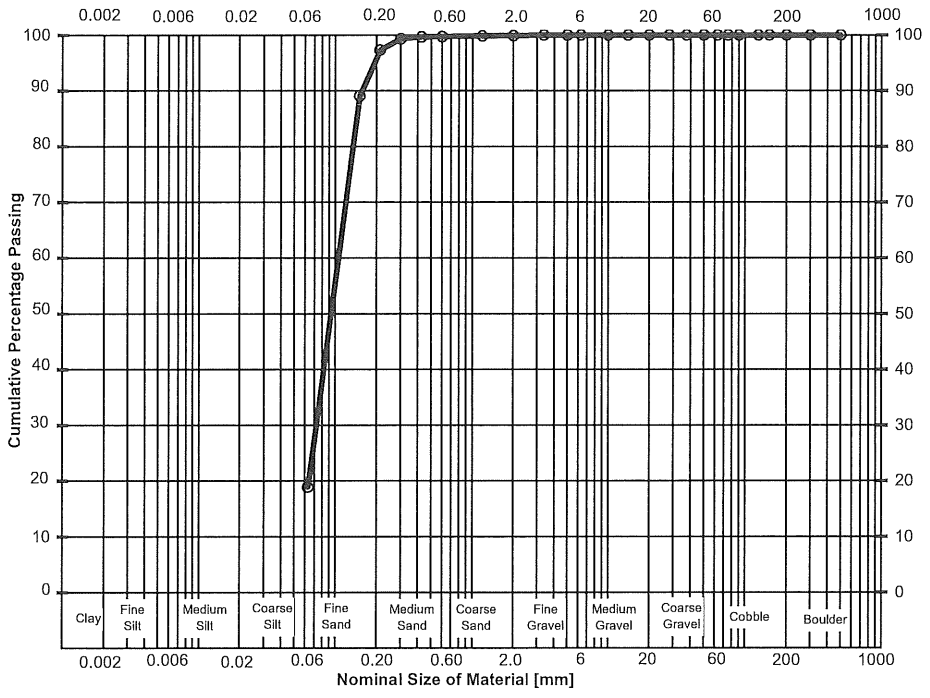
Tested in Accordance with BS 1377-2: 1990: Clause 9.2
Wet Sieving Method

Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/9/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8244-1/9 **Pre-treatment for organic material:** N/A
Client Reference: B12

Sample Description: Grey slightly clayey silty SAND.

Material Specification: Not Required **Depth Top:** 11.50m
Location: BH1 **Depth Base:** 12.00m
Source: **Supplier:**



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	99
0.212	97
0.150	89
0.063	19
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

GROUND ENGINEERING LIMITED

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

UKAS TESTING
8180

TEST CERTIFICATE

Determination of Particle Size Distribution

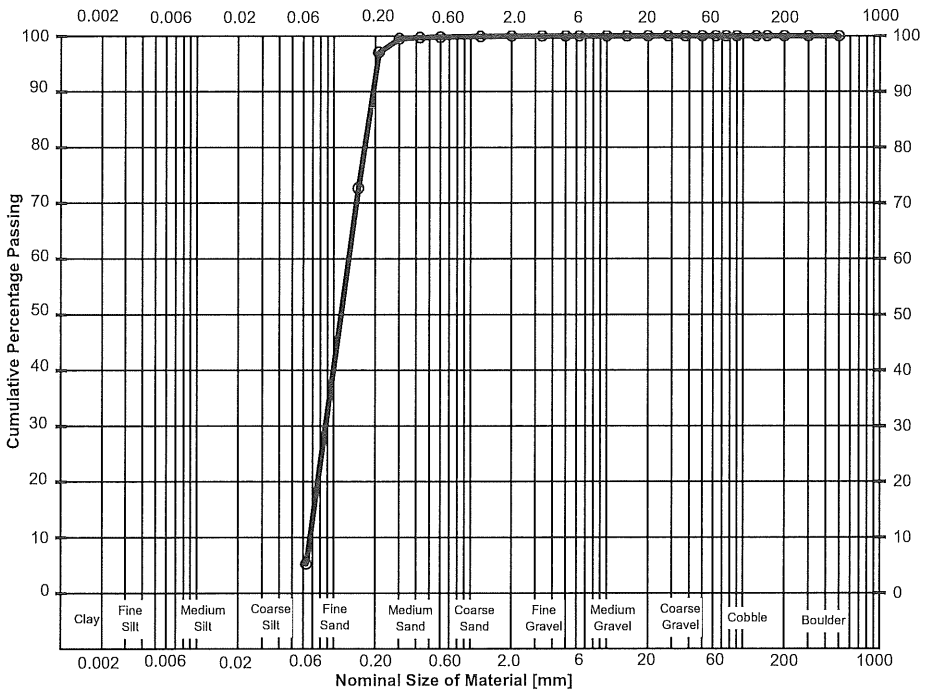
Tested in Accordance with BS 1377-2: 1990: Clause 9.2
Wet Sieving Method

Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/10/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8244-1/10 **Pre-treatment for organic material:** N/A
Client Reference: B14

Sample Description: Grey SAND.

Material Specification: Not Required **Depth Top:** 14.50m
Location: BH1 **Depth Base:** 15.00m
Source: **Supplier:**



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	97
0.150	73
0.063	5
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

GROUND ENGINEERING LIMITED
Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

UKAS TESTING
8180

TEST CERTIFICATE

Determination of Particle Size Distribution

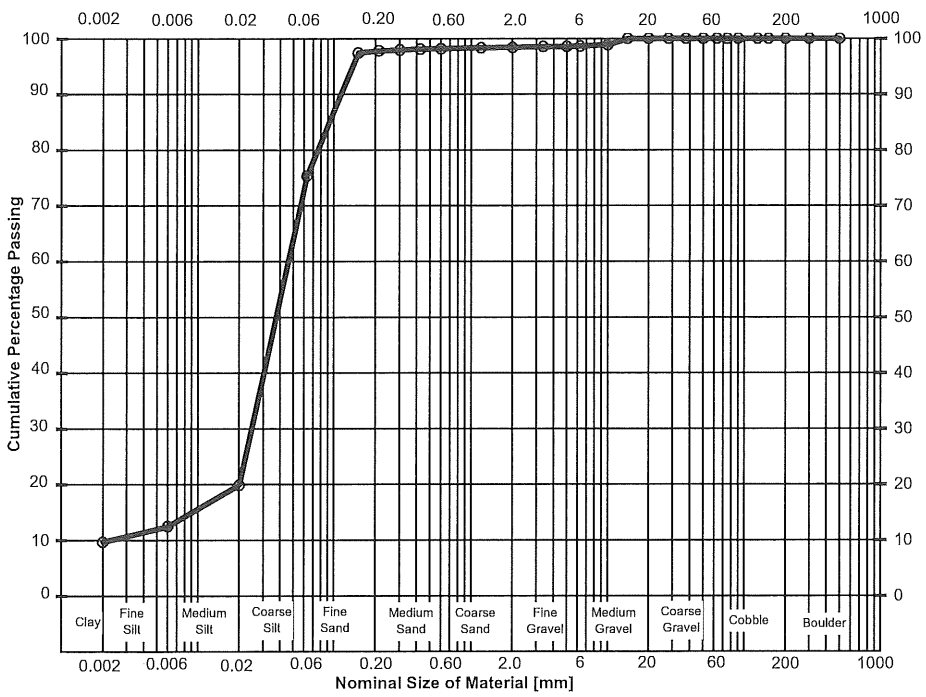
Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4
Wet Sieving Method and Sedimentation by Pipette

Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/12/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8244-1/12 **Pre-treatment for organic material:** No
Client Reference: B4

Sample Description: Brown clayey silty SAND with rare fine to medium sub-angular flint.

Material Specification: Not Required **Depth Top:** 1.20m
Location: BH2 **Depth Base:** 1.70m
Source: **Supplier:**



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	99
6.3	99
5.0	99
3.35	99
2.00	98
1.18	98
0.600	98
0.425	98
0.300	98
0.212	98
0.150	97
0.063	75
0.020	**20**
0.006	**13**
0.002	**10**

Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

8180

GROUND ENGINEERING LIMITED

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2 & 9.4
Wet Sieving Method and Sedimentation by Pipette

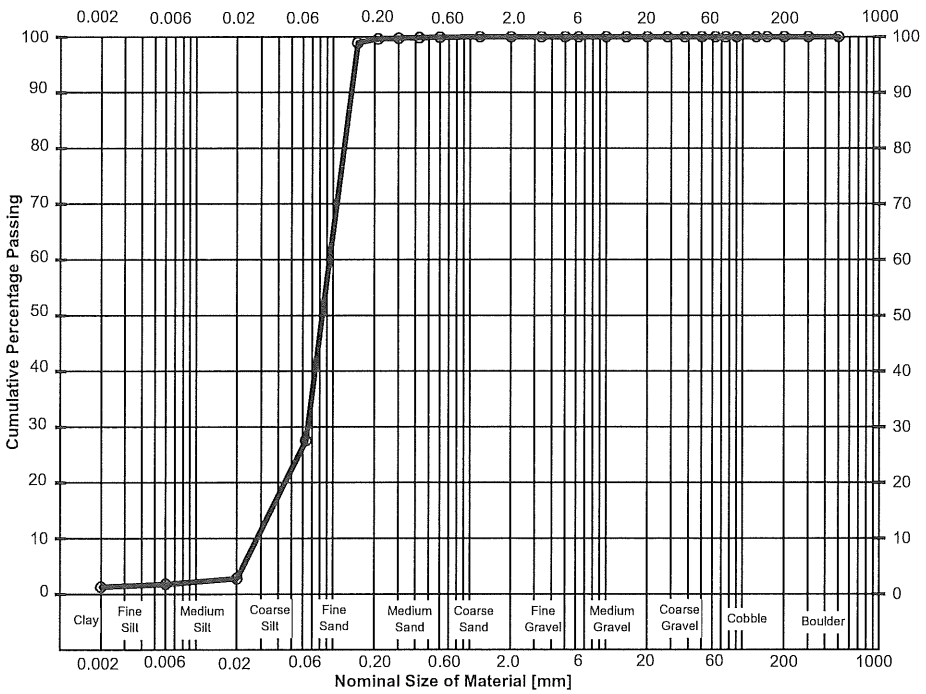
Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/13/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS

Laboratory Reference: PL8244-1/13
Client Reference: B6
Pre-treatment for organic material: No

Sample Description: Grey slightly clayey silty SAND.

Material Specification: Not Required
Location: BH2
Source:
Depth Top: 3.00m
Depth Base: 3.50m
Supplier:



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	100
0.150	99
0.063	28
0.020	**3**
0.006	**2**
0.002	**1**

Comments: Data relevant to material below 63 microns is outside the current scope of UKAS accreditation

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

8180

GROUND ENGINEERING LIMITED

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Particle Size Distribution

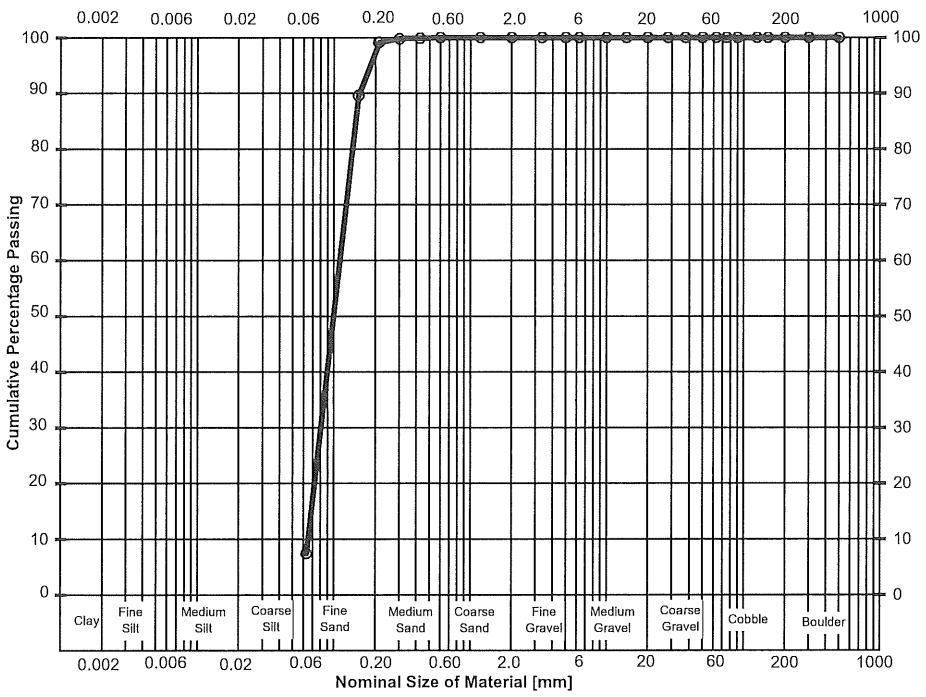
Tested in Accordance with BS 1377-2: 1990: Clause 9.2
Wet Sieving Method

Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/15/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8244-1/15 **Pre-treatment for organic material:** N/A
Client Reference: B10

Sample Description: Grey-brown grey slightly clayey slightly silty SAND.

Material Specification: Not Required **Depth Top:** 7.00m
Location: BH2 **Depth Base:** 7.50m
Source: **Supplier:**



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	99
0.150	90
0.063	7
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

8180

GROUND ENGINEERING LIMITED

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Particle Size Distribution

Tested in Accordance with BS 1377-2: 1990: Clause 9.2
Wet Sieving Method

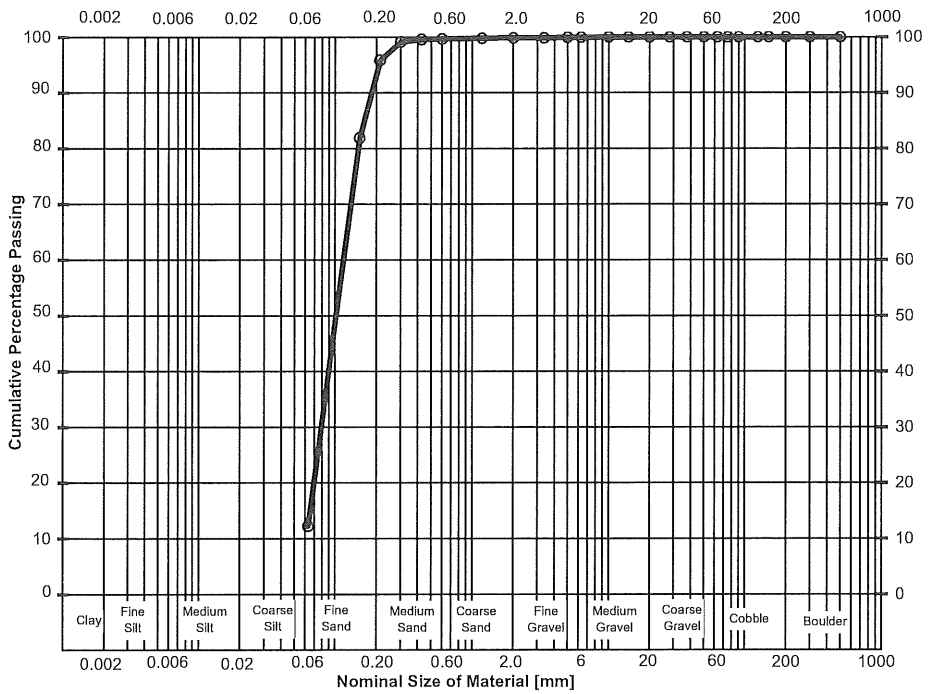
Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/16/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS

Laboratory Reference: PL8244-1/16
Client Reference: B12
Pre-treatment for organic material: N/A

Sample Description: Grey-brown grey slightly clayey slightly silty SAND.

Material Specification: Not Required
Location: BH2
Source:
Depth Top: 10.00m
Depth Base: 10.50m
Supplier:



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	99
0.212	96
0.150	82
0.063	12
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager

Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

8180

GROUND ENGINEERING

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Particle Size Distribution

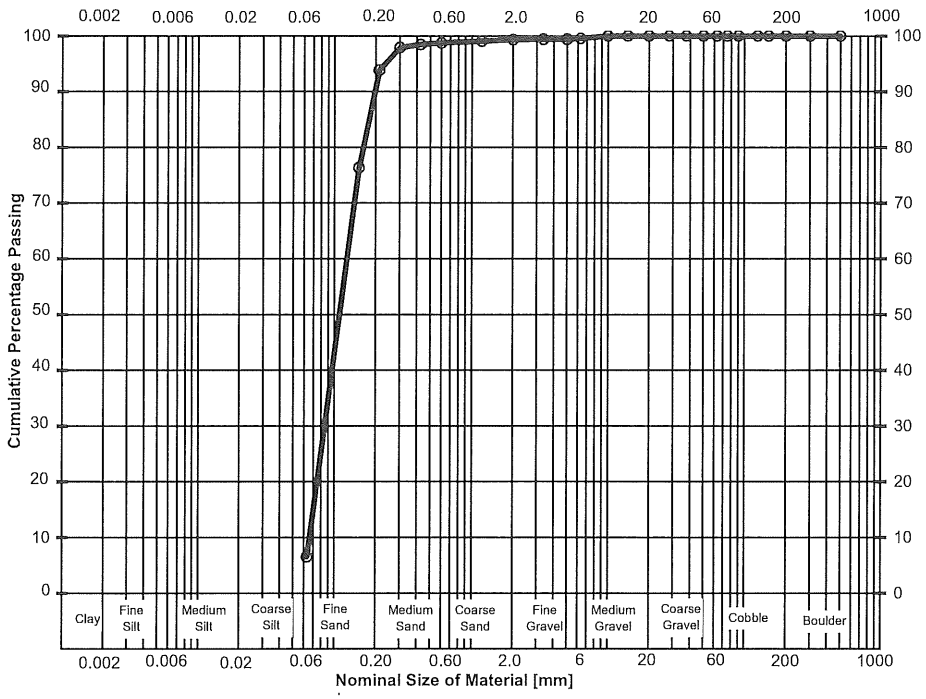
Tested in Accordance with BS 1377-2: 1990: Clause 9.2
Wet Sieving Method

Client:	Ground Engineering Ltd	Certificate Number:	PL8244-1/17/710-2
Client Address:	Newark Road	Client Reference:	C15929
	Peterborough	Lab Job Number:	PL8244-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	13.04.2023
Contact:	Simon Weatherley	Date Tested:	20.04.2023
		Certificate of Sampling:	N/A
Site Name:	Phase2 - Land off Fleet Road	Sampling Certificate No.:	N/A
Site Address:	Fleet, Holbeach	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8244-1/17 **Pre-treatment for organic material:** N/A
Client Reference: B13

Sample Description: Grey-brown grey slightly clayey slightly silty SAND.

Material Specification: Not Required **Depth Top:** 11.50m
Location: BH2 **Depth Base:** 12.00m
Source: **Supplier:**



Sieve Analysis

Sieve mm	%Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	99
3.35	99
2.00	99
1.18	99
0.600	99
0.425	98
0.300	98
0.212	94
0.150	76
0.063	7
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 03.05.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. Reported results relate explicitly to the individual sample and/or specimen in its 'as received' condition, unless otherwise stated.

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-12065-1
Initial Date of Issue:	21-Apr-2023
Client	Ground Engineering Limited
Client Address:	Newark Road Peterborough Cambridgeshire PE1 5UA
Contact(s):	Simon Weatherley
Project	SW/C15929 Phase 2, Land off Fleet Road, Fleet

Quotation No.:		**Date Received:**	13-Apr-2023
Order No.:	SW/C15929	**Date Instructed:**	13-Apr-2023
No. of Samples:	5		
Turnaround (Wkdays):	5	**Results Due:**	19-Apr-2023
Date Approved:	21-Apr-2023		

Approved By:



Details: Stuart Henderson, Technical Manager

Results - Soil

Project: SW/C15929 Phase 2, Land off Fleet Road, Fleet

Client: Ground Engineering Limited				**Chemtest Job No.:**	23-12065	23-12065	23-12065	23-12065	23-12065
Quotation No.:				**Chemtest Sample ID.:**	1622273	1622274	1622275	1622276	1622277
Order No.: SW/C15929				Client Sample Ref.:	D1ES1	D1ES1	D1ES1	D1ES1	D1ES1
				Sample Location:	HA1	HA2	HA3	HA4	HA5
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.10	0.10	0.20	0.30	0.30
				Date Sampled:	11-Apr-2023	11-Apr-2023	11-Apr-2023	11-Apr-2023	11-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
pH	M	2010		4.0	6.9	7.5	7.5	7.7	7.1
Moisture	N	2030	%	0.020	24	24	21	22	20
Stones and Removed Materials	N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.60	0.94	0.82	0.67	0.55
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.061	1.0	0.89	0.053	0.032
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	15	15	3.2	3.0	3.2
Arsenic	M	2455	mg/kg	0.5	13	41	54	13	14
Cadmium	M	2455	mg/kg	0.10	0.15	1.0	1.0	0.15	0.14
Chromium	M	2455	mg/kg	0.5	22	32	41	21	21
Copper	M	2455	mg/kg	0.50	16	57	62	16	16
Mercury	M	2455	mg/kg	0.05	0.47	0.52	0.53	0.11	0.23
Nickel	M	2455	mg/kg	0.50	18	36	39	17	17
Lead	M	2455	mg/kg	0.50	27	340	400	26	25
Selenium	M	2455	mg/kg	0.25	0.67	1.4	1.4	0.65	0.66
Zinc	M	2455	mg/kg	0.50	53	320	400	50	48
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	1.3	5.8	6.8	1.6	2.1
Acenaphthene	M	2700	mg/kg	0.10	2.0	0.87	1.2	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	0.18	0.91	0.84	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	1.6	2.0	1.6	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	4.0	6.1	4.8	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	3.2	6.5	4.3	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	5.6	8.8	6.6	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	1.7	< 0.10	2.7	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	1.9	4.6	2.6	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	4.8	8.5	6.9	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	1.5	< 0.10	0.62	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	9.9	13	9.7	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	3.1	0.92	0.86	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	3.3	< 0.10	3.6	< 0.10	< 0.10
Naphthalene	M	2700	mg/kg	0.10	2.8	0.88	1.1	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	13	8.0	7.1	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	9.1	12	9.6	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	67	73	64	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown

Results - Soil

Project: SW/C15929 Phase 2, Land off Fleet Road, Fleet

Client: Ground Engineering Limited				**Chemtest Job No.:**	23-12065	23-12065	23-12065	23-12065	23-12065
Quotation No.:				**Chemtest Sample ID.:**	1622273	1622274	1622275	1622276	1622277
Order No.: SW/C15929				Client Sample Ref.:	D1ES1	D1ES1	D1ES1	D1ES1	D1ES1
				Sample Location:	HA1	HA2	HA3	HA4	HA5
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.10	0.10	0.20	0.30	0.30
				Date Sampled:	11-Apr-2023	11-Apr-2023	11-Apr-2023	11-Apr-2023	11-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Other Material	N	2040		N/A	Stones and Roots	Stones and Roots	Stones	Stones and Roots	Stones and Roots
Soil Texture	N	2040		N/A	Clay	Clay	Clay	Clay	Clay
Total TPH >C6-C40	M	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10

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
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
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-diphenylcarbazide.
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; Dibenz[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)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

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

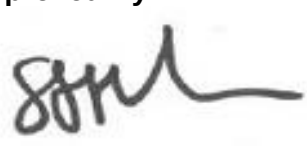
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-26401-1
Initial Date of Issue:	14-Aug-2023
Re-Issue Details:	
Client	Ground Engineering Limited
Client Address:	Newark Road Peterborough Cambridgeshire PE1 5UA
Contact(s):	Simon Weatherley
Project	C15929A Phase 2, Fleet Road, Fleet

Quotation No.:		**Date Received:**	07-Aug-2023
Order No.:	C15929A	**Date Instructed:**	07-Aug-2023
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	11-Aug-2023
Date Approved:	14-Aug-2023		

Approved By:



Details: Stuart Henderson, Technical Manager

Results - Soil

Project: C15929A Phase 2, Fleet Road, Fleet

Client: Ground Engineering Limited			**Chemtest Job No.:**		23-26401	23-26401	23-26401	23-26401
Quotation No.:			**Chemtest Sample ID.:**		1684263	1684264	1684265	1684266
Order No.: C15929A			Client Sample Ref.:		D1	D1	D2	D1
			Sample Location:		HA6	HA7	HA8	HA9
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.10	0.30	0.10
			Date Sampled:		02-Aug-2023	02-Aug-2023	02-Aug-2023	02-Aug-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
pH	M	2010		4.0	7.1	7.2	7.6	6.9
Moisture	N	2030	%	0.020	13	16	13	16
Stones and Removed Materials	N	2030	%	0.020	< 0.020	< 0.020	< 0.020	< 0.020
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.4	1.2	1.3	< 0.40
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.014	0.016	0.011	< 0.010
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	3.0	2.5	2.5	2.4
Arsenic	M	2455	mg/kg	0.5	14	12	12	14
Cadmium	M	2455	mg/kg	0.10	0.12	< 0.10	< 0.10	< 0.10
Chromium	M	2455	mg/kg	0.5	22	18	23	22
Copper	M	2455	mg/kg	0.50	18	16	13	15
Mercury	M	2455	mg/kg	0.05	0.07	0.06	0.07	0.07
Nickel	M	2455	mg/kg	0.50	18	16	15	18
Lead	M	2455	mg/kg	0.50	21	17	16	22
Selenium	M	2455	mg/kg	0.25	0.75	0.64	0.59	0.71
Zinc	M	2455	mg/kg	0.50	51	43	40	49
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	1.9	1.8	1.7	1.8
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.14
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown

