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GROUND INVESTIGATION REPORT

RISEHOLME FARM
WINDMILL LANE
GOSBERTON RISEGATE
SPALDING
LINCOLNSHIRE

Report Reference C16066

On behalf of:-

R. K. Wilson Builders Limited
Sandpit Farm
Wisbech Road
Long Sutton
Spalding
Lincolnshire
PE12 9AQ

December 2023

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R. K. WILSON BUILDERS LIMITED

ROBERT DOUGHTY CONSULTANCY

TOWN PLANNING/LANDSCAPE ARCHITECTURE/ARCHITECTURE

SITE INVESTIGATION REPORT

FOR

PROPOSED RESIDENTIAL DEVELOPMENT

AT

RISEHOLME FARM

WINDMILL LANE

GOSBERTON RISEGATE

SPALDING

LINCOLNSHIRE

Report Reference No. C16066 **December 2023**

INTRODUCTION

The client, R. K. Wilson Builders Limited, propose to build a new residential development at Riseholme Farm, Windmill Lane, Gosberton Risegate 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, under the direction of Robert Doughty Consultancy, 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.

LOCATION, TOPOGRAPHY AND GEOLOGY OF THE SITE

The 0.30 hectare site is located at Riseholme Farm, Windmill Lane, Gosberton Risegate, Spalding in Lincolnshire. The village of Gosberton Risegate is approximately 8km north-west of Spalding. The site is centred at National Grid Reference TF 2211 3034 and its location is shown on plans following this report text.

The site comprises an undeveloped field in the western part of Riseholme Farm, accessed along a track from Windmill Lane. The square site was bounded by properties fronting Windmill Lane to the west; by No.1 Risegate Road to the south with a drain (Risegate Eau) beyond; Riseholme Farm to the east with a railway line beyond; and a field to the north.

A coniferous hedge was present along the northern boundary of the site, on the north side of the track. Mature deciduous trees were also present within Riseholme Farm to the east, and in the gardens to the south of the site.

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 superficial Terrington Beds, more recently identified as Tidal Flat Deposits. These silt, fine sand and clay soils are indicated to rest on the solid geology of the Oxford Clay Formation at depth. The site is within area reclaimed by "Fenbanks' in the early 12th Century. British Geological Survey borehole records in the area indicate the Tidal Flat Deposits extend to approximately 7.00m depth.

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 Sheets 25SE & 26SW Scale 1:10,560 **Figure A**	The site is undeveloped within the southern part of a field. A house and outbuildings are shown to the south of the site, with a north-north-east/south-south-west aligned drain further south. The north-west to south-east aligned Great Northern & Great Eastern Joint Railway is present 50m east of the site. Gosberton Station is shown 130m south-east of the site. Risegate Windmill (corn) is denoted 200m south of the site.
1888 Lincolnshire Sheet 126.13 Scale 1:2500 **Figure B**	The site and its immediate surrounding area appear unchanged.
1905 Lincolnshire Sheet 126.13 Scale 1:2500 **Figure C**	The site and its immediate surrounding area appear generally unchanged. A dwelling is no longer shown 65m south of the site.
1932 Lincolnshire Sheet 126.13 Scale 1:2500 **Figure D**	The site remains undeveloped within the southern part of a field. New buildings are shown 65m south-east of the site. A new building is shown at Risegate Windmill to the south-west of the site.
1947 Lincolnshire Sheet 26SW Scale 1:10,560 **Figure E**	Two rectangular buildings are outlined on the site. Small new buildings are also shown adjacent the west and east of the site.
1971-72 Sheets TF2130 & TF2230 Scale 1:2500 **Figure F**	The site is part of Riseholme Farm, with an access track from Windmill Lane to the west. The two rectangular buildings on the site are denoted as glasshouses. New houses have been built to the west and south of the site. A property named Broadland to the south of the site, which has glasshouses further south, is denoted as a Nursery. An electricity sub-station is shown 110m south-west of the site. Two new buildings are shown at the site of the former windmill, which is now denoted as Station Mills, which has a weigh bridge on its northern side and a small rectangular tank on its southern side. The station to the south-east is denoted as disused.

OS extract studied	*Description*
1995 Sheets TF2130 & TF2230 Scale 1:2500 **Figure G**	The glasshouses on the site have been extended and are now joined, occupying most of the site. Large new buildings are shown 150m south of the site, close to Station Mills. New houses have been built along 'Siltside' and Risegate Road to the south-west of the site.
1999 Aerial Photograph Page 13, Appendix 2	The glasshouses are evident on the site. A hedgerow is present along the northern boundary of the site, with a field further north.
2001 Sheets TF22NW & TF23SW Scale 1:10,000 **Figure H**	The site and its immediate surrounding area appear unchanged.
2003 Sheets TF2130SE & TF2230SW Scale 1:1250 **Figure I**	The site area appears unchanged. Two new dwellings are shown on the adjacent land to the west, replacing former outbuildings. A new dwelling is also evident on the corner of Windmill Lane and Siltside to the south-west.
2010-2018 Aerial Photographs Pages 10-12 Appendix 2	The site and its immediate surrounding area appear generally unchanged. A house to the south of Risegate Road has had a rear extension (by 2010).
2010 Sheets TF22NW & TF23SW Scale 1:10,000 **Figure J**	The site and its immediate surrounding area appear unchanged.
2021 Aerial Photograph Page 9, Appendix 2	The site remains predominantly developed with glasshouses. A track is evident within the northern edge of the site, and with a grassed strip in the eastern edge of the site. A barn and stored materials are evident immediately east of the site within Riseholme Farm. A large new house is under construction to the south-west of the site.
2023 Sheets TF2130SE & TF2230SW Not to Scale **Figure K**	The site area remains developed with glasshouses within Riseholme Farm. The site is bounded by residential properties to the south and west, and by a field to the north.