Results - Soil

Project: C15929A Phase 2, Fleet Road, Fleet

Client: Ground Engineering Limited			**Chemtest Job No.:**		23-26401	23-26401	23-26401	23-26401
Quotation No.:			**Chemtest Sample ID.:**		1684263	1684264	1684265	1684266
Order No.: C15929A			Client Sample Ref.:		D1	D1	D2	D1
			Sample Location:		HA6	HA7	HA8	HA9
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.10	0.10	0.30	0.10
			Date Sampled:		02-Aug-2023	02-Aug-2023	02-Aug-2023	02-Aug-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Other Material	N	2040		N/A	Stones	Stones and Roots	Stones	Stones and Roots
Soil Texture	N	2040		N/A	Clay	Clay	Clay	Clay

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
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
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-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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; Dibenz[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)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

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

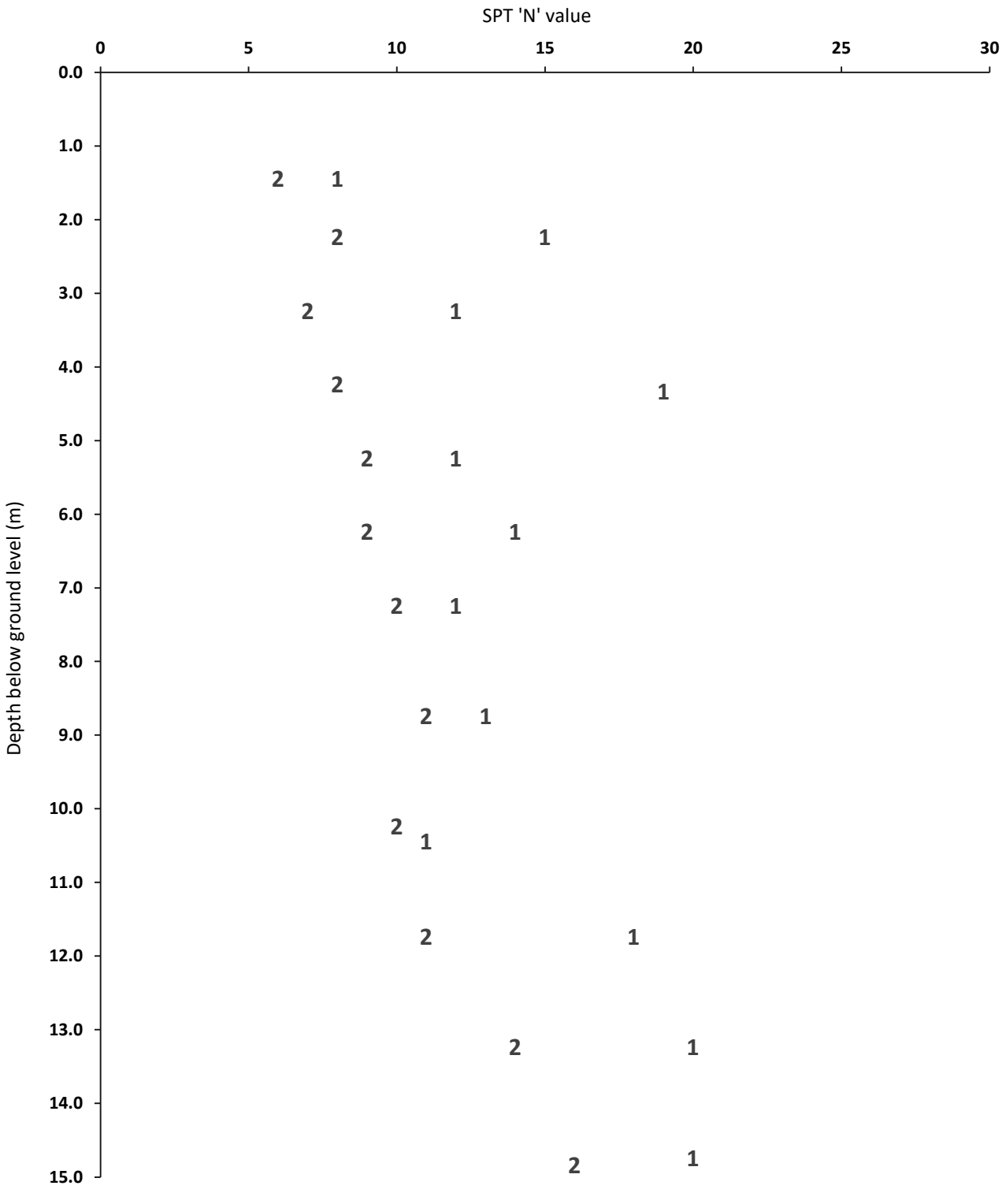
Sample Deviation Codes

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

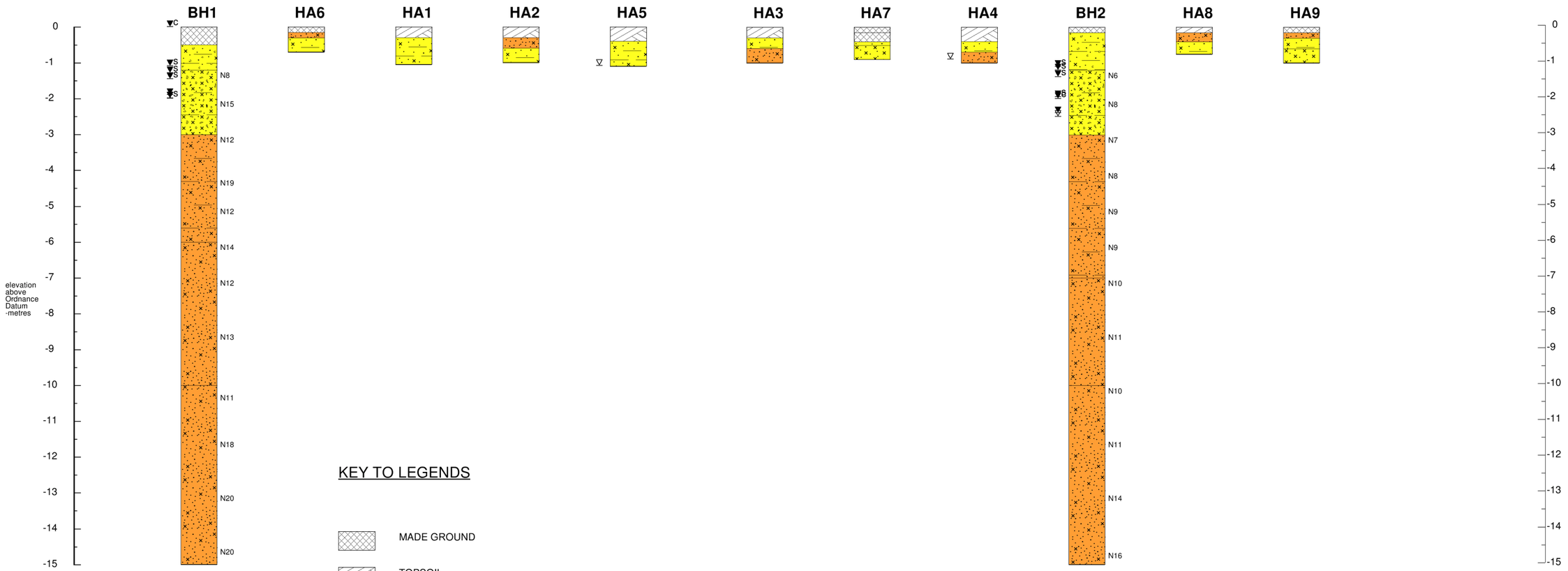
If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com



Key: BH1 = 1 & BH2 = 2

SPT 'N' value v Depth below ground level (m)

SITE	**Phase 2 - Land off Fleet Road, Fleet, Holbeach**
CLIENT	**Kaplan Property Limited**
GROUND ENGINEERING LIMITED Newark Road, Peterborough	Project No. C15929 Figure 1



KEY TO LEGENDS

- MADE GROUND
- TOPSOIL
- TIDAL FLAT DEPOSIT
- TIDAL FLAT DEPOSIT
- TIDAL FLAT DEPOSIT
- MARINE SAND
- ▽ Groundwater Encountered
- ▼ Groundwater Rise
- ▼C Level on Completion
- C▼W Level Casing Withdrawn
- ▼S Standpipe Level

Project : Phase 2 – Land off Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Tel: 01733 566566	**SOIL PROFILE** **Fig No. 2A**	**Project No: C15929A** **Vertical Scale 1:100**

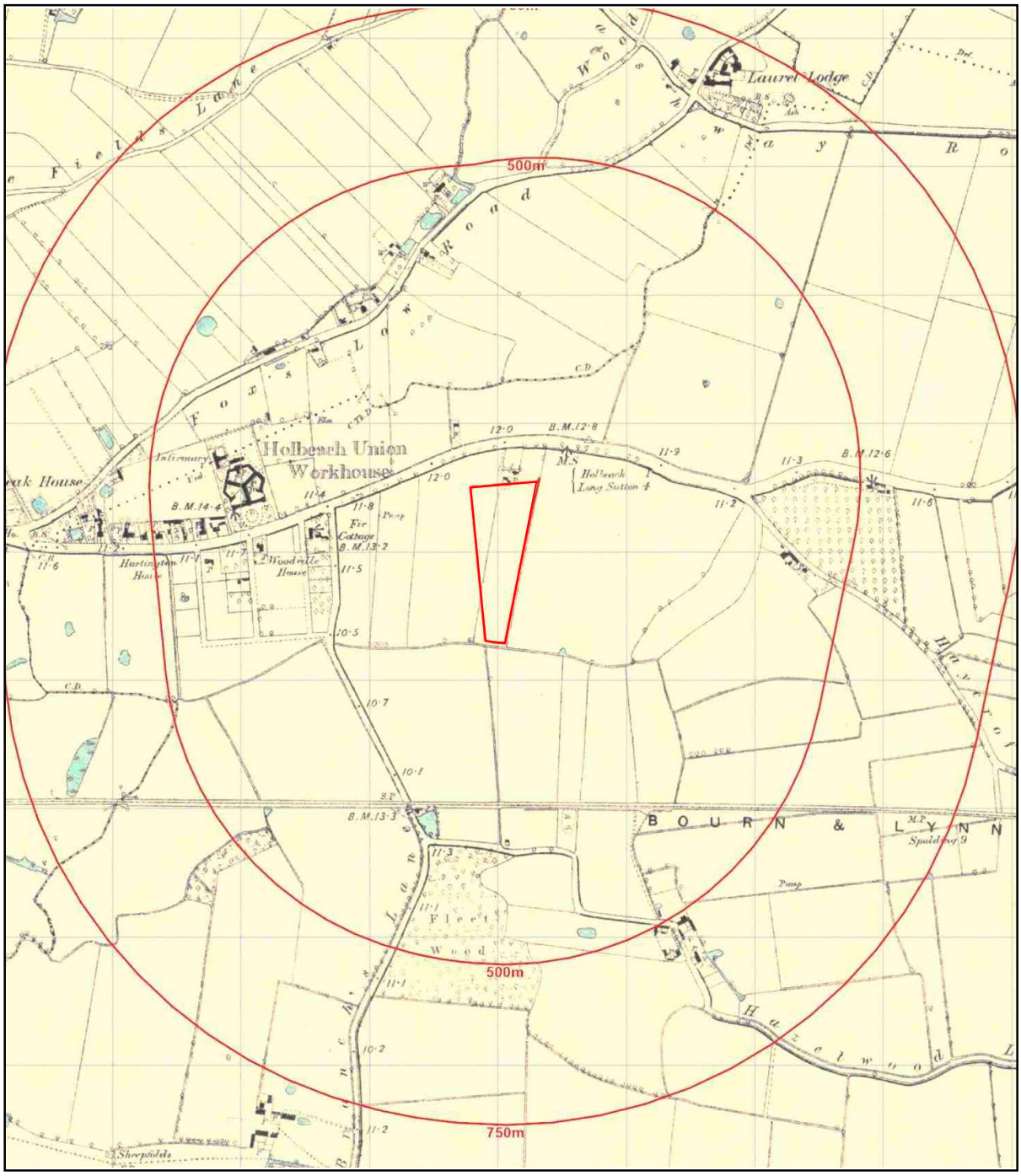
APPENDIX 1

HISTORICAL MAP EXTRACTS

Site History

Figure A

Reproduced from the **1887** edition Ordnance Survey sheet **Lincolnshire 135SE** at **1:10,560** scale

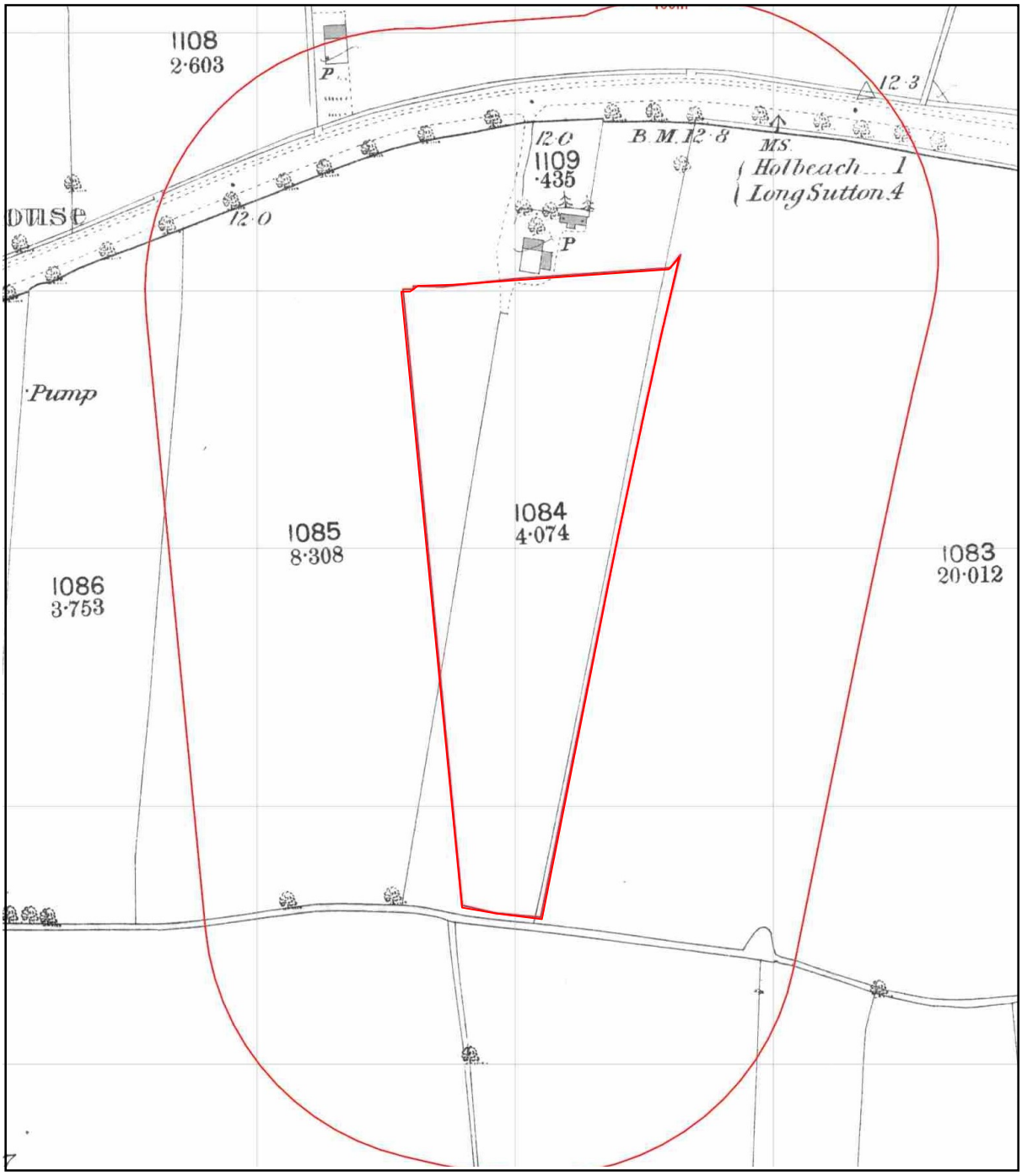


Project : Phase 2 – Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure B

Reproduced from the **1888** edition Ordnance Survey sheet **Lincolnshire 135.11** at **1:2500** scale

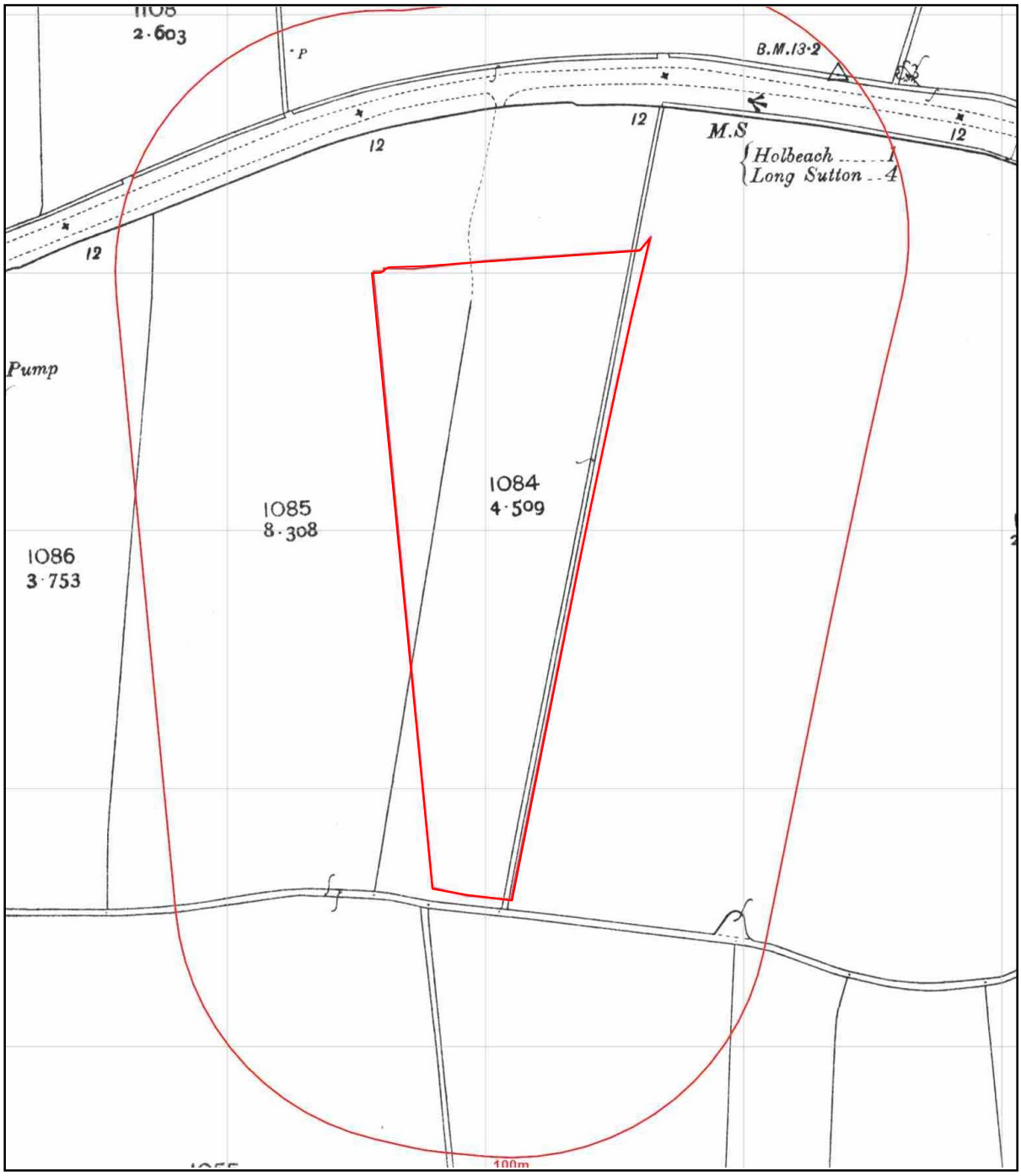


Project : Phase 2 – Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure C

Reproduced from the **1904** edition Ordnance Survey sheet **Lincolnshire 135.11** at **1:2500** scale

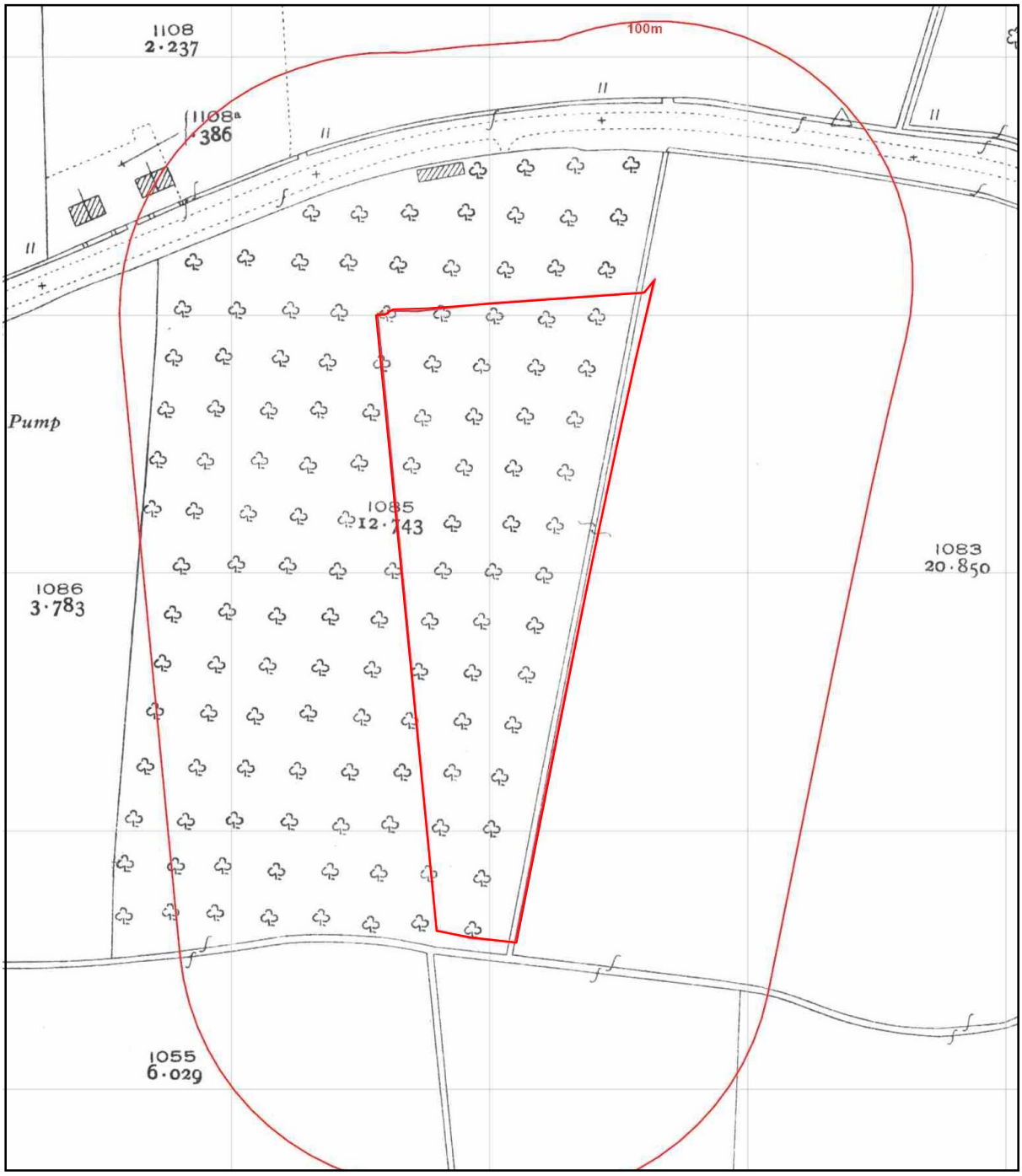


Project : Phase 2 – Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure D

Reproduced from the **1931** edition Ordnance Survey sheet **Lincolnshire 135.11** at **1:2500** scale

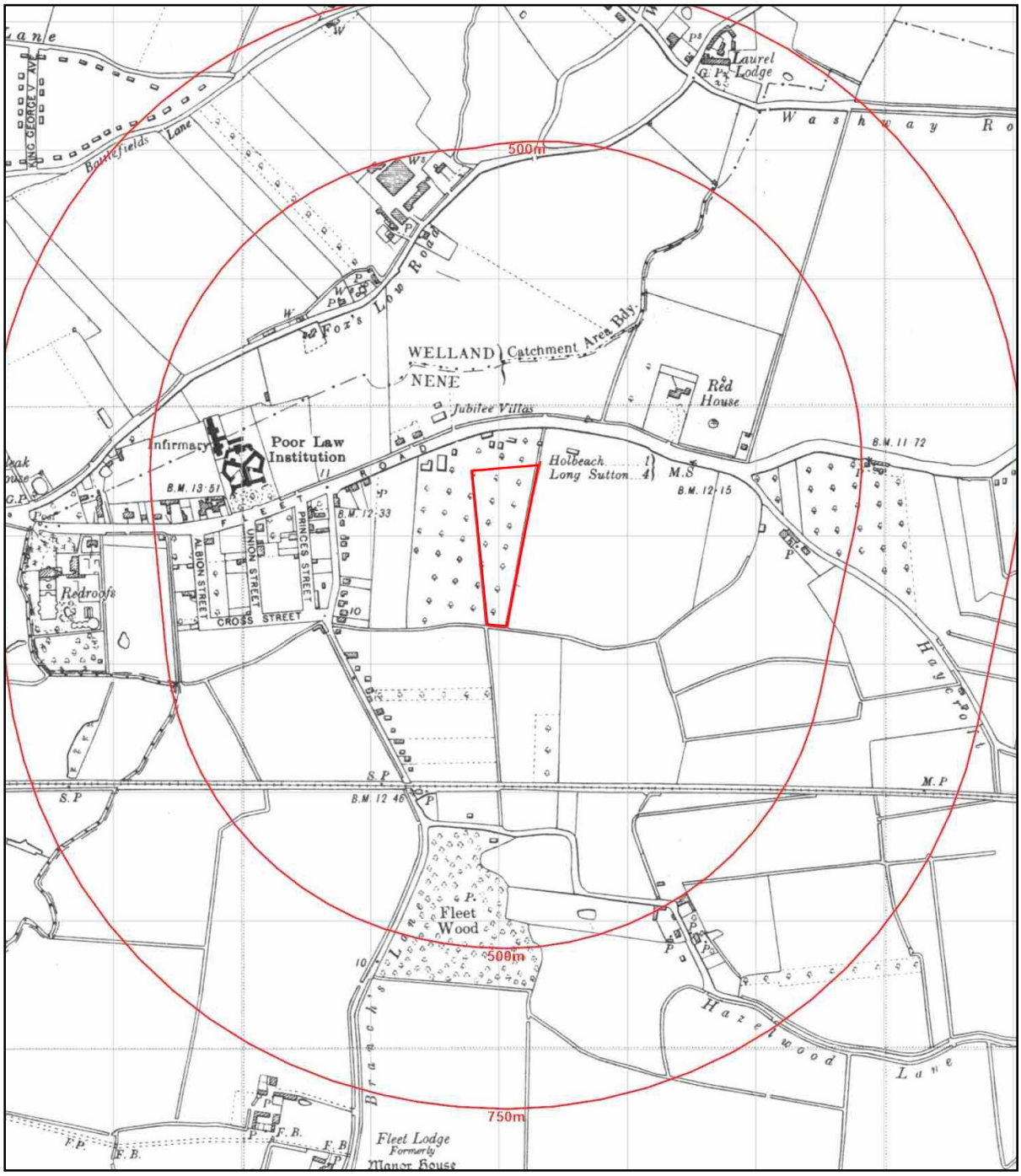


Project : Phase 2 – Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure E

Reproduced from the **1938** edition Ordnance Survey sheet **Lincolnshire 135SE** at **1:10,560** scale

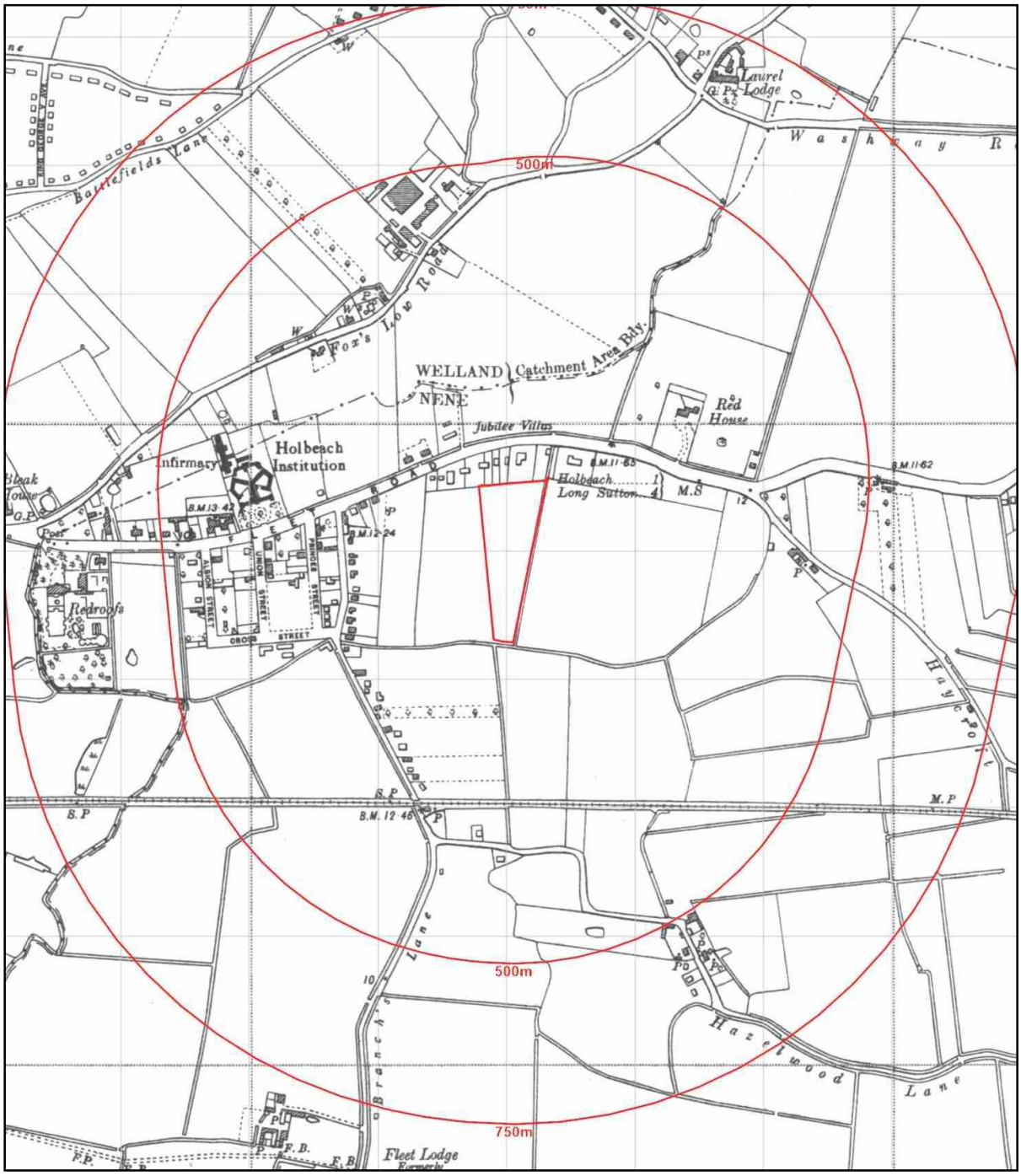


Project : Phase 2 – Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure F

Reproduced from the **1950** edition Ordnance Survey sheet **Lincolnshire 135SE** at **1:10,560** scale

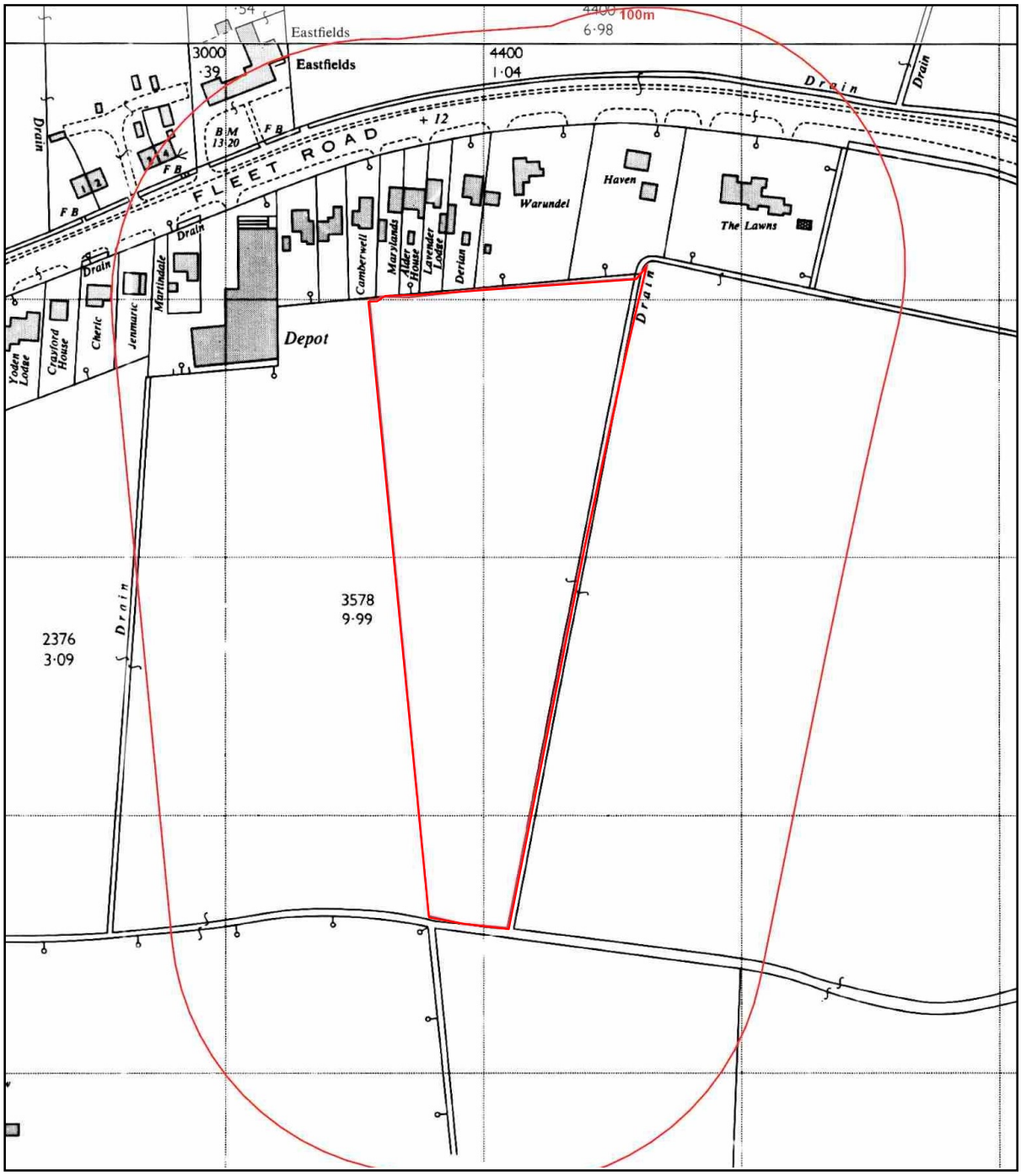


Project : Phase 2 – Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure G

Reproduced from the **1969** edition Ordnance Survey sheets **TF3724 & TF3725** at **1:2500** scale

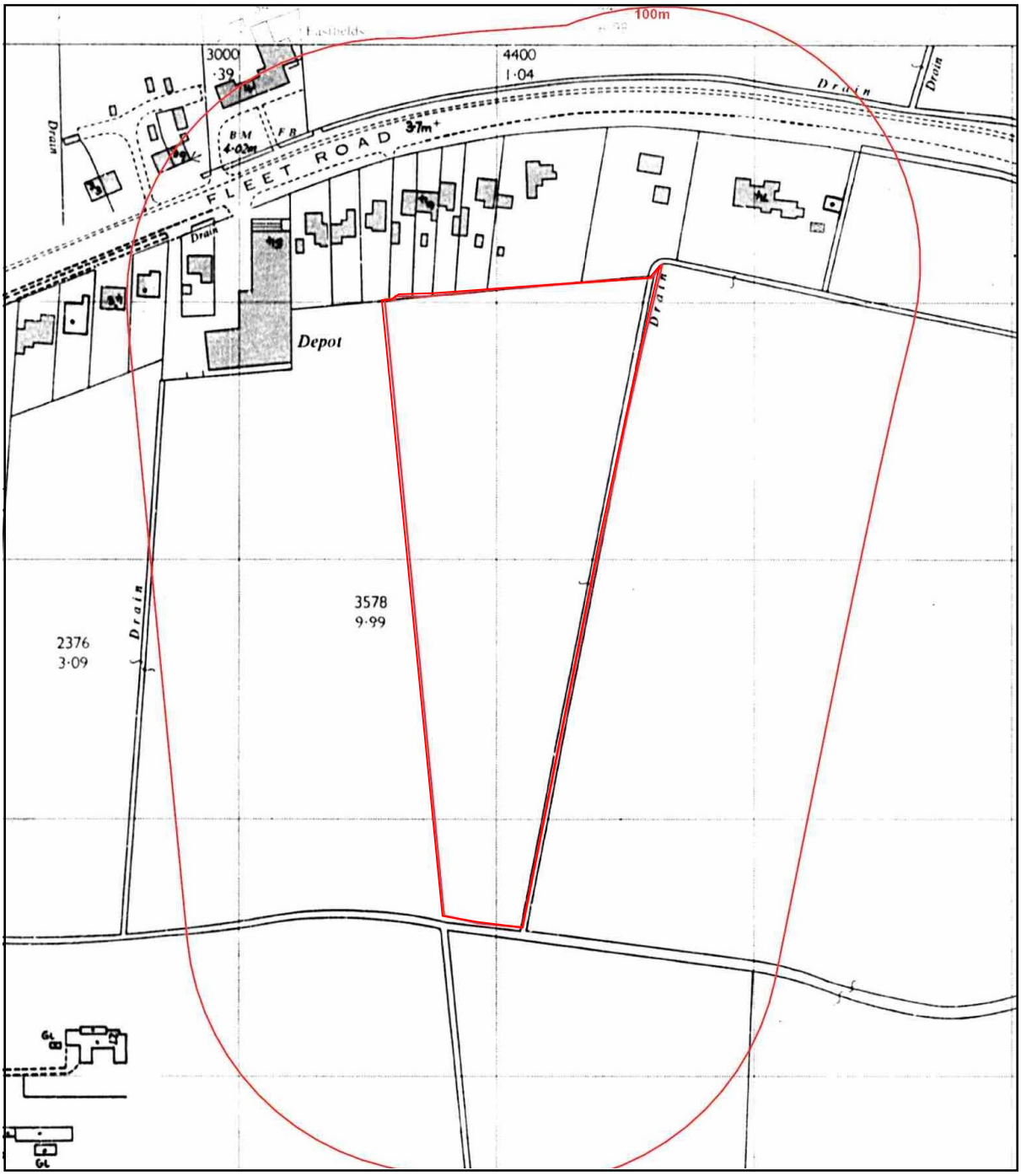


Project : Phase 2 – Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure H

Reproduced from the **1981** edition Ordnance Survey sheets **TF3724 & TF3725** at **1:2500** scale
© Crown Copyright. Licence number AL100005523

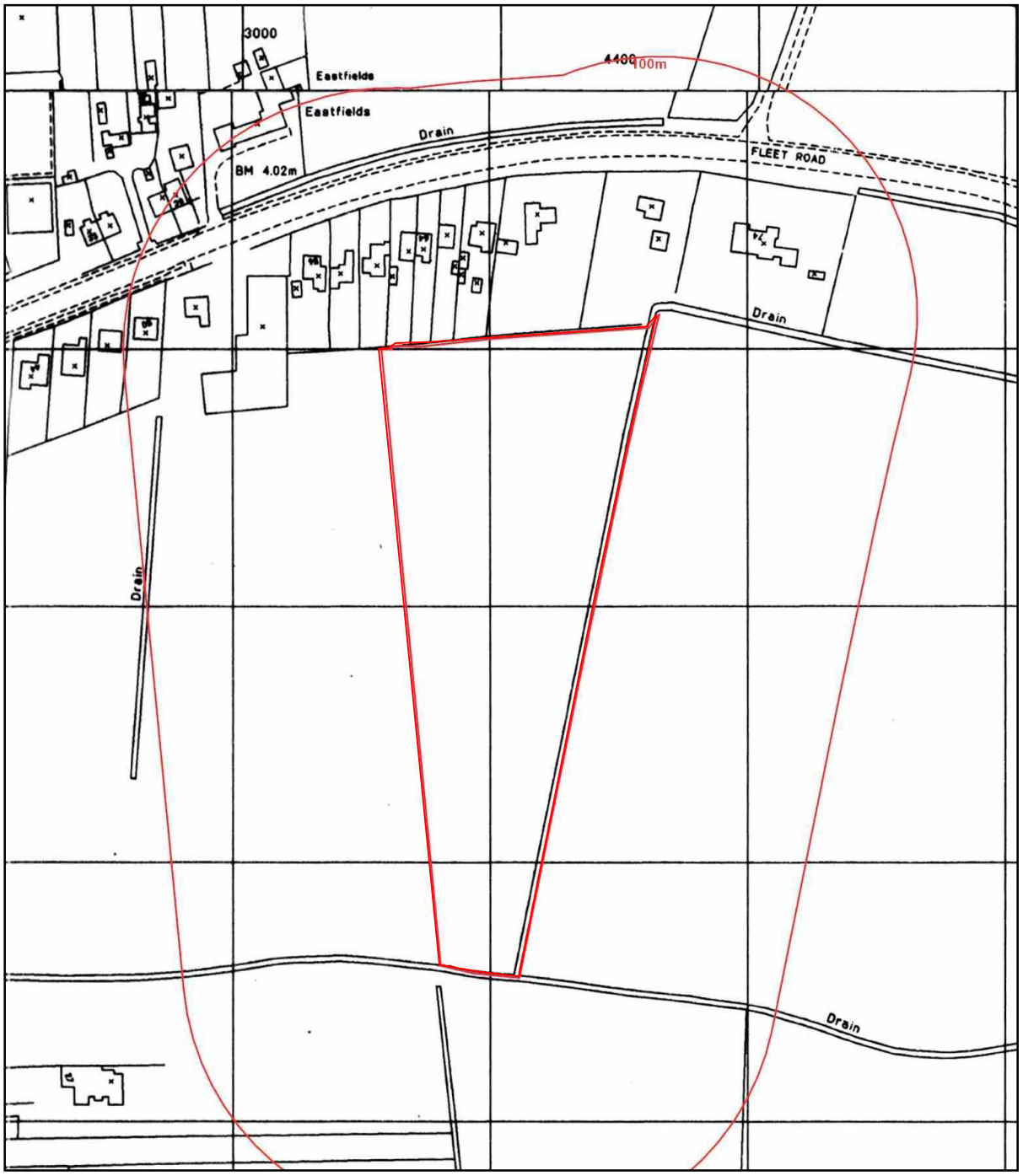


Project : Phase 2, Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure I

Reproduced from the **1991** edition Ordnance Survey sheets **TF3724 & TF3725** at **1:2500** scale
© Crown Copyright. Licence number AL100005523

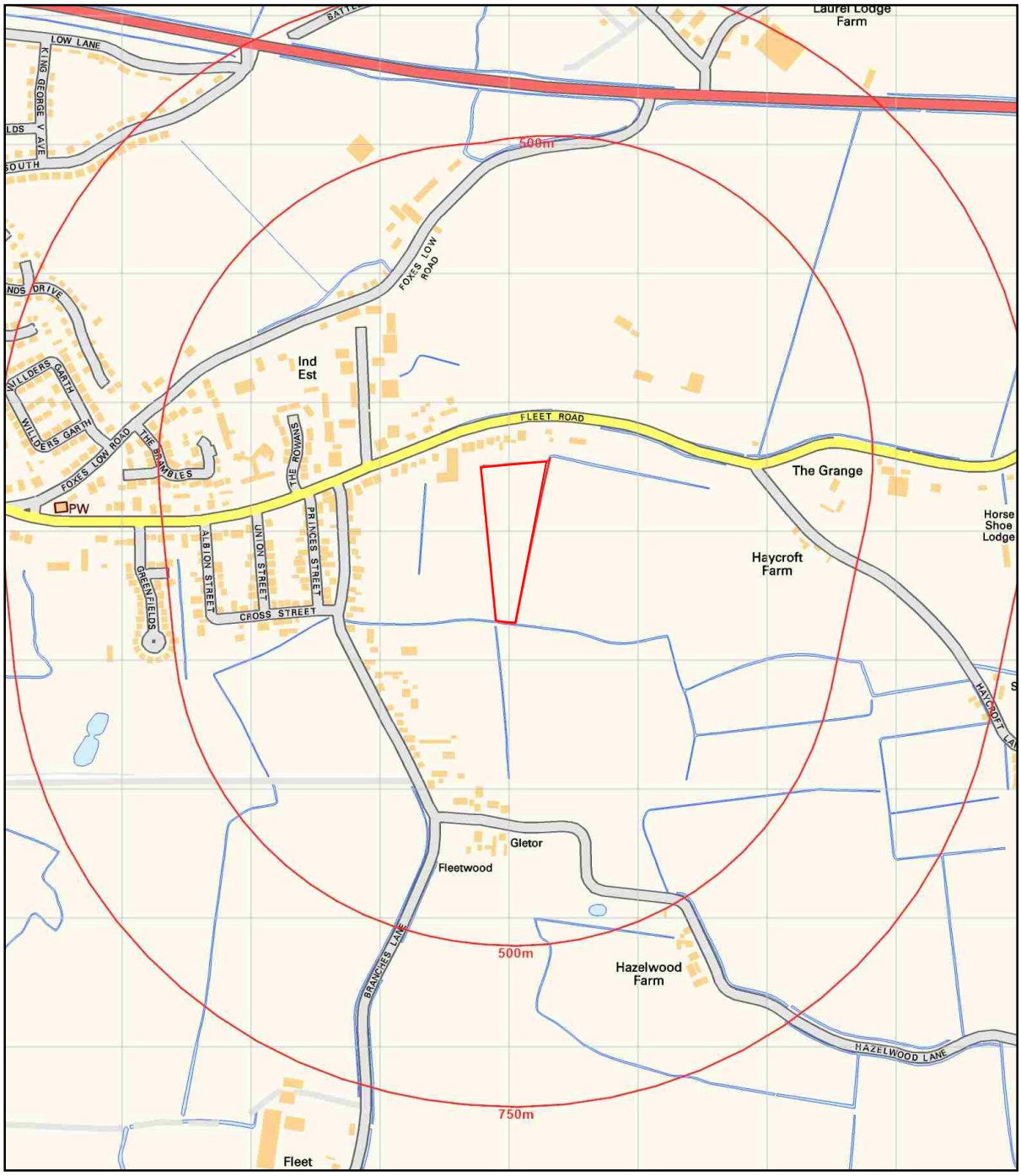


Project : Phase 2, Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure J

Reproduced from the **2001** edition Ordnance Survey sheets **TF32SE & NE** at **1:10,000** scale
© Crown Copyright. Licence number AL100005523



Project : Phase 2, Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure K

Reproduced from the **2003** edition Ordnance Survey sheet **TF3724NW** originally at **1:1250** scale
© Crown Copyright. Licence number AL100005523



Project : Phase 2, Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure L

Reproduced from the **2010** edition Ordnance Survey sheets **TF32SE & NE** at **1:10,000** scale
© Crown Copyright. Licence number AL100005523

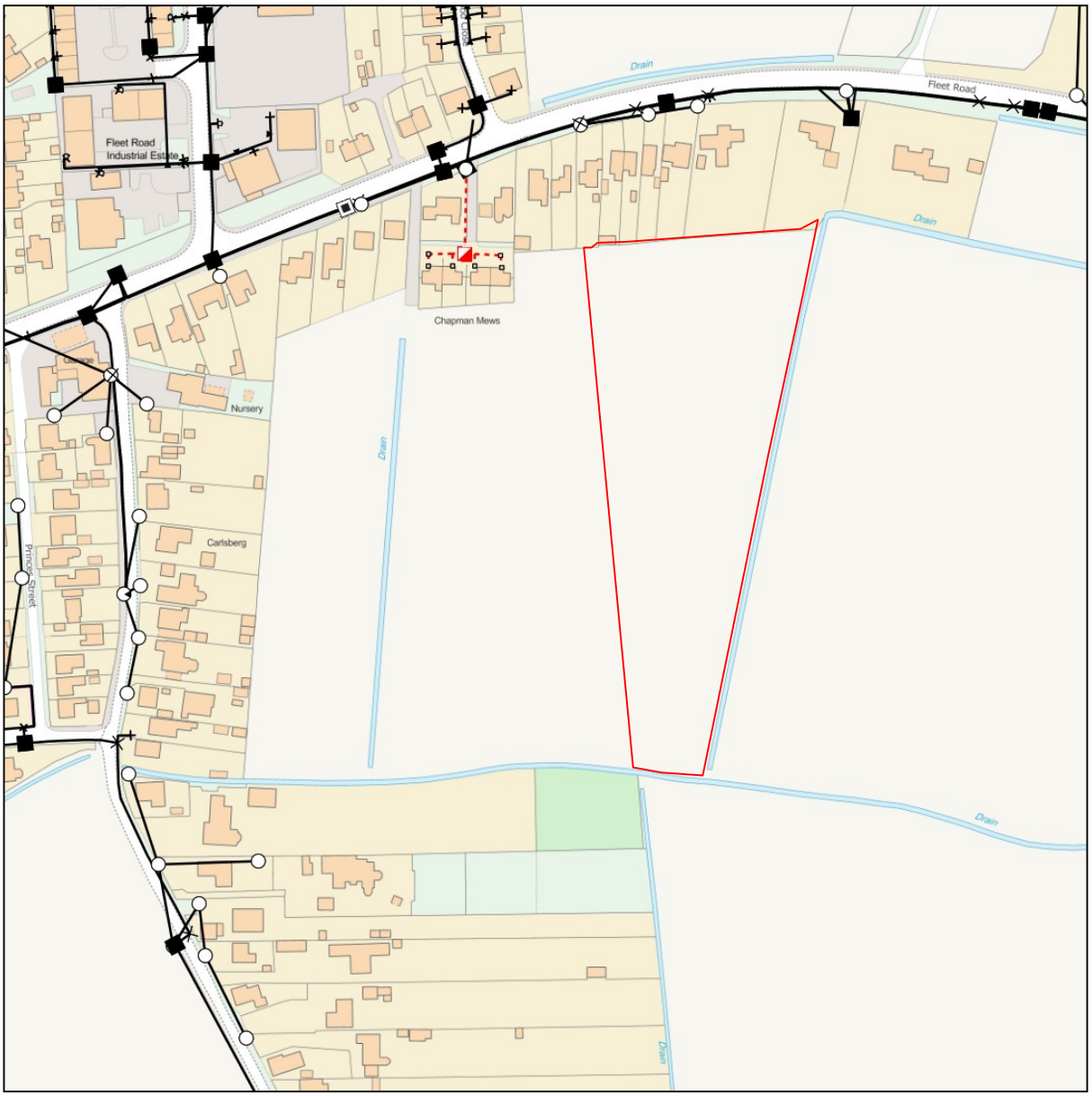


Project : Phase 2, Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

Site History

Figure M

Reproduced from the **2023** edition Ordnance Survey sheet **TF3724NW (BT plan)** originally at **1:1250** not to scale
© Crown Copyright. Licence number AL100005523



Project : Phase 2, Fleet Road, Fleet, Holbeach **Client : Kaplan Property Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C15929**

APPENDIX 2

ENVIRONMENTAL DATABASE SEARCH

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

LAND OFF FLEET ROAD, FLEET, HOLBEACH, PE12 8LA

Order Details

Date: 15/05/2023

Your ref: swc15929

Our Ref: HMD-WRS-N2K-1YU-FLR

Site Details

Location: 537399 324835

Area: 1.66 ha

Authority: South Holland District Council ↗



© Crown copyright and database rights 2023. Ordnance Survey licence 100035207

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 ↗
01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
14 >	1.1 >	Historical industrial land uses >	0	1	2	13	-
15 >	1.2 >	Historical tanks >	0	0	1	4	-
16 >	1.3 >	Historical energy features >	0	0	0	1	-
16 >	1.4 >	Historical petrol stations >	0	0	0	0	-
16 >	1.5 >	Historical garages >	0	0	2	0	-
17 >	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
18 >	2.1 >	Historical industrial land uses >	0	2	2	16	-
19 >	2.2 >	Historical tanks >	0	0	1	5	-
20 >	2.3 >	Historical energy features >	0	0	0	2	-
20 >	2.4 >	Historical petrol stations >	0	0	0	0	-
20 >	2.5 >	Historical garages >	0	0	3	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
22 >	3.1 >	Active or recent landfill >	0	0	0	0	-
22 >	3.2 >	Historical landfill (BGS records) >	0	0	0	0	-
23 >	3.3 >	Historical landfill (LA/mapping records) >	0	0	0	0	-
23 >	3.4 >	Historical landfill (EA/NRW records) >	0	0	0	0	-
23 >	3.5 >	Historical waste sites >	0	0	0	0	-
23 >	3.6 >	Licensed waste sites >	0	0	0	0	-
23 >	3.7 >	Waste exemptions >	0	0	1	5	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
25 >	4.1 >	Recent industrial land uses >	0	0	9	-	-
26 >	4.2 >	Current or recent petrol stations >	0	0	1	0	-
26 >	4.3 >	Electricity cables >	0	0	0	0	-
27 >	4.4 >	Gas pipelines >	0	0	0	0	-
27 >	4.5 >	Sites determined as Contaminated Land >	0	0	0	0	-

27 >	4.6 >	Control of Major Accident Hazards (COMAH) >	0	0	1	0	-
27 >	4.7 >	Regulated explosive sites >	0	0	0	0	-
28 >	4.8 >	Hazardous substance storage/usage >	0	0	2	0	-
28 >	4.9 >	Historical licensed industrial activities (IPC) >	0	0	0	0	-
28 >	4.10 >	Licensed industrial activities (Part A(1)) >	0	0	0	0	-
29 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	1	0	-
29 >	4.12 >	Radioactive Substance Authorisations >	0	0	0	0	-
29 >	4.13 >	Licensed Discharges to controlled waters >	0	0	0	5	-
30 >	4.14 >	Pollutant release to surface waters (Red List) >	0	0	0	0	-
30 >	4.15 >	Pollutant release to public sewer >	0	0	0	0	-
30 >	4.16 >	List 1 Dangerous Substances >	0	0	0	0	-
31 >	4.17 >	List 2 Dangerous Substances >	0	0	0	0	-
31 >	4.18 >	Pollution Incidents (EA/NRW) >	0	0	1	0	-
31 >	4.19 >	Pollution inventory substances >	0	0	0	0	-
31 >	4.20 >	Pollution inventory waste transfers >	0	0	0	0	-
32 >	4.21 >	Pollution inventory radioactive waste >	0	0	0	0	-

Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
33 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
34 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
35 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
36 >	5.4 >	Groundwater vulnerability- soluble rock risk >	None (within 0m)				
36 >	5.5 >	Groundwater vulnerability- local information >	None (within 0m)				
37 >	5.6 >	Groundwater abstractions >	0	0	0	0	0
38 >	5.7 >	Surface water abstractions >	0	0	0	0	1
38 >	5.8 >	Potable abstractions >	0	0	0	0	0
38 >	5.9 >	Source Protection Zones >	0	0	0	0	-
38 >	5.10 >	Source Protection Zones (confined aquifer) >	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
40 >	6.1 >	Water Network (OS MasterMap) >	0	4	4	-	-

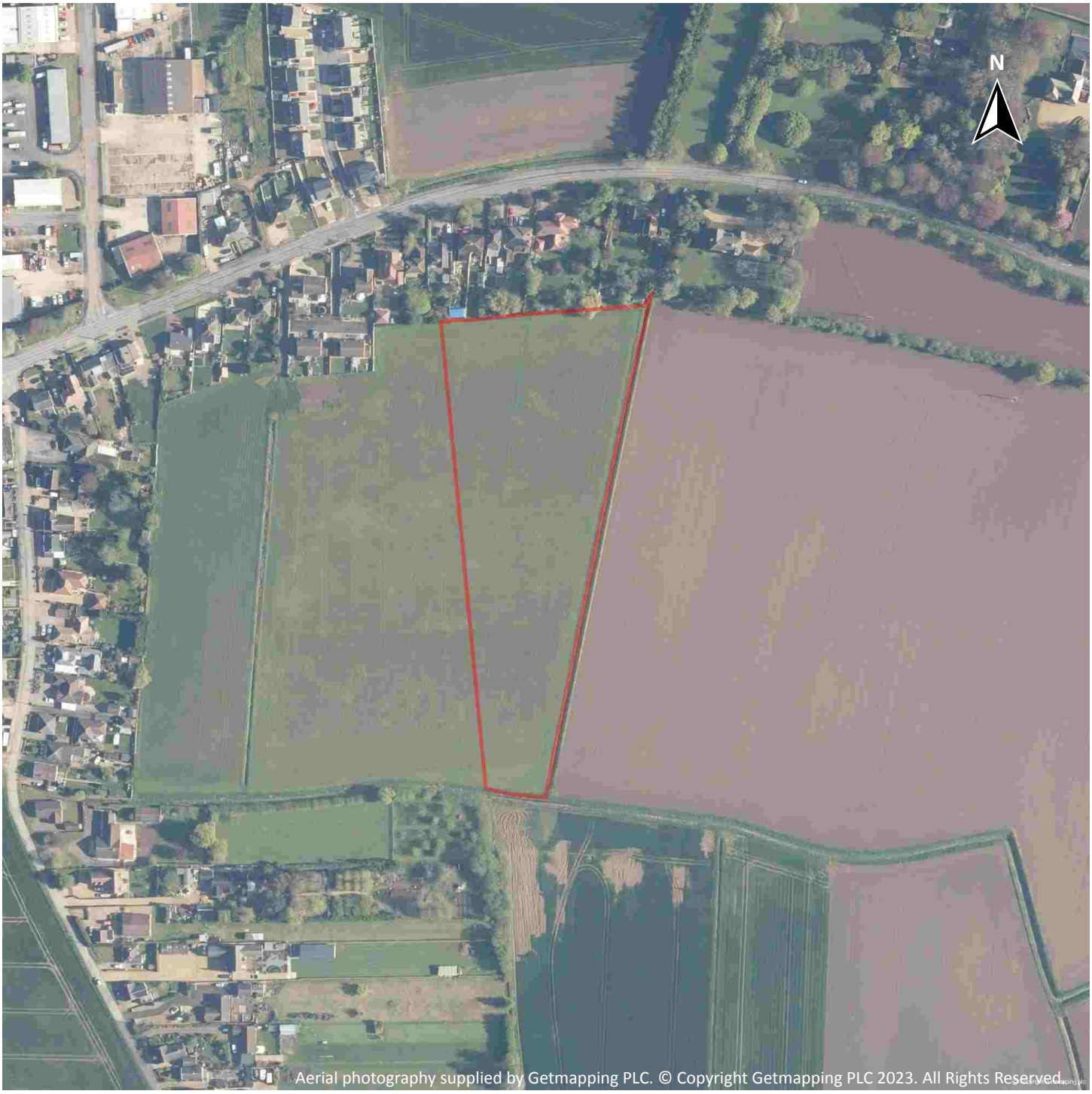
41 >	6.2 >	Surface water features >	1	1	3	-	-
41 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
42 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
42 >	6.5 >	WFD Groundwater bodies >	0	-	-	-	-
Page	Section	**River and coastal flooding >**	On site	0-50m	50-250m	250-500m	500-2000m
43 >	7.1 >	Risk of flooding from rivers and the sea >	Low (within 50m)				
44 >	7.2 >	Historical Flood Events >	0	0	0	-	-
44 >	7.3 >	Flood Defences >	0	0	0	-	-
44 >	7.4 >	Areas Benefiting from Flood Defences >	0	0	0	-	-
44 >	7.5 >	Flood Storage Areas >	0	0	0	-	-
45 >	7.6 >	Flood Zone 2 >	Identified (within 50m)				
46 >	7.7 >	Flood Zone 3 >	Identified (within 50m)				
Page	Section	**Surface water flooding >**					
47 >	8.1 >	Surface water flooding >	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	**Groundwater flooding >**					
49 >	9.1 >	Groundwater flooding >	Negligible (within 50m)				
Page	Section	**Environmental designations >**	On site	0-50m	50-250m	250-500m	500-2000m
50 >	10.1 >	Sites of Special Scientific Interest (SSSI) >	0	0	0	0	0
50 >	10.2 >	Conserved wetland sites (Ramsar sites) >	0	0	0	0	0
50 >	10.3 >	Special Areas of Conservation (SAC) >	0	0	0	0	0
50 >	10.4 >	Special Protection Areas (SPA) >	0	0	0	0	0
51 >	10.5 >	National Nature Reserves (NNR) >	0	0	0	0	0
51 >	10.6 >	Local Nature Reserves (LNR) >	0	0	0	0	0
51 >	10.7 >	Designated Ancient Woodland >	0	0	0	0	0
51 >	10.8 >	Biosphere Reserves >	0	0	0	0	0
52 >	10.9 >	Forest Parks >	0	0	0	0	0
52 >	10.10 >	Marine Conservation Zones >	0	0	0	0	0
52 >	10.11 >	Green Belt >	0	0	0	0	0
52 >	10.12 >	Proposed Ramsar sites >	0	0	0	0	0

52 >	10.13 >	Possible Special Areas of Conservation (pSAC) >	0	0	0	0	0
53 >	10.14 >	Potential Special Protection Areas (pSPA) >	0	0	0	0	0
53 >	10.15 >	Nitrate Sensitive Areas >	0	0	0	0	0
53 >	10.16 >	Nitrate Vulnerable Zones >	0	0	1	0	1
54 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
55 >	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
56 >	11.1 >	World Heritage Sites >	0	0	0	-	-
57 >	11.2 >	Area of Outstanding Natural Beauty >	0	0	0	-	-
57 >	11.3 >	National Parks >	0	0	0	-	-
57 >	11.4 >	Listed Buildings >	0	0	1	-	-
58 >	11.5 >	Conservation Areas >	0	0	0	-	-
58 >	11.6 >	Scheduled Ancient Monuments >	0	0	0	-	-
58 >	11.7 >	Registered Parks and Gardens >	0	0	0	-	-
Page	Section	**Agricultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
59 >	12.1 >	Agricultural Land Classification >	Grade 1 (within 250m)				
60 >	12.2 >	Open Access Land >	0	0	0	-	-
60 >	12.3 >	Tree Felling Licences >	0	0	0	-	-
60 >	12.4 >	Environmental Stewardship Schemes >	0	1	0	-	-
60 >	12.5 >	Countryside Stewardship Schemes >	0	0	0	-	-
Page	Section	**Habitat designations >**	On site	0-50m	50-250m	250-500m	500-2000m
61 >	13.1 >	Priority Habitat Inventory >	0	0	2	-	-
62 >	13.2 >	Habitat Networks >	0	0	0	-	-
62 >	13.3 >	Open Mosaic Habitat >	0	0	0	-	-
62 >	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
63 >	14.1 >	10k Availability >	Identified (within 500m)				
64 >	14.2 >	Artificial and made ground (10k) >	0	0	0	0	-
65 >	14.3 >	Superficial geology (10k) >	0	0	0	0	-

65 >	14.4 >	Landslip (10k) >	0	0	0	0	-
66 >	14.5 >	Bedrock geology (10k) >	0	0	0	0	-
66 >	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
67 >	15.1 >	50k Availability >	Identified (within 500m)				
68 >	15.2 >	Artificial and made ground (50k) >	0	0	0	0	-
68 >	15.3 >	Artificial ground permeability (50k) >	0	0	-	-	-
69 >	15.4 >	Superficial geology (50k) >	1	0	0	0	-
70 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
70 >	15.6 >	Landslip (50k) >	0	0	0	0	-
70 >	15.7 >	Landslip permeability (50k) >	None (within 50m)				
71 >	15.8 >	Bedrock geology (50k) >	1	0	0	0	-
72 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
72 >	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
73 >	16.1 >	BGS Boreholes >	0	0	0	-	-
Page	Section	**Natural ground subsidence** >					
74 >	17.1 >	Shrink swell clays >	Low (within 50m)				
75 >	17.2 >	Running sands >	Moderate (within 50m)				
76 >	17.3 >	Compressible deposits >	Moderate (within 50m)				
77 >	17.4 >	Collapsible deposits >	Negligible (within 50m)				
78 >	17.5 >	Landslides >	Very low (within 50m)				
79 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	**Mining, ground workings and natural cavities** >	On site	0-50m	50-250m	250-500m	500-2000m
81 >	18.1 >	Natural cavities >	0	0	0	0	-
81 >	18.2 >	BritPits >	0	0	0	0	-
81 >	18.3 >	Surface ground workings >	0	0	0	-	-
81 >	18.4 >	Underground workings >	0	0	0	0	0
82 >	18.5 >	Historical Mineral Planning Areas >	0	0	0	0	-

82 >	18.6 >	Non-coal mining >	0	0	0	0	0
82 >	18.7 >	Mining cavities >	0	0	0	0	0
82 >	18.8 >	JPB mining areas >	None (within 0m)				
82 >	18.9 >	Coal mining >	None (within 0m)				
83 >	18.10 >	Brine areas >	None (within 0m)				
83 >	18.11 >	Gypsum areas >	None (within 0m)				
83 >	18.12 >	Tin mining >	None (within 0m)				
83 >	18.13 >	Clay mining >	None (within 0m)				
Page	Section	**Radon** >					
84 >	19.1 >	Radon >	Less than 1% (within 0m)				
Page	Section	**Soil chemistry** >	On site	0-50m	50-250m	250-500m	500-2000m
86 >	20.1 >	BGS Estimated Background Soil Chemistry >	1	1	-	-	-
86 >	20.2 >	BGS Estimated Urban Soil Chemistry >	0	0	-	-	-
86 >	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
87 >	21.1 >	Underground railways (London) >	0	0	0	-	-
87 >	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	-	-
88 >	21.6 >	Historical railways >	0	0	1	-	-
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: 05/05/2021

Site Area: 1.66ha

Recent site history - 2018 aerial photograph



Capture Date: 06/05/2018

Site Area: 1.66ha

Recent site history - 2015 aerial photograph



Capture Date: 06/04/2015

Site Area: 1.66ha

Recent site history - 2007 aerial photograph



Capture Date: 11/08/2007

Site Area: 1.66ha

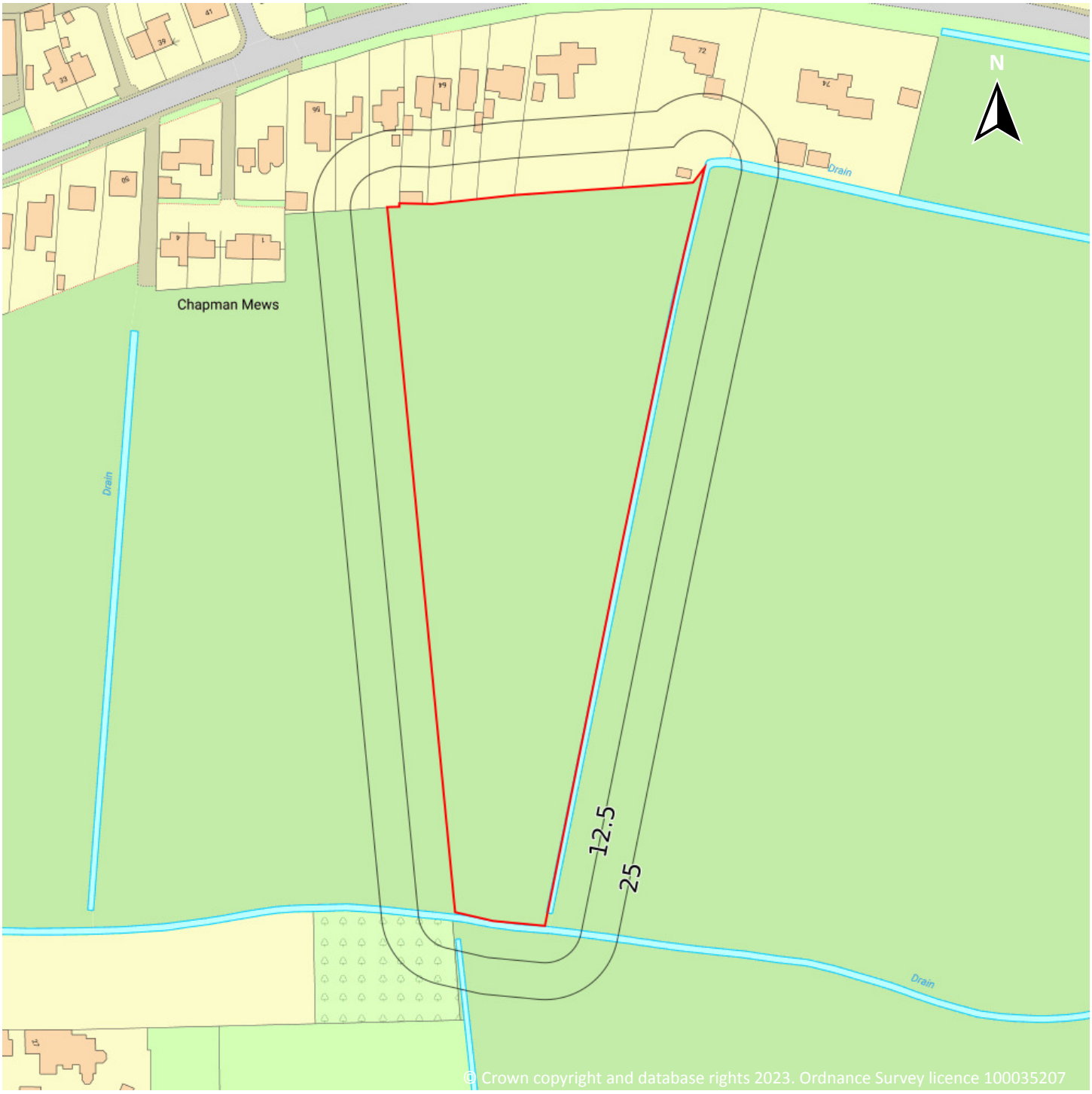
Recent site history - 1999 aerial photograph



Capture Date: 18/06/1999

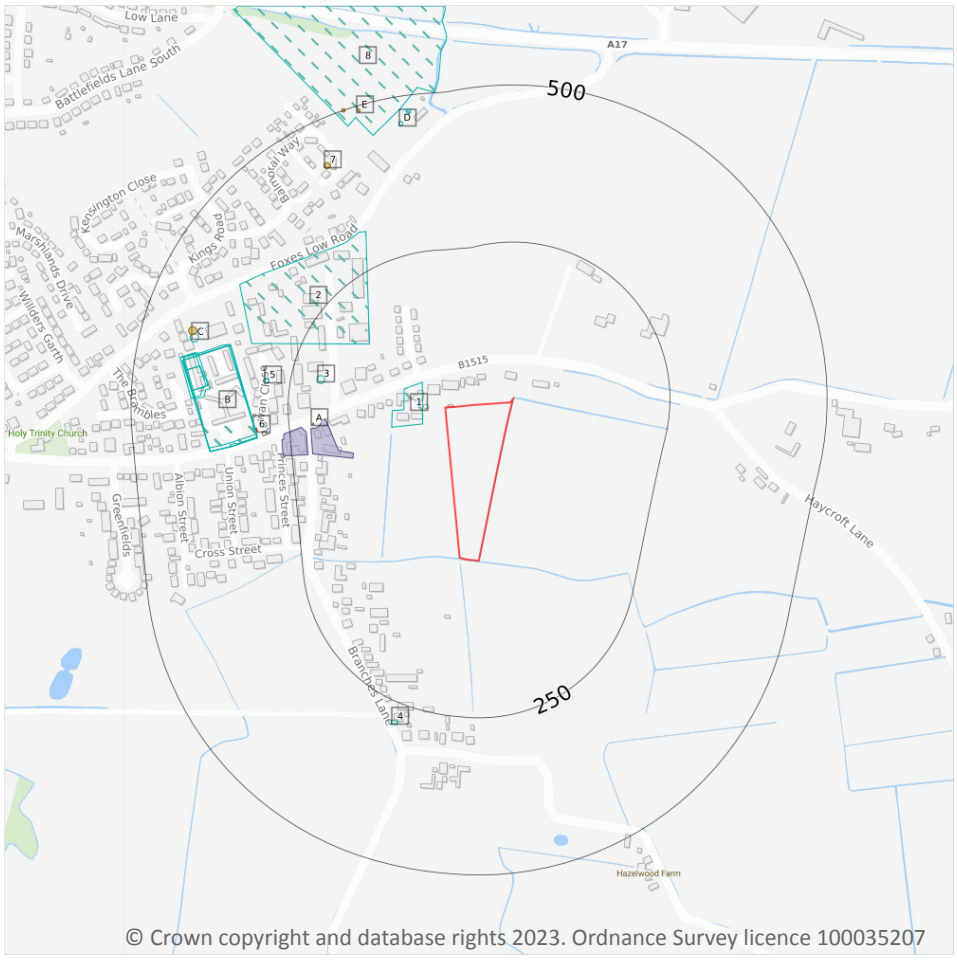
Site Area: 1.66ha

OS MasterMap site plan



Site Area: 1.66ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

Historical garages

1.1 Historical industrial land uses

Records within 500m	16

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	36m NW	Unspecified Depot	1970 - 1992	2017241

ID	Location	Land use	Dates present	Group ID
2	158m NW	Industrial Estate	1992	2007488
3	197m NW	Unspecified Workhouse	1887	2006229
4	276m S	Railway Building	1903 - 1929	2023755
5	283m NW	Unspecified Workhouse	1903	2006225
B	302m W	Union Workhouse	1903	2011034
B	302m W	Infirmary	1887 - 1903	2036399
B	302m W	Infirmary	1950	2036977
B	303m W	Hospital	1970	2011865
B	375m W	Infirmary	1929 - 1938	2027707
B	379m W	Infirmary	1903	2017266
B	383m W	Infirmary	1958	2039824
C	408m NW	Unspecified Tank	1950	2004297
8	448m N	Nursery	1976	2008144
D	453m N	Unspecified Tank	1955	2004300
D	471m N	Unspecified Tank	1955	2004299

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**5**

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

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

ID	Location	Land use	Dates present	Group ID
A	211m W	Unspecified Tank	1968	338401
C	414m NW	Unspecified Tank	1968	337856
7	424m NW	Unspecified Tank	1965 - 1991	341166

ID	Location	Land use	Dates present	Group ID
E	490m N	Unspecified Tank	1965	338400
E	497m N	Unspecified Tank	1991	338402

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	1

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

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

ID	Location	Land use	Dates present	Group ID
6	301m W	Electricity Substation	1968 - 1981	224036

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

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

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	2

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

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

ID	Location	Land use	Dates present	Group ID
A	152m W	Garage	1968	67889
A	224m W	Garage	1968 - 1991	68709

This data is sourced from Ordnance Survey / Groundsure.

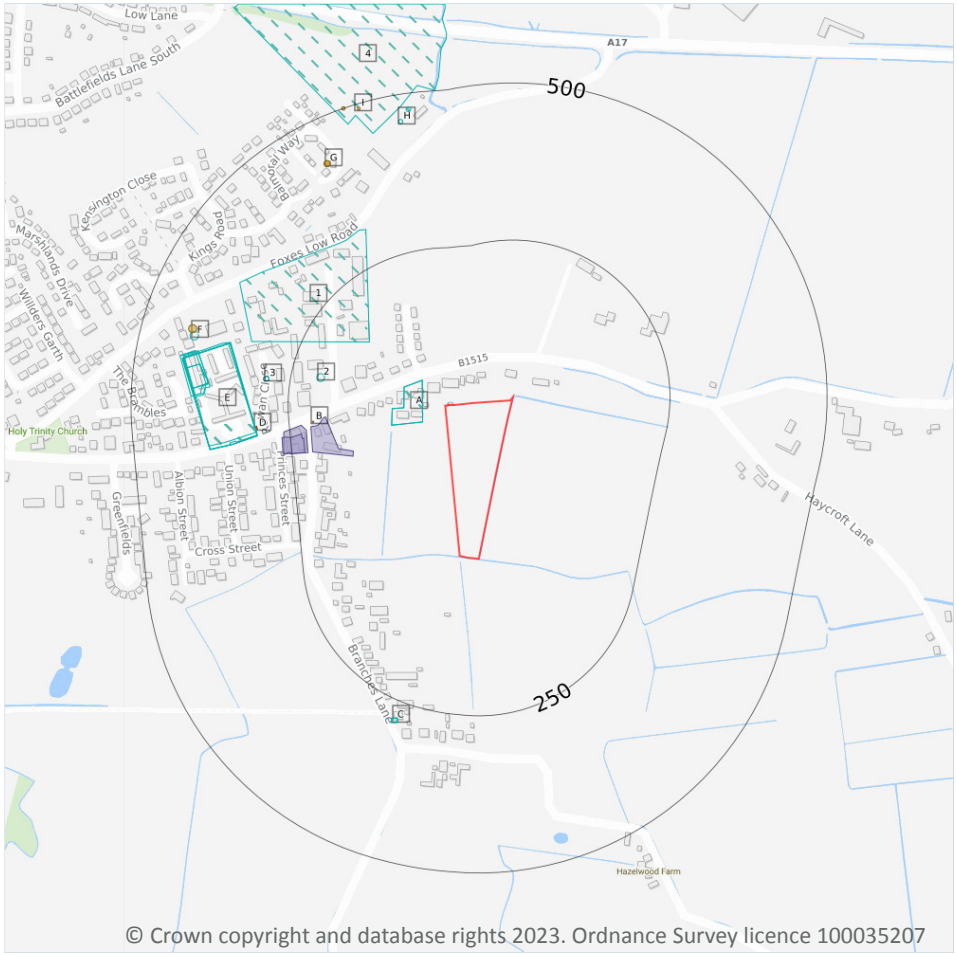
1.6 Historical military land

Records within 500m	**0**

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

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

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

Historical garages

2.1 Historical industrial land uses

Records within 500m	20

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 18 >**

ID	Location	Land Use	Date	Group ID
A	36m NW	Unspecified Depot	1992	2017241
A	36m NW	Unspecified Depot	1970	2017241
1	158m NW	Industrial Estate	1992	2007488

ID	Location	Land Use	Date	Group ID
2	197m NW	Unspecified Workhouse	1887	2006229
C	276m S	Railway Building	1929	2023755
C	276m S	Railway Building	1903	2023755
3	283m NW	Unspecified Workhouse	1903	2006225
E	302m W	Union Workhouse	1903	2011034
E	302m W	Infirmary	1950	2036977
E	302m W	Infirmary	1903	2036399
E	302m W	Infirmary	1887	2036399
E	303m W	Hospital	1970	2011865
E	375m W	Infirmary	1929	2027707
E	378m W	Infirmary	1938	2027707
E	379m W	Infirmary	1903	2017266
E	383m W	Infirmary	1958	2039824
F	408m NW	Unspecified Tank	1950	2004297
4	448m N	Nursery	1976	2008144
H	453m N	Unspecified Tank	1955	2004300
H	471m N	Unspecified Tank	1955	2004299

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**6**

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'.

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
B	211m W	Unspecified Tank	1968	338401
F	414m NW	Unspecified Tank	1968	337856
G	424m NW	Unspecified Tank	1965	341166

ID	Location	Land Use	Date	Group ID
G	424m NW	Unspecified Tank	1991	341166
I	490m N	Unspecified Tank	1965	338400
I	497m N	Unspecified Tank	1991	338402

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**2**

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

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
D	301m W	Electricity Substation	1981	224036
D	301m W	Electricity Substation	1968	224036

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	**3**

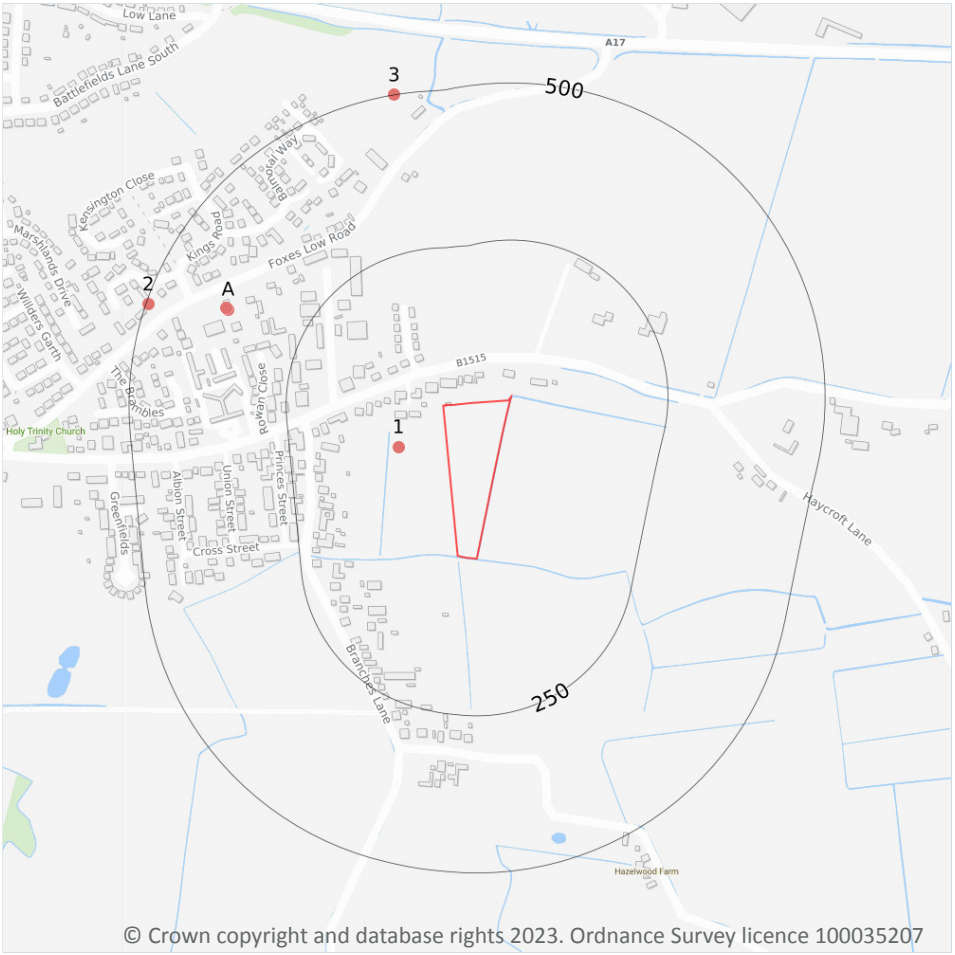
Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
B	152m W	Garage	1968	67889
B	224m W	Garage	1991	68709
B	229m W	Garage	1968	68709

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	6

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

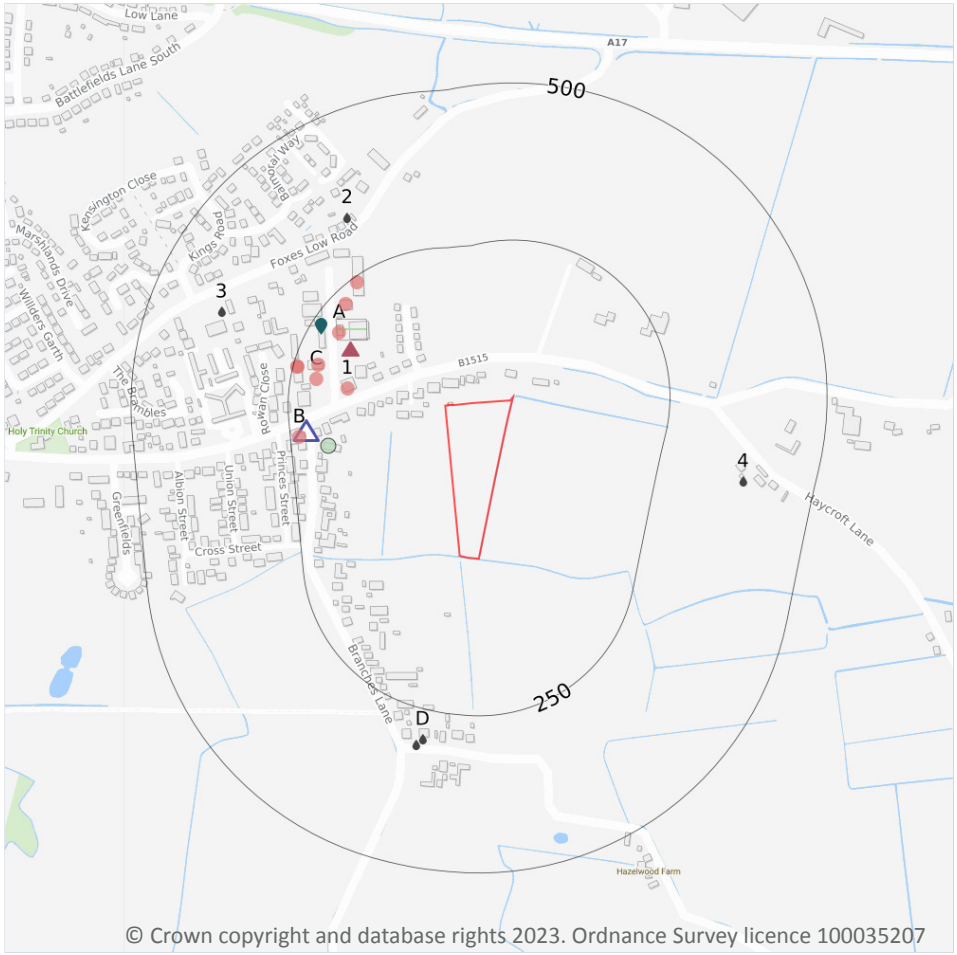
Features are displayed on the Waste and landfill map on **page 22 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	77m W	-	WEX303422	Using waste exemption	Not on a Farm	Use of waste in construction

ID	Location	Site	Reference	Category	Sub-Category	Description
A	375m NW	FOXES LOWE ROAD, HOLBEACH, SPALDING, PE12 7PA	WEX021678	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	375m NW	FOXES LOWE ROAD HOLBEACH SPALDING PE12 7PA	WEX020240	Storing waste exemption	Not on a farm	Storage of waste in a secure place
A	379m NW	South Holland Internal Drainage Board Marsh Reeves Holbeach Lincolnshire PE12 7PA	EPR/PE5755YU /A001	Storing waste exemption	Both agricultural and non-agricultural waste	Storage of waste in a secure place
2	496m NW	-	WEX178236	Storing waste exemption	Not on a farm	Storage of waste in a secure place
3	499m N	South Holland Internal Drainage Board Marsh Reeves Holbeach PE12 7PA	EPR/XE5050YZ /A001	Storing waste exemption	Both agricultural and non-agricultural waste	Storage of waste in a secure place

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

4 Current industrial land use



Site Outline

Search buffers in metres (m)

- Recent industrial land uses
- Current or recent petrol stations
- Control of Major Accident Hazards
- Hazardous substance storage/usage
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m	9

Current potentially contaminative industrial sites.

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

ID	Location	Company	Address	Activity	Category
1	158m NW	Godfrey's Automotive Services	Unit 35, Fleet Road Industrial Estate, Fleet, Spalding, Lincolnshire, PE12 8LY	Vehicle Repair, Testing and Servicing	Repair and Servicing
A	206m NW	J M L Henderson Ltd	31, Fleet Road Industrial Estate, Fleet, Spalding, Lincolnshire, PE12 8LY	General Construction Supplies	Industrial Products

ID	Location	Company	Address	Activity	Category
C	210m NW	Fleet Road Industrial Estate	Lincolnshire, PE12	Business Parks and Industrial Estates	Industrial Features
C	213m NW	Extreme Quads	5, Fleet Road Industrial Estate, Fleet, Spalding, Lincolnshire, PE12 8LY	New Vehicles	Motoring
A	226m NW	A & J Services Spalding Ltd	30, Fleet Road Industrial Estate, Fleet, Spalding, Lincolnshire, PE12 8LY	Electrical and Electronic Engineers	Engineering Services
B	236m W	Fleet Road Garage	36, Fleet Road, Holbeach, Spalding, Lincolnshire, PE12 8LA	Petrol and Fuel Stations	Road and Rail
A	242m NW	Hargrave Agriculture	28-29, Fleet Road Industrial Estate, Fleet, Spalding, Lincolnshire, PE12 8LY	Agricultural Machinery and Goods	Industrial Products
C	243m NW	Exhausts Unlimited	Exhaust Unlimited 3, Fleet Road Industrial Estate, Fleet, Spalding, Lincolnshire, PE12 8LY	Vehicle Parts and Accessories	Motoring
C	243m NW	E U Car Parts	Exhaust Unlimited 3, Fleet Road Industrial Estate, Fleet, Spalding, Lincolnshire, PE12 8LY	Vehicle Parts and Accessories	Motoring

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	**1**

Open, closed, under development and obsolete petrol stations.

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

ID	Location	Company	Address	LPG	Status
B	225m W	PACE	36, Fleet Road, Branches Lane, Fleet, Holbeach, Spalding, Lincolnshire, PE12 8LA	No	Open

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	1

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.

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

ID	Location	Company	Address	Operational status	Tier
A	162m NW	Sidney Banks Plc	Sidney Banks Plc, (banks Agriculture), Fleet Road, Holbeach, Spalding, PE12 8LX	Historical NIHHS Site	-

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	2

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.

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

ID	Location	Details	
A	176m NW	Application reference number: No Details Application status: Approved Application date: No Details Address: Frontier Agriculture Ltd, Fleet Road Industrial Estate, Holbeach, Spalding, Lincolnshire, England, PE12 8LX	Details: No Details Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
A	176m NW	Application reference number: No Details Application status: Historical Consent Application date: No Details Address: Frontier Agriculture Ltd, Fleet Road Industrial Estate, Holbeach, Spalding, Lincolnshire, England, PE12 8LX	Details: No Details Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

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

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

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

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

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

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

Records within 500m	1

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

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

ID	Location	Address	Details	
A	235m NW	A&J Services, 30 Fleet Road, Enterprise Park, Spalding, PE12 8LY	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

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

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

4.13 Licensed Discharges to controlled waters

Records within 500m	5

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

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

ID	Location	Address	Details	
D	297m S	BRANCHES LANE, HOLBEACH, SPALDING	Effluent Type: UNSPECIFIED Permit Number: PR5LF3386 Permit Version: 1 Receiving Water: land	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 09/12/1976 Effective Date: 09/12/1976 Revocation Date: 01/10/1996
D	309m S	HAZELDENE, HAZELWOOD LANE, HOLBEACH, SPALDING, LINCS, PE12 8PF	Effluent Type: UNSPECIFIED Permit Number: PR5LF5526 Permit Version: 1 Receiving Water: Land	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 24/06/1988 Effective Date: 24/06/1988 Revocation Date: 23/09/1997

ID	Location	Address	Details	
2	337m NW	BUNGALOW AT FOX'S LOW ROAD, HOLBEACH, SPALDING, LINCS	Effluent Type: UNSPECIFIED Permit Number: PR5LF3799 Permit Version: 1 Receiving Water: Land	Status: PRE NRA LEGISLATION WHERE ISSUE DATE 01-SEP-89 (HISTORIC ONLY) Issue date: 13/10/1981 Effective Date: 13/10/1981 Revocation Date: 01/10/1996
3	386m NW	FOXES LOW HOUSE, FOXES LOW ROAD, FLEET, LINCOLNSHIRE	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: PRNLF01861 Permit Version: 1 Receiving Water: land	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 13/11/1989 Effective Date: 13/11/1989 Revocation Date: 21/02/1992
4	387m E	HAYCROFT LANE, FLEET, HOLBEACH, SPALDING, LINCS, PE12 8LB	Effluent Type: UNSPECIFIED Permit Number: PRNLF02905 Permit Version: 1 Receiving Water: land	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 01/06/1990 Effective Date: 01/06/1990 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 25 >**

ID	Location	Details	
B	190m W	Incident Date: 22/04/2003 Incident Identification: 152744 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

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.

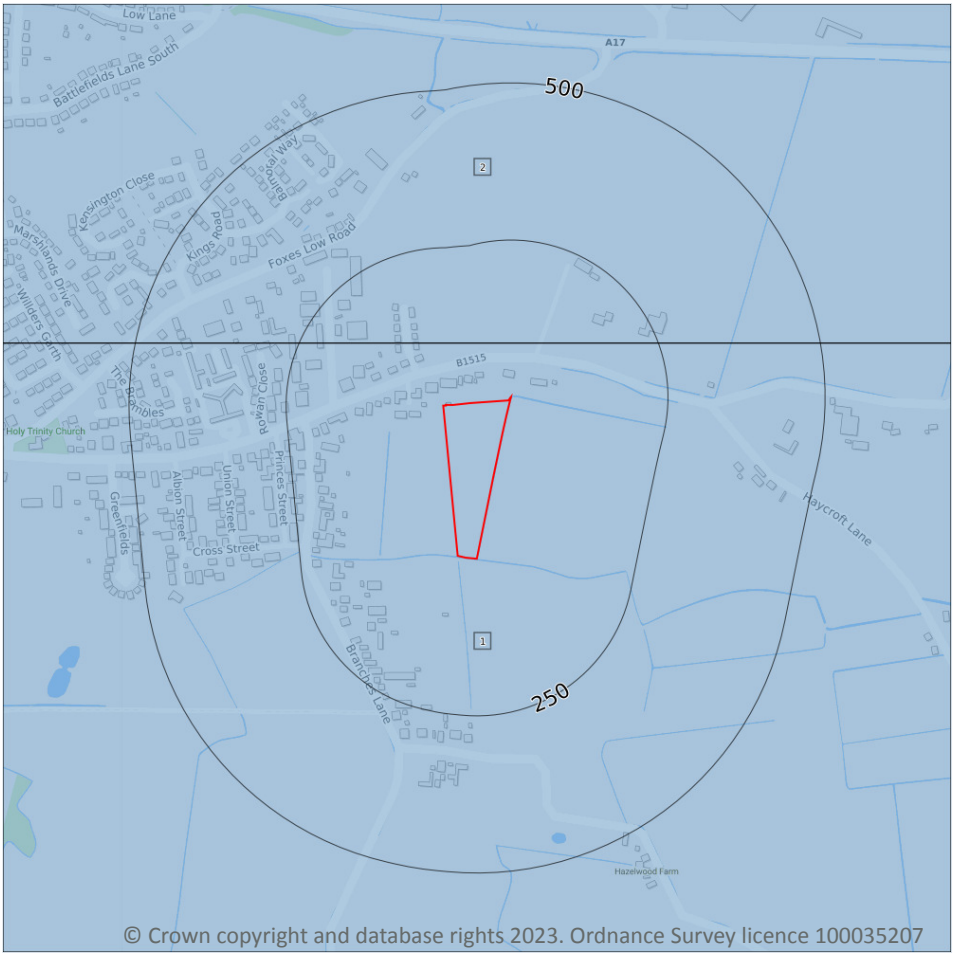
4.21 Pollution inventory radioactive waste

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

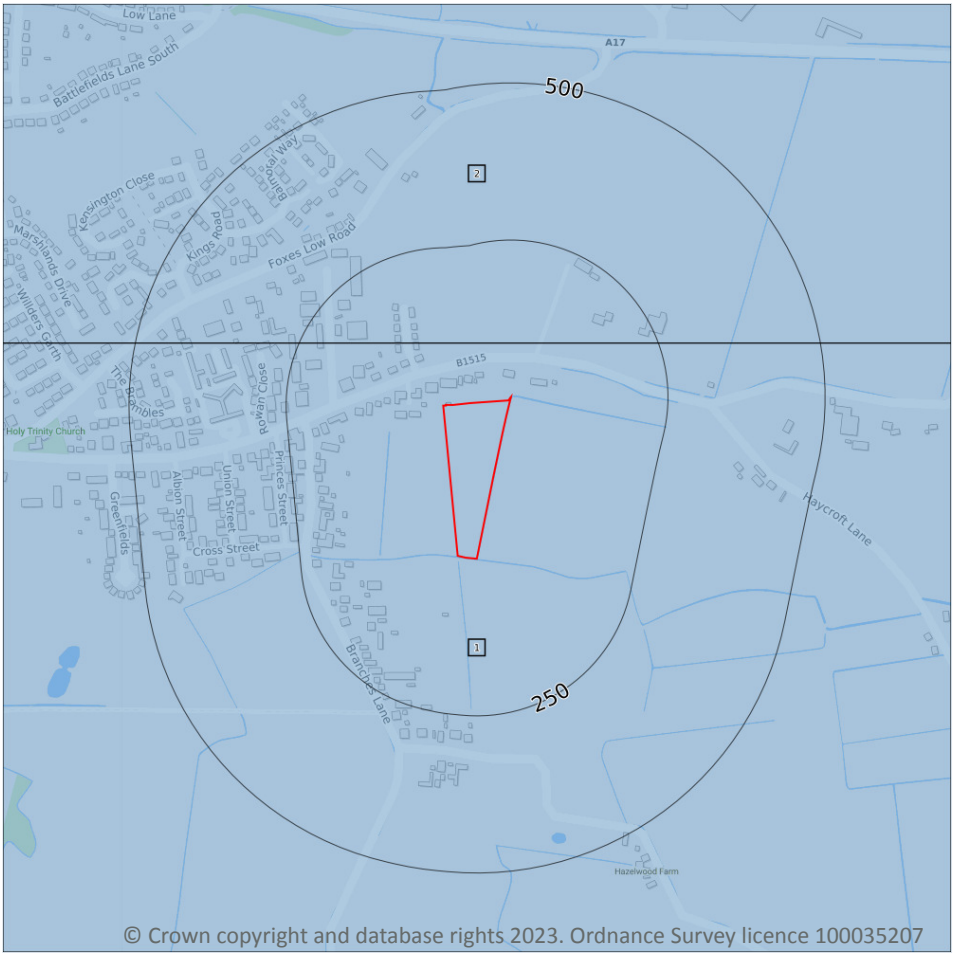
Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 33 >**

ID	Location	Designation	Description
1	**On site**	**Unproductive**	**These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow**
2	86m N	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	2

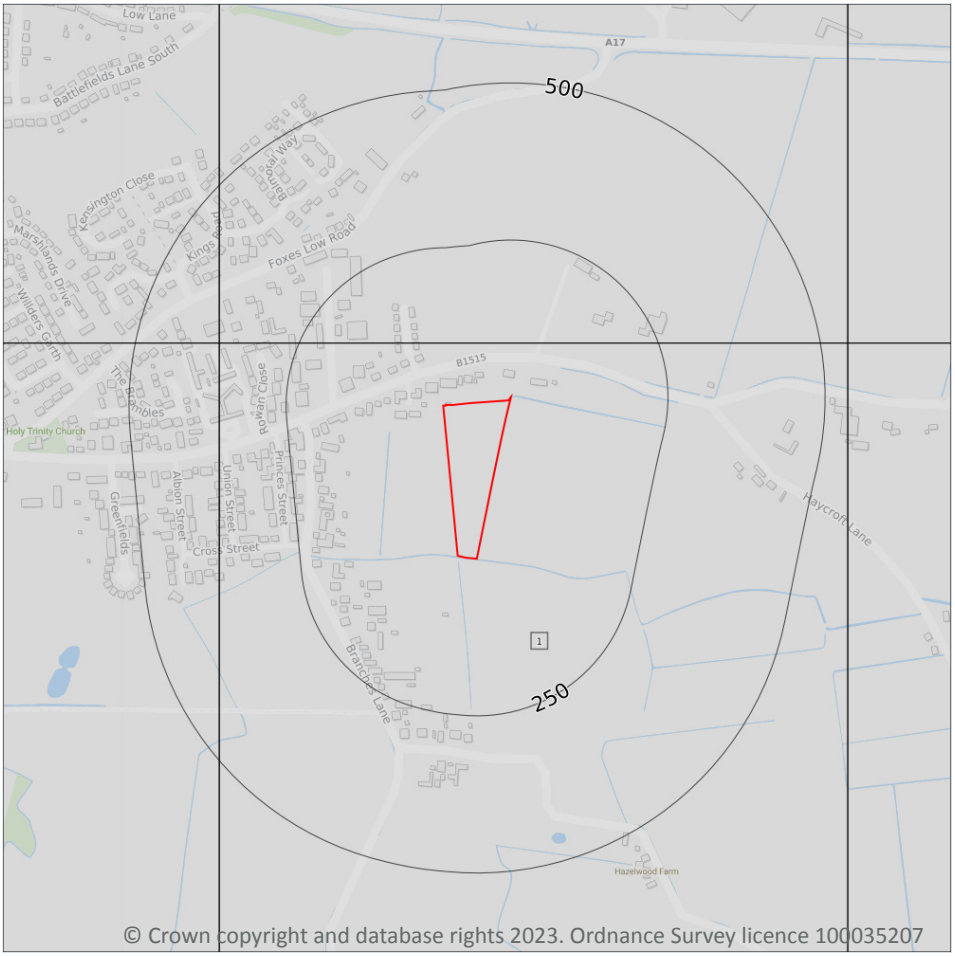
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 34 >**

ID	Location	Designation	Description
1	**On site**	**Unproductive**	**These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow**
2	86m N	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.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability

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

Bedrock vulnerability

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

Other information

- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	1

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

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

Features are displayed on the Groundwater vulnerability map on **page 35 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	**Summary Classification: Unproductive aquifer (may have productive aquifer beneath) Combined classification: Unproductive Bedrock Aquifer, Unproductive Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: <300mm/year**	**Vulnerability: Unproductive Aquifer type: Unproductive Thickness: >10m Patchiness value: >90% Recharge potential: Low**	**Vulnerability: Unproductive Aquifer type: Unproductive Flow mechanism: Well connected fractures**

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

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

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

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

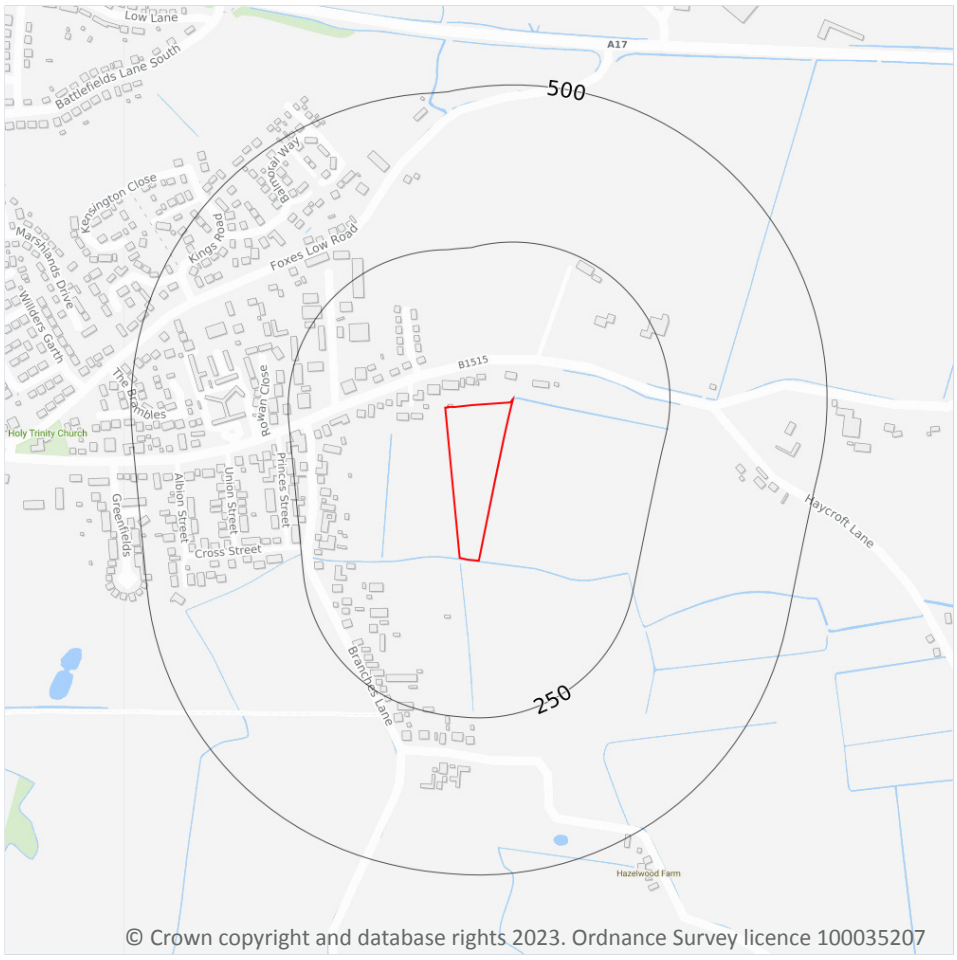
5.5 Groundwater vulnerability- local information

Records on site	0

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

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

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

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

5.6 Groundwater abstractions

Records within 2000m	0

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.

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

5.7 Surface water abstractions

Records within 2000m	1

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

Features are displayed on the Abstractions and Source Protection Zones map on **page 37 >**

ID	Location	Details	
-	1778m W	Status: Historical Licence No: AN/033/0053/028 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: DRAIN IN WHITTLESEY & DISTRICT IDB Data Type: Line Name: P & L Hayes (Farms) Limited Easting: 535535 Northing: 300683	Annual Volume (m^3): 10480 Max Daily Volume (m^3): 1090.8 Original Application No: - Original Start Date: 20/05/2011 Expiry Date: 31/03/2025 Issue No: 7 Version Start Date: 25/04/2019 Version End Date: -

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	0

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

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

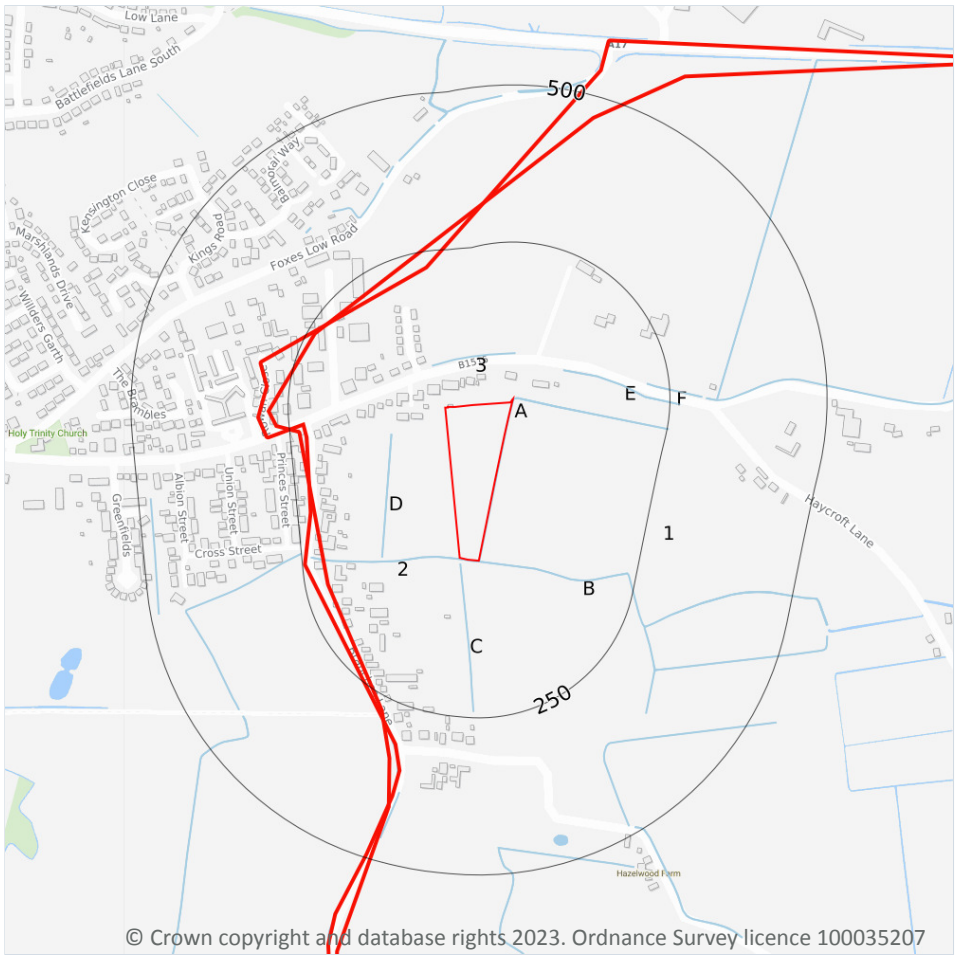
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

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

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

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	8

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 40 >**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	**On site**	**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
2	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
B	1m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	8m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
3	69m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	89m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	92m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	214m NE	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	**5**

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 40 >**

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 40 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**Coastal Catchment**	**Not part of a river WB catchment**	**116**	**Lower Nene**	**Nene**

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

6.4 WFD Surface water bodies

Records identified	**0**

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.

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

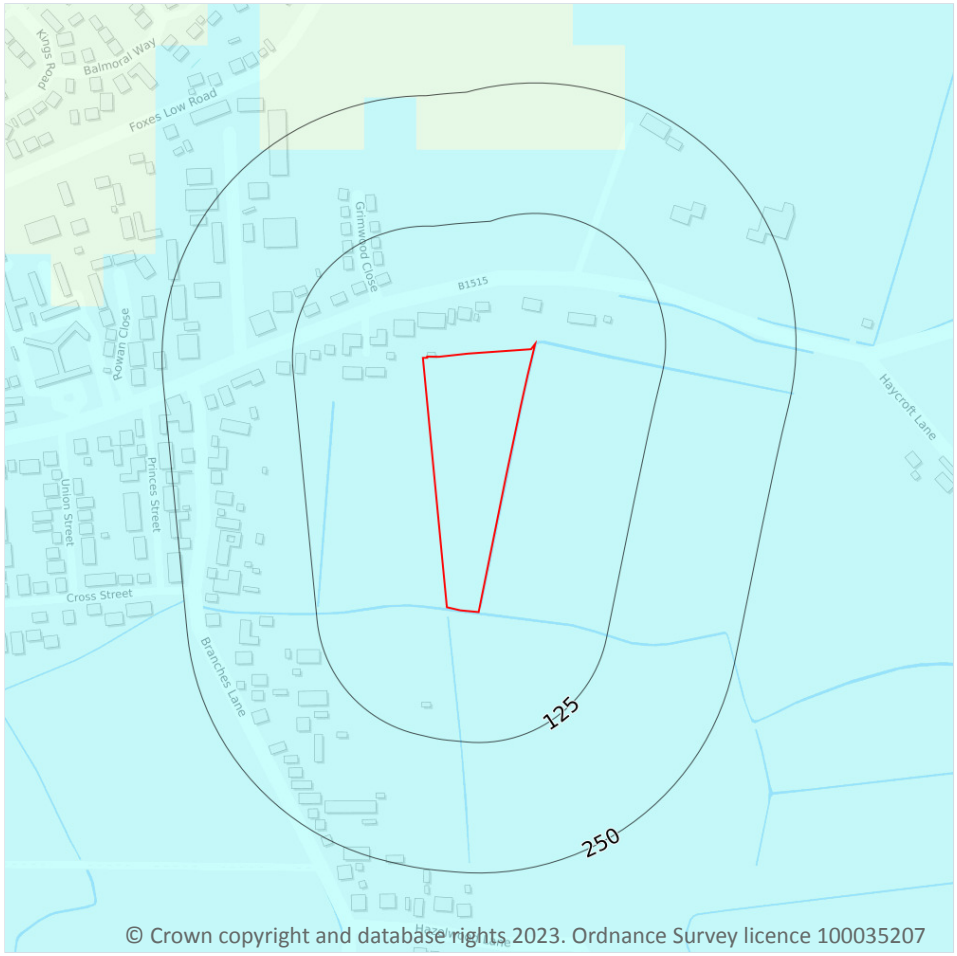
6.5 WFD Groundwater bodies

Records on site	**0**

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.

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

7 River and coastal flooding



Site Outline

Search buffers in metres (m)

River and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m	1

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).

Features are displayed on the River and coastal flooding map on **page 43 >**

Distance	Flood risk category
On site	**Low**
0 - 50m	Low

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.

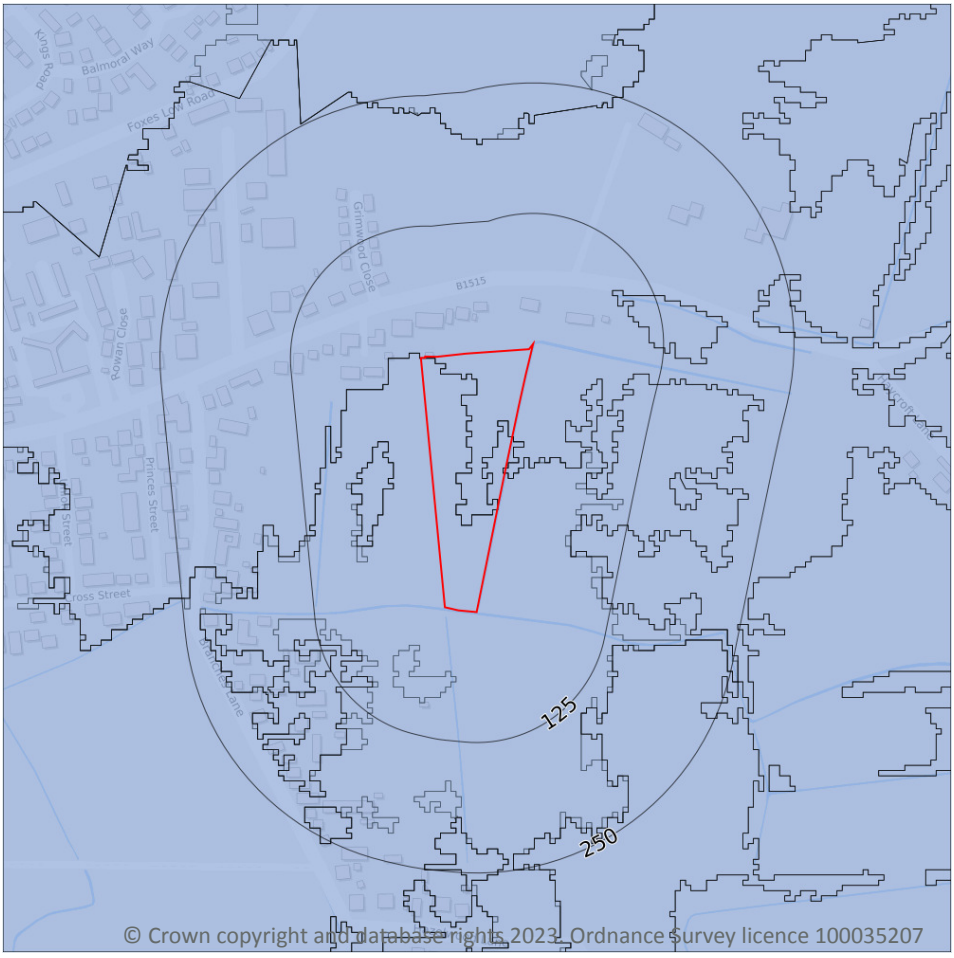
7.5 Flood Storage Areas

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



Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

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.

Features are displayed on the River and coastal flooding map on **page 43 >**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

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

7.7 Flood Zone 3

Records within 50m	1

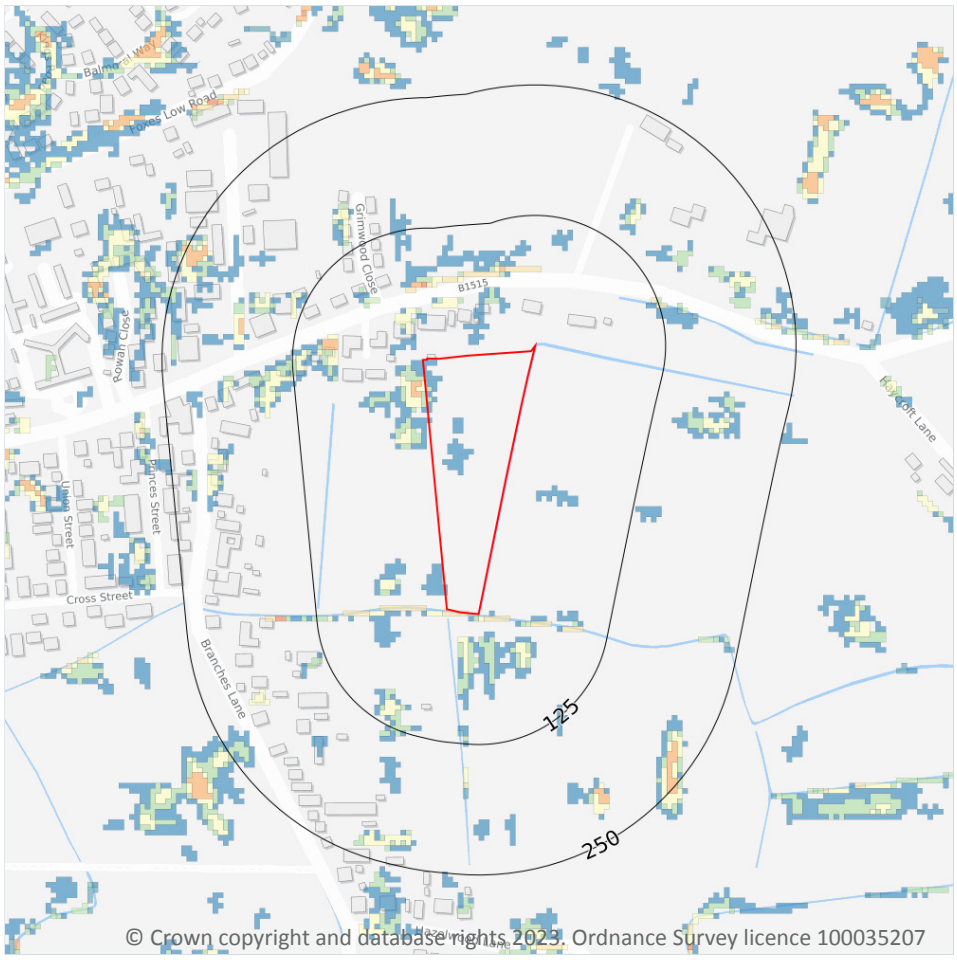
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 43 >**

Location	Type
On site	**Zone 3 - (Fluvial /Tidal Models)**

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

8 Surface water flooding



Site Outline
Search buffers in metres (m)

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

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

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

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

8.1 Surface water flooding

Highest risk on site	**1 in 100 year, 0.3m - 1.0m**
Highest risk within 50m	**1 in 30 year, 0.1m - 0.3m**

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

Features are displayed on the Surface water flooding map on **page 47 >**

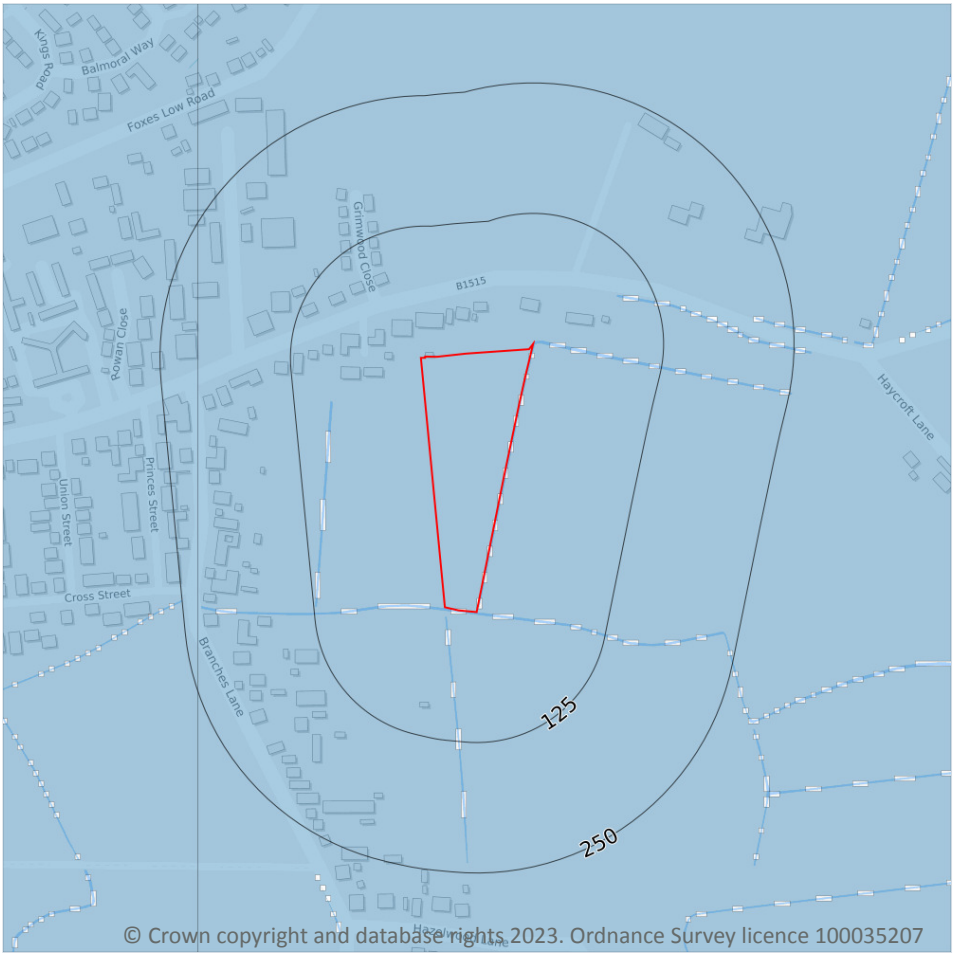
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

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	Greater than 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	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	**Negligible**
Highest risk within 50m	**Negligible**

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

Features are displayed on the Groundwater flooding map on **page 49 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

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	0

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.

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

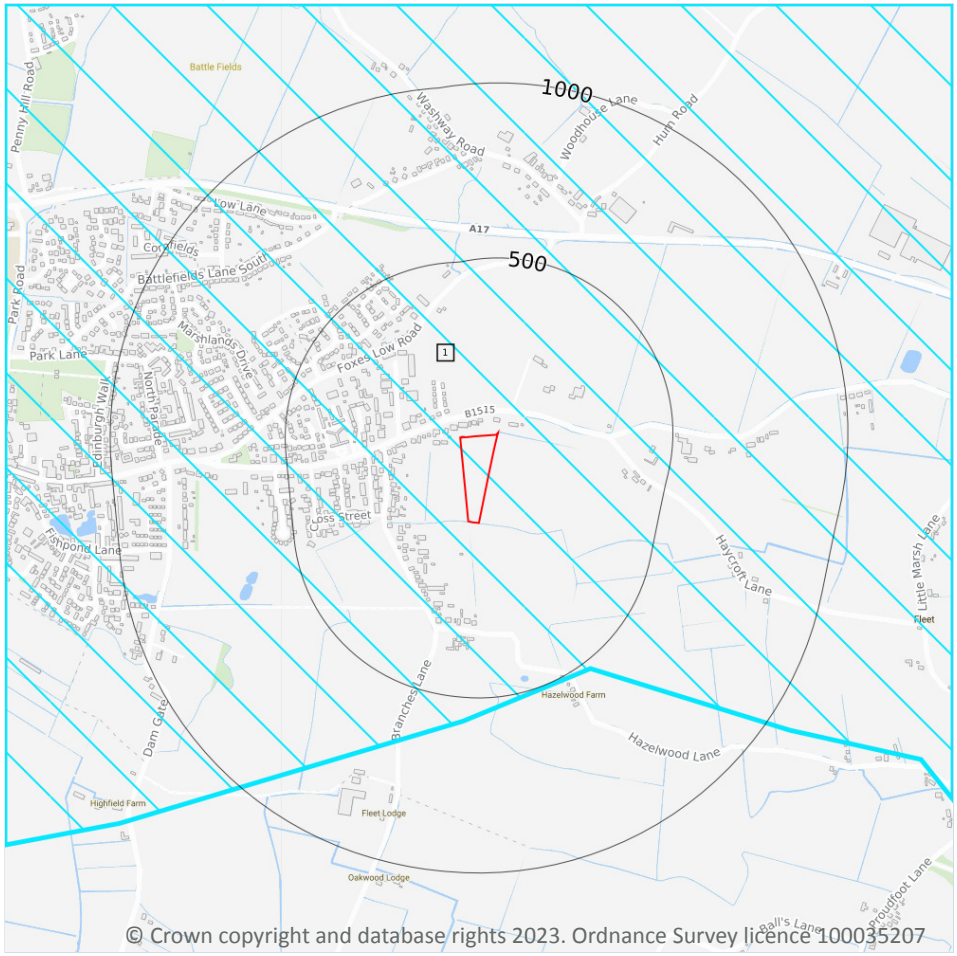
Records within 2000m	2

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
208m NW	Whaplode River NVZ	Surface Water	824	Existing
1068m N	Whaplode River NVZ	Surface Water	824	Existing

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

SSSI Impact Zones and Units



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 54 >**

ID	Location	Type of developments requiring consultation
1	On site	**Infrastructure - Airports, helipads and other aviation proposals.** **Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.**

This data is sourced from Natural England.

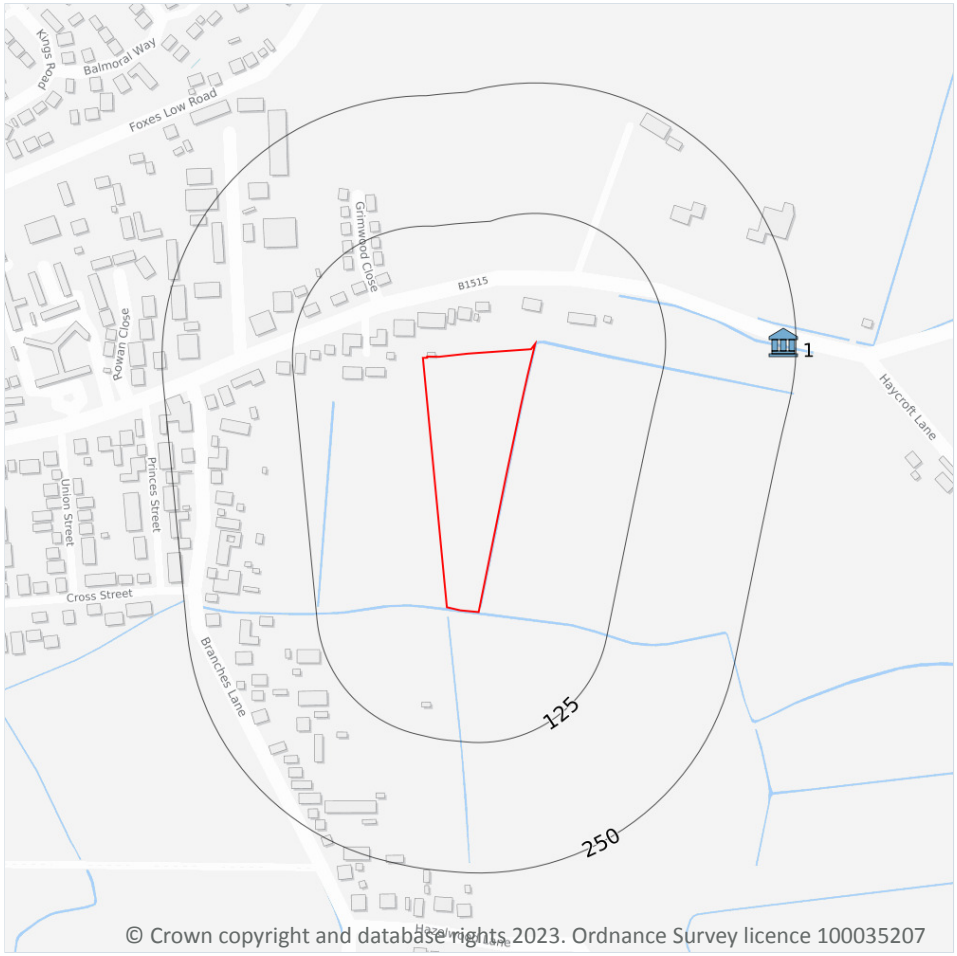
10.18 SSSI Units

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



© Crown copyright and database rights 2023. Ordnance Survey licence 100035207

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	1

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 56 >**

ID	Location	Name	Grade	Reference Number	Listed date
1	238m E	Milestone, Fleet, South Holland, Lincolnshire, PE12	II	1308933	07/12/1987

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

11.5 Conservation Areas

Records within 250m	0

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

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

11.6 Scheduled Ancient Monuments

Records within 250m	0

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

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

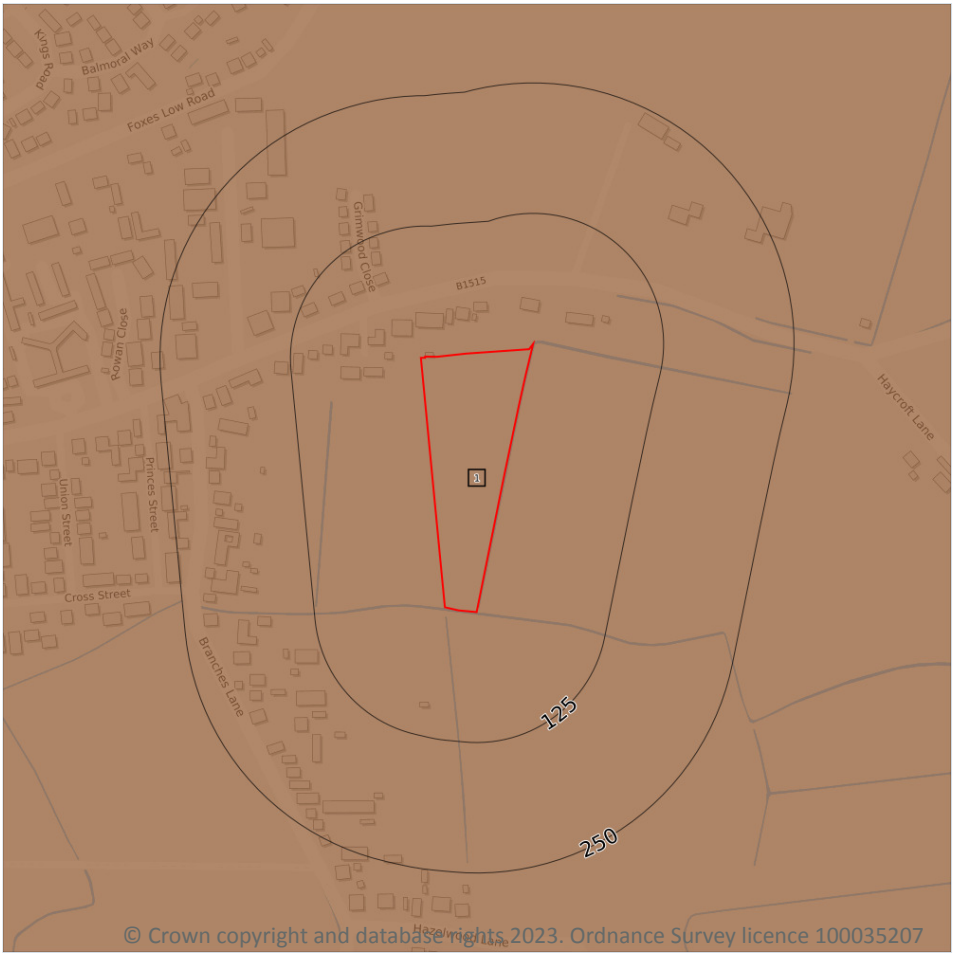
11.7 Registered Parks and Gardens

Records within 250m	0

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

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

12 Agricultural designations



Site Outline

Search buffers in metres (m)

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

12.1 Agricultural Land Classification

Records within 250m	1

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

Features are displayed on the Agricultural designations map on **page 59 >**

ID	Location	Classification	Description
1	On site	Grade 1	**Excellent quality agricultural land. Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.**

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

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

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

12.3 Tree Felling Licences

Records within 250m	0

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

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	1

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
1m NE	AG00712284	Entry Level Stewardship	01/10/2013	30/09/2018

This data is sourced from Natural England.

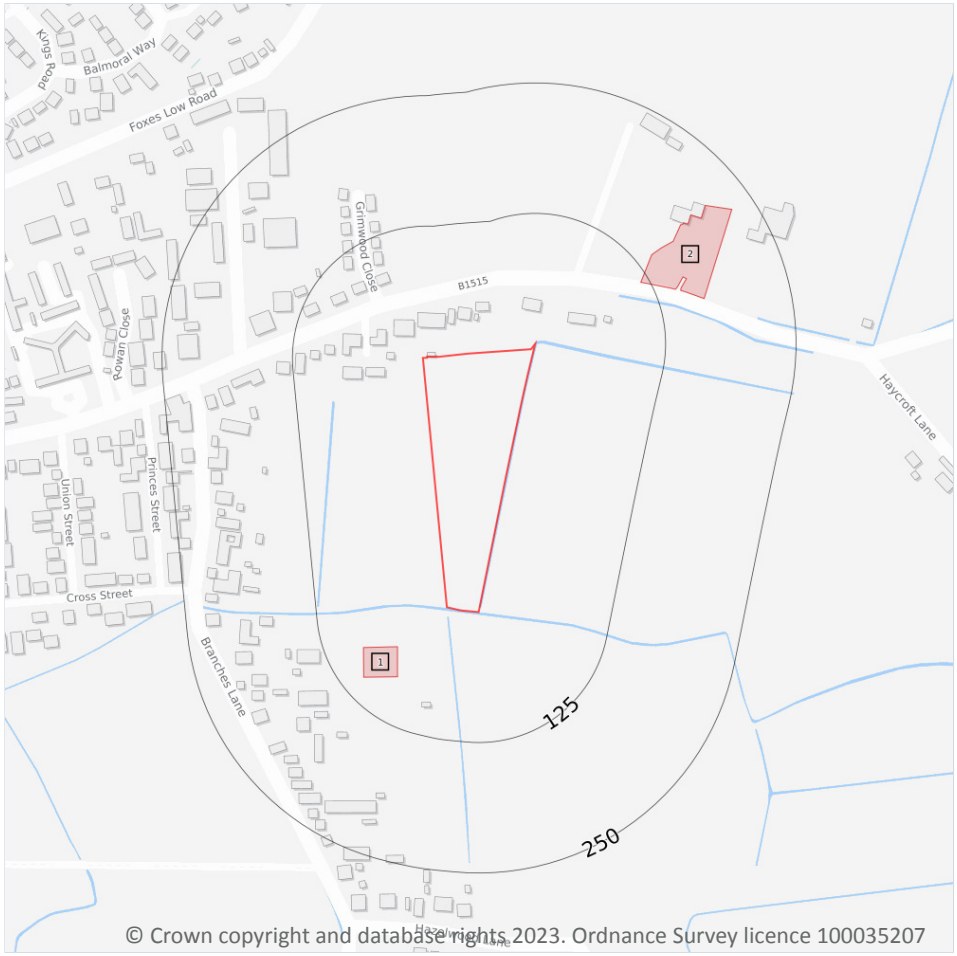
12.5 Countryside Stewardship Schemes

Records within 250m	0

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

This data is sourced from Natural England.

13 Habitat designations



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks

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

13.1 Priority Habitat Inventory

Records within 250m	2

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 61 >**

ID	Location	Main Habitat	Other habitats
1	61m S	Traditional orchard	Overruled by Traditional Orchards HAP Inventory dataset
2	117m NE	No main habitat but additional habitats present	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

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 63 >**

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.

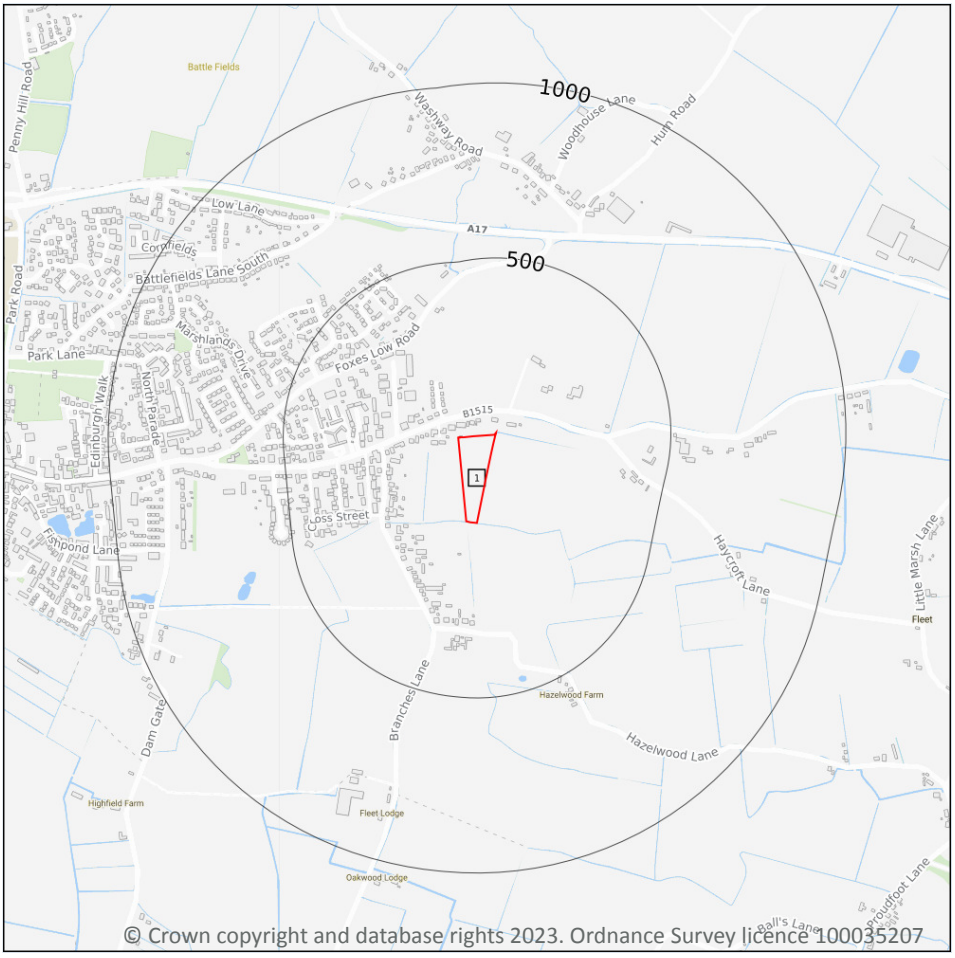
14.6 Bedrock faults and other linear features (10k)

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 67 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**EW144_spalding_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.

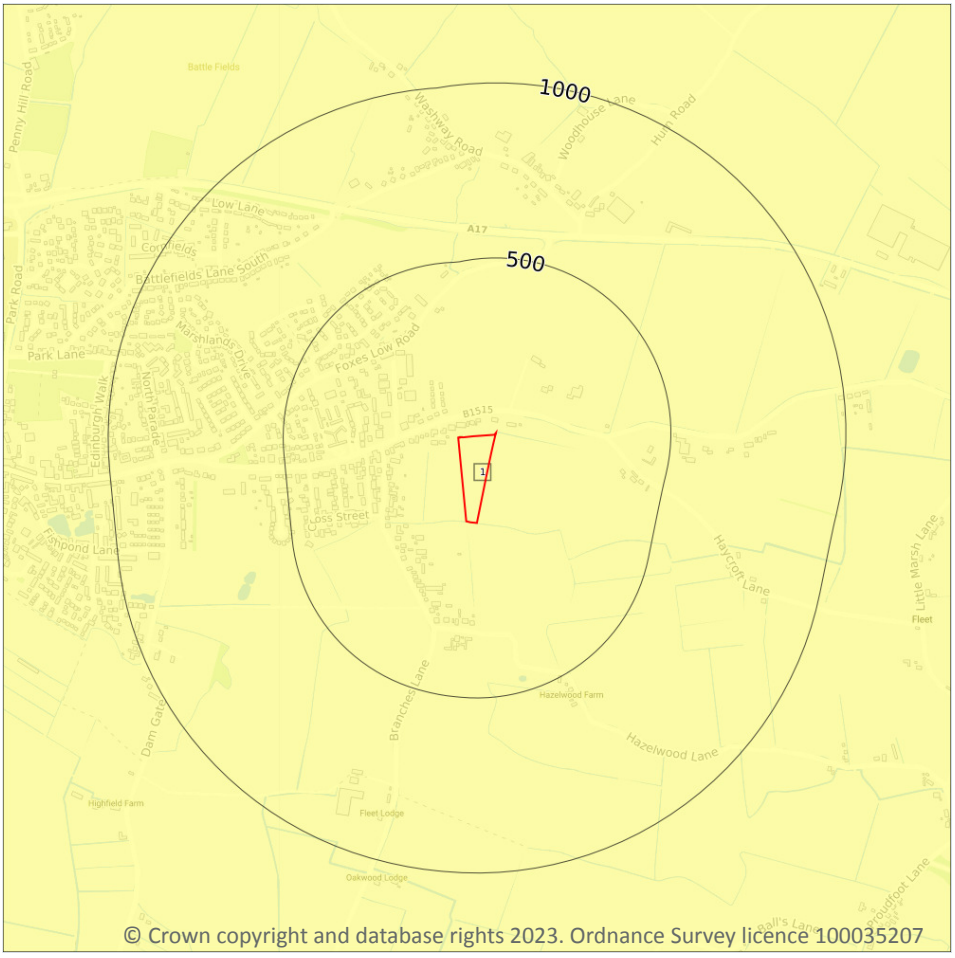
15.3 Artificial ground permeability (50k)

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 2023. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

Landslip (50k)

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

15.4 Superficial geology (50k)

Records within 500m	1

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 69 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TFD-XCZ**	**TIDAL FLAT DEPOSITS**	**CLAY AND SILT**

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	**Intergranular**	**Low**	**Very 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.

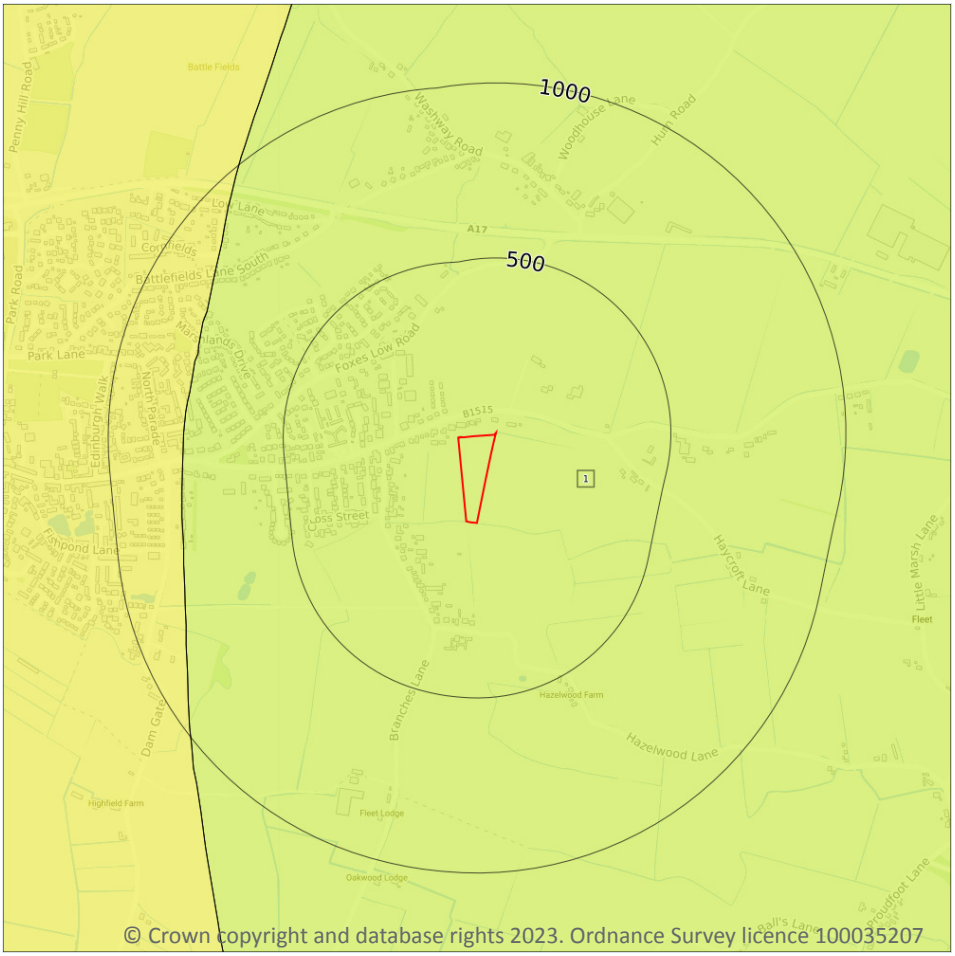
15.7 Landslip permeability (50k)

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 71 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**AMC-MDST**	**AMPTHILL CLAY FORMATION - MUDSTONE**	**OXFORDIAN**

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**	**Low**	**Very Low**

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

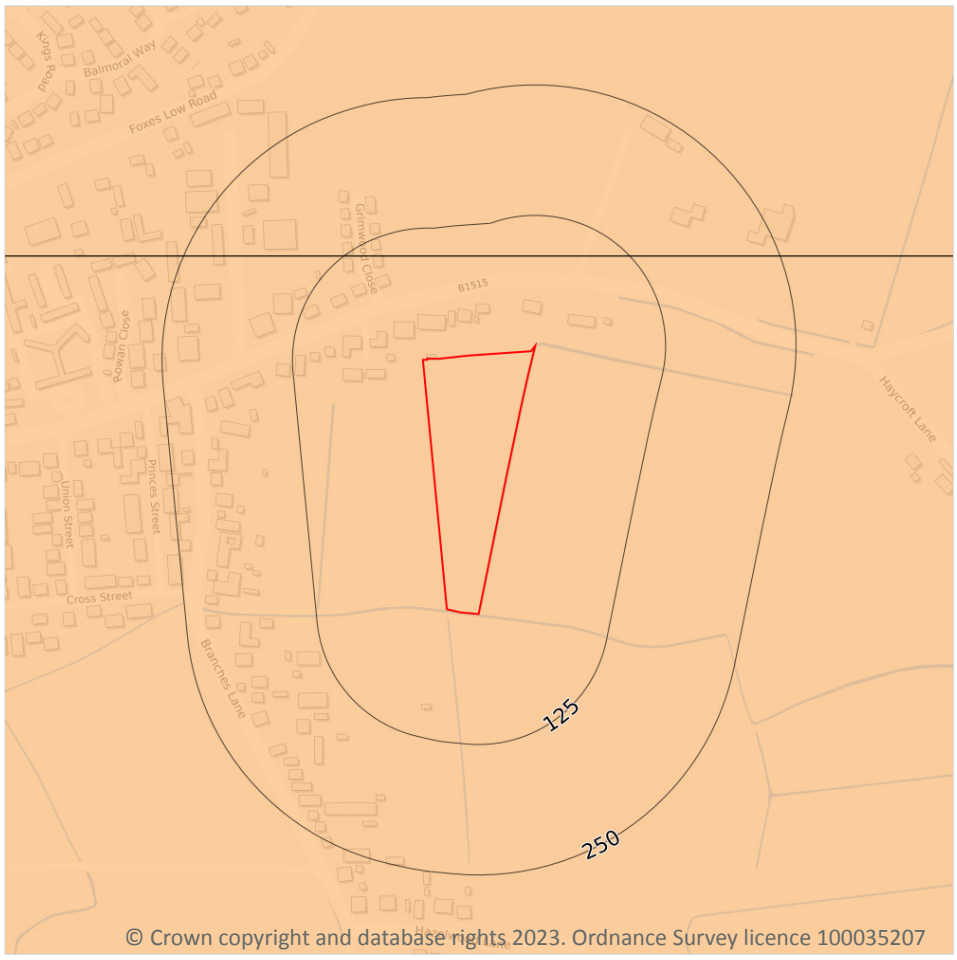
16.1 BGS Boreholes

Records within 250m	0

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

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

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

17.1 Shrink swell clays

Records within 50m	1

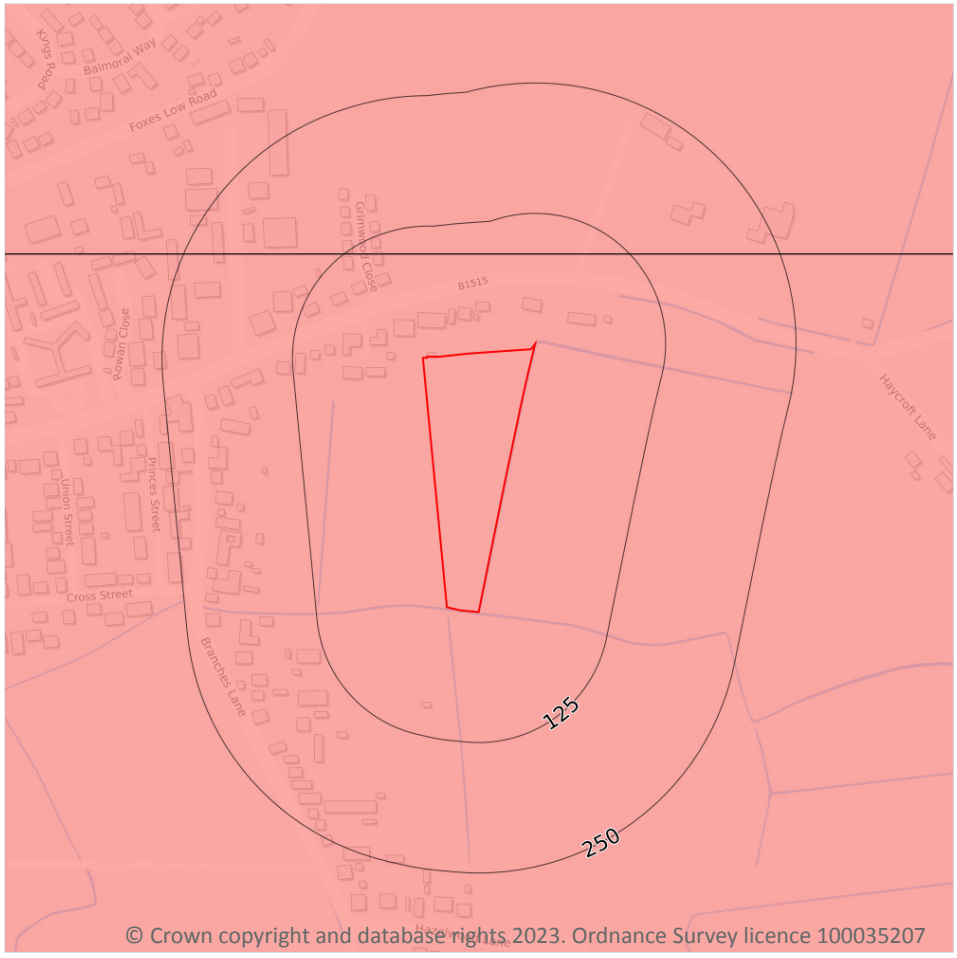
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and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



Site Outline

Search buffers in metres (m)

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

17.2 Running sands

Records within 50m	1

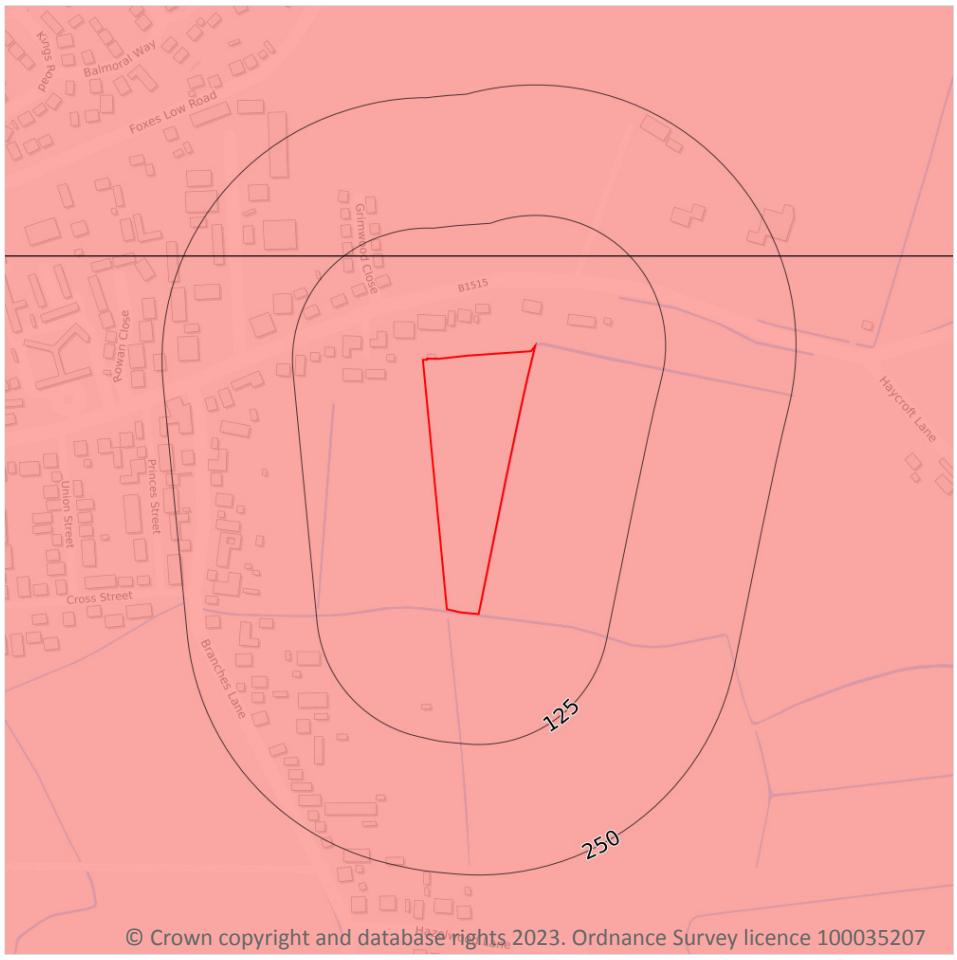
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

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

Location	Hazard rating	Details
On site	**Moderate**	**Running sand conditions are probably present. Constraints may apply to land uses involving excavation or the addition or removal of water.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

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

17.3 Compressible deposits

Records within 50m	1

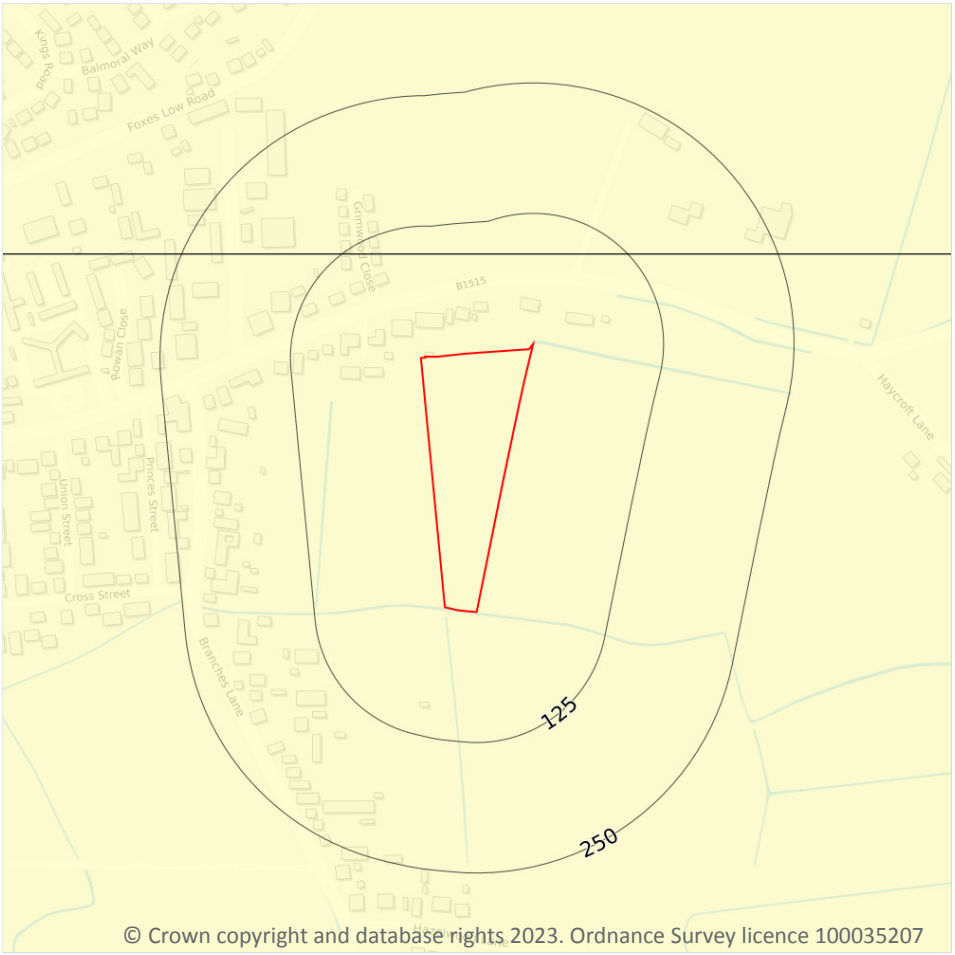
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

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

Location	Hazard rating	Details
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

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

17.4 Collapsible deposits

Records within 50m	1

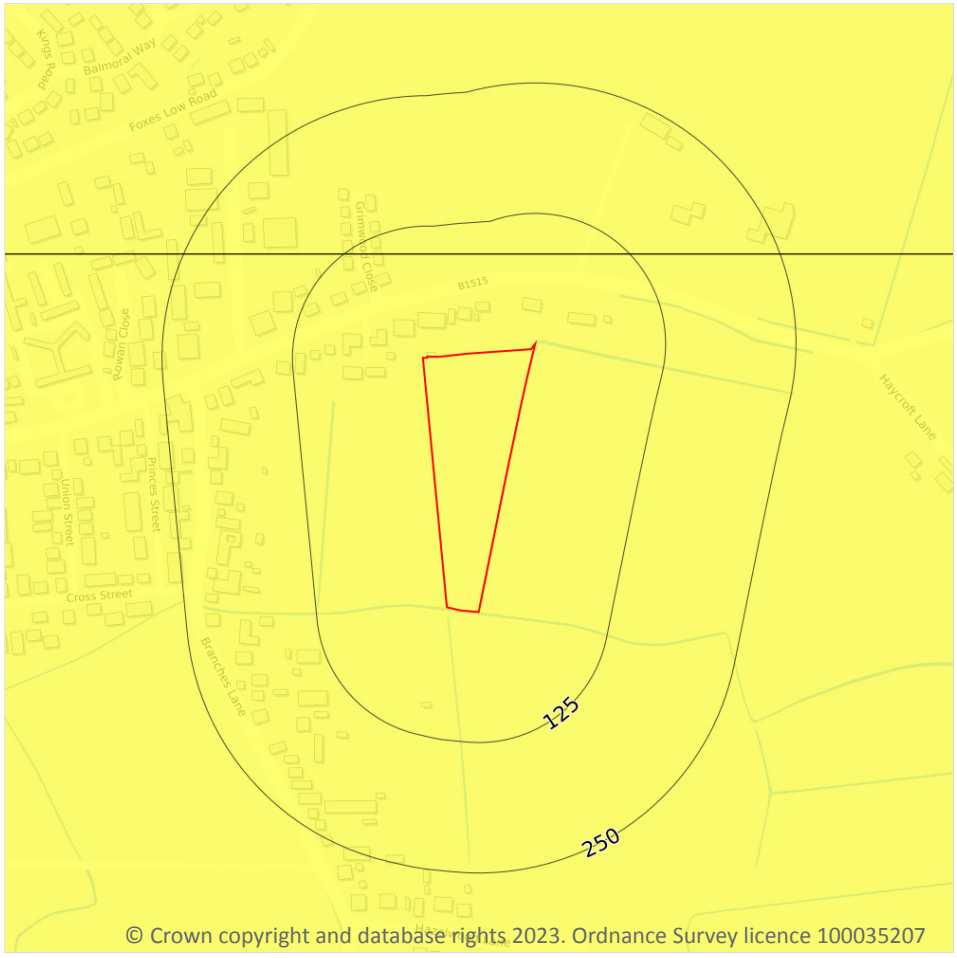
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

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

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

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

17.5 Landslides

Records within 50m	1

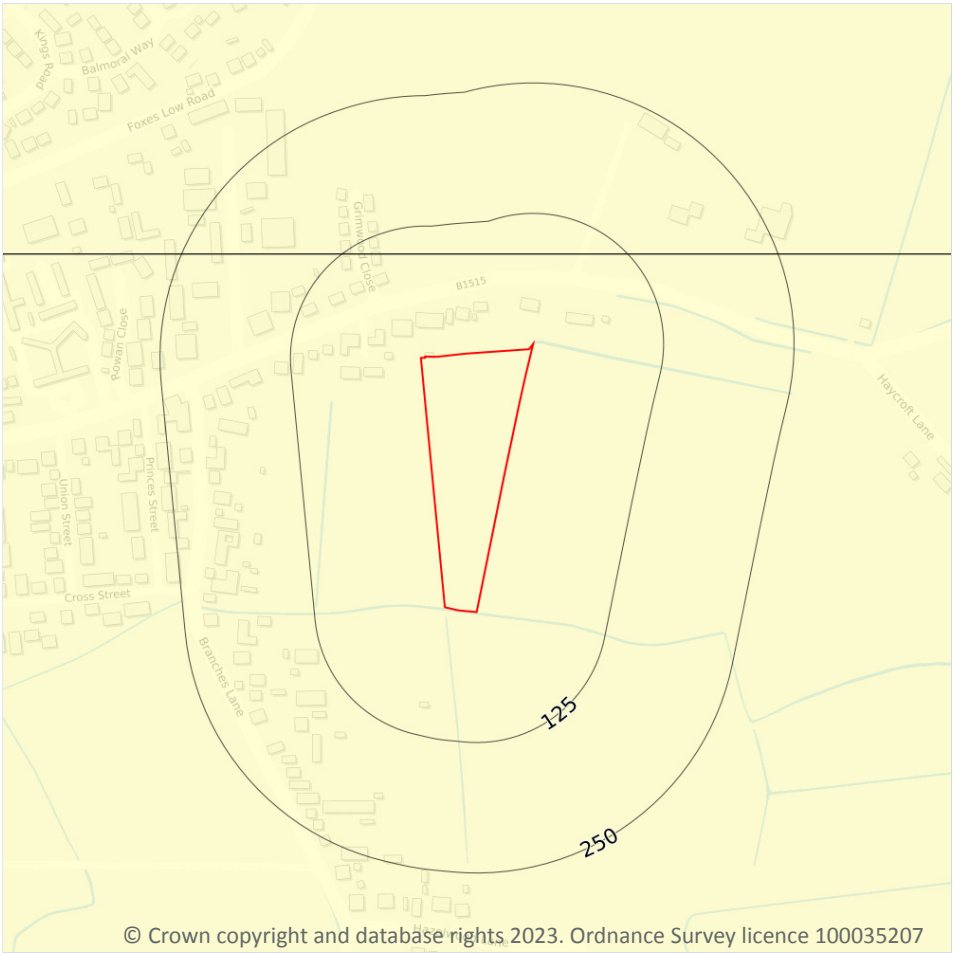
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

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	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities

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	0

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.

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	0

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).

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.

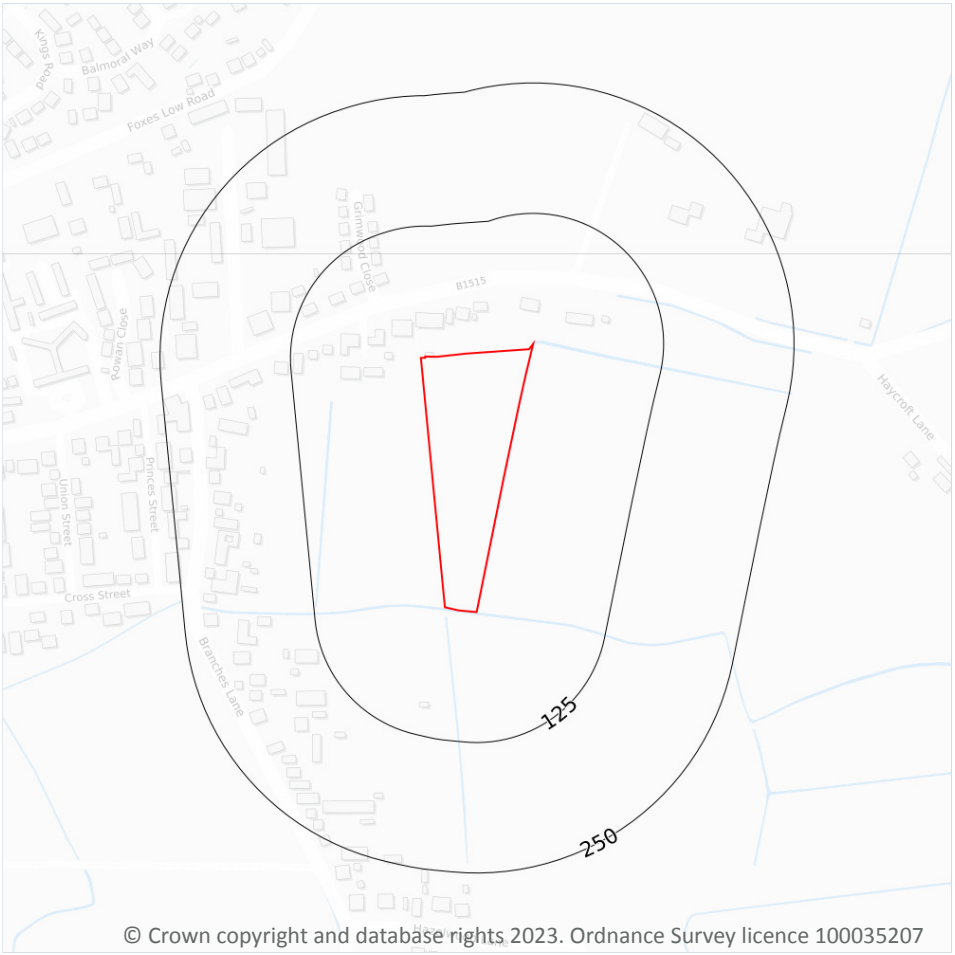
18.13 Clay mining

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



Site Outline

Search buffers in metres (m)

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

19.1 Radon

Records on site	1

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on **page 84 >**

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

This data is sourced from the British Geological Survey and UK Health Security Agency.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	2

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

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
36m NE	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

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

This data is sourced from the British Geological Survey.

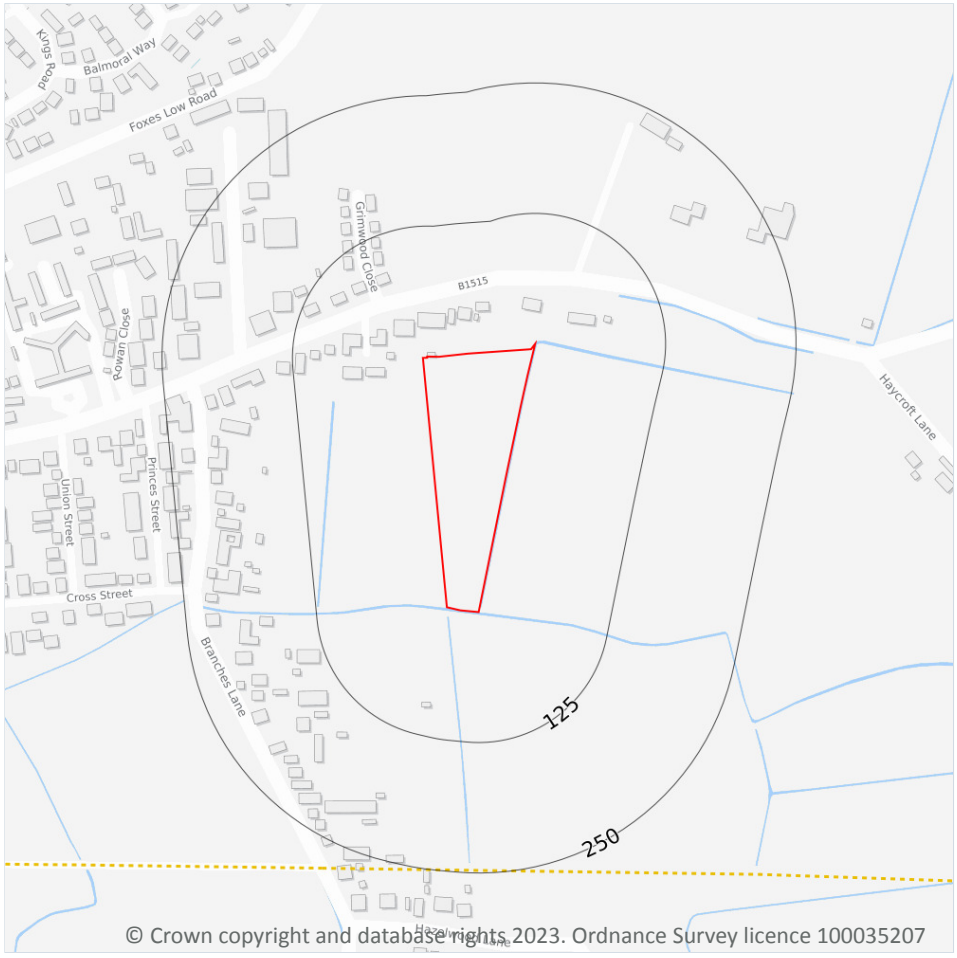
20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

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

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



Site Outline

Search buffers in metres (m)

- Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

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	1

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

Features are displayed on the Railway infrastructure and projects map on **page 87 >**

Location	Description
248m S	Razed

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-april-2023/ ↗.

APPENDIX 3

CLASSIFICATION OF AGGRESSIVE CHEMICAL ENVIRONMENT FOR BURIED CONCRETE

TABLE C1 – AGGRESSIVE CHEMICAL ENVIRONMENT FOR CONCRETE (ACEC) CLASSIFICATION FOR NATURAL GROUND LOCATIONS[a]

Table C1 Aggressive Chemical Environment for Concrete (ACEC) classification for natural ground locations[a]

Sulfate				Groundwater		ACEC
Design Sulfate Class for location	2:1 water/soil extract[b]	Groundwater	Total potential sulfate[c]	Static water	Mobile water	Class for location
1	2 (SO_4 mg/l)	3 (SO_4 mg/l)	4 (SO_4 %)	5 (pH)	6 (pH)	7
DS-1	< 500	< 400	< 0.24	≥ 2.5		AC-1s
					> 5.5[d]	AC-1[d]
					2.5–5.5	AC-2z
DS-2	500–1500	400–1400	0.24–0.6	> 3.5		AC-1s
					> 5.5	AC-2
				2.5–3.5		AC-2s
					2.5–5.5	AC-3z
DS-3	1600–3000	1500–3000	0.7–1.2	> 3.5		AC-2s
					> 5.5	AC-3
				2.5–3.5		AC-3s
					2.5–5.5	AC-4
DS-4	3100–6000	3100–6000	1.3–2.4	> 3.5		AC-3s
					> 5.5	AC-4
				2.5–3.5		AC-4s
					2.5–5.5	AC-5
DS-5	> 6000	> 6000	> 2.4	> 3.5		AC-4s
				2.5–3.5	≥ 2.5	AC-5

Notes

a Applies to locations on sites that comprise either undisturbed ground that is in its natural state (ie is not brownfield – Table C2) or clean fill derived from such ground.

b The limits of Design Sulfate Classes based on 2:1 water/soil extracts have been lowered relative to previous Digests (Box C7).

c Applies only to locations where concrete will be exposed to sulfate ions (SO_4) which may result from the oxidation of sulfides (eg pyrite) following ground disturbance (Appendix A1 and Box C8).

d For flowing water that is potentially aggressive to concrete owing to high purity or an aggressive carbon dioxide level greater than 15 mg/l (Section C2.2.3), increase the ACEC Class to AC-2z.

Explanation of suffix symbols to ACEC Class

- Suffix 's' indicates that the water has been classified as static.
- Concrete placed in ACEC Classes that include the suffix 'z' primarily have to resist acid conditions and may be made with any of the cements or combinations listed in Table D2 on page 42.

© Crown Copyright
Produced from Building Research Establishment Special Digest 1, June 2005, by permission of the Controller of HM Stationery Office.