Summary of Historical Information

The Ordnance Survey map of 1887 showed that the site was undeveloped within a field. The site was developed with glasshouses between 1932 and 1947, which had been extended by 1995, and remained until recently. The site had been cleared of glasshouses and was grassed at the time of this investigation in November 2023.

The site was in a semi-rural area, with Riseholme Farm immediately east, residential properties to the west and south, and a field to the north of the site. A railway line is present 50m east of the site, and Gosberton Station 130m to the south-east, which was closed by 1971. A corn windmill was present 200m to the south of the site in 1887, which had been extended by 1932, and redeveloped as Station Mills by 1971. A nursery is shown to the south of the site at 'Broadland'. An electricity sub-station is also shown 110m south-west of the site.

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)	0	17
Historical Tank Database	0	2
Historical Energy Features Database	0	1
Historical Petrol & Fuel Site Database	0	0
Historical Garage & Motor Vehicle Repair Database	0	0
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	35
4. Current Land Use	**On-Site**	**0 - 250m**
Current Industrial Sites Data	0	3
Records of Petrol and Fuel Sites	0	0
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	0
Environmental permits/pollution incidents/registers	0	6
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	3
Potable Water Abstraction Licences	0	0
Source Protection Zones	0	0
Water Network Entries	0	22
Surface Water Features	0	12

7-9. Flooding	On-Site	0-250m
Risk of flooding from rivers & the sea (RoFRaS) rating	Very Low	High (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 250 year (0.10m to 0.30m)	
Groundwater flooding on site	Negligible (within 50m)	
10-13. Designated Environmentally Sensitive Sites	**On Site**	**0 - 250m**
Environmentally sensitive sites	2	0
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	3
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

A nursery is recorded 35m south of the site, unspecified mills 73m south and a corn windmill 157m south of the site. An unspecified tank is recorded at the mills 183m south of the site. A railway station (now disused), and railway sidings are recorded 123m south-east of the site. An electricity sub-station is recorded 106m south of the site. The glasshouses on the site, and that the site is within Riseholme Farm are not recognised. No areas of potentially infilled land, landfills or waste sites are recognised within 250m of the site, however there are thirty-five waste exemptions, mainly for spreading organic matter or sediment from dredging, or

burning waste in the open. Marshall Welding & Design and Healey & Dobney Ltd. (transport, storage & delivery) are recorded to the south of the site, on the southern side of Risegate Road. Historical permits for use of bulk cement at the former station yard (for RMC Readymix Ltd.), and for fish meal processing (Healey & Dobney Ltd.) are also recorded. A pollution incident was recorded on 12th January 2018, 212m south-east of the site beside the railway, for construction waste, commercial waste, metal waste, vehicles and vehicle parts.

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 Oxford Clay Formation is also classified by the Environment Agency (EA) as an 'Unproductive' stratum. No groundwater abstractions are recorded within 250m of the site. Surface water abstractions are recorded 104m south, and 124m east of the site, for spray irrigation. The site is not within a source protection zone.

A drain is recorded 11m west of the site, along the western side of Windmill Lane, and Risegate Eau is recorded 36m south of the site. A surface water body is recorded 197m south-east, and a pond 246m south-east of the site. The site is within a Zone 2 and Zone 3 floodplain, and has a very low risk of flooding from rivers and the sea. Within 50m of the site there is a high risk of flooding from Risegate Eau. The site has a 1 in 250 year risk of surface water flooding, and a negligible risk of groundwater flooding. The site is within a nitrate vulnerable zone and an SSSI impact zone, both environmentally sensitive areas.

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 soluble rocks and collapsible 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	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 Riseholme Farm to the east.

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 Oxford 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 A surface water drain is present 11m west along the western site of Windmill Lane. Risegate Eau is present 36m south of the site. Surface water abstractions are recorded 104m south, and 124m east of the site.	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 site work conducted on 3rd November 2023 comprised eight machine excavated trial pits (TP1 to TP8). The positions are shown on the exploratory hole location plan following this report text, which were selected to provide coverage of the proposed development area.

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.

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, and the groundwater conditions observed during and on completion of excavation.

Machine Excavated Trial Pits

Eight trial pits (TP1 to TP8) were dug using a tracked mini-excavator. Trial pits TP4 and TP8 were completed at 1.70m and 2.10m depth respectively, within which soakaway tests were undertaken; trial pits TP1 to TP3, and TP5 to TP7 were completed at depths between 1.05m and 2.50m. The trial pits were generally completed following groundwater seepages leading to pit sidewall collapse.

Small disturbed (D) and large bulk (B) samples of soil were taken at regular intervals throughout the pits, and placed into polycarbonate pots or plastic bags, respectively. Environmental samples (ES) were also recovered from the made ground and placed into amber glass jars.

A Mackintosh Probe (MP) was used to ascertain the in-situ relative density of the coarse grained soils in the trial pits at frequent intervals. The 25mm diameter solid cone point of the probe was screwed onto the rods and driven into the ground by repeated blows of 4.5kg slide hammer with a fall of 0.30m. The depth driven for 100 blows was recorded.

An indication of the shear strength of clay soils within TP5 was made using a hand shear vane (V) and the result is presented on the trial pit record.

Soakaway tests broadly in line with BRE Digest 365 were undertaken to allow the assessment of the soil infiltration rate in the completed TP4 and TP8 pits. The general method of the test was to excavate the trial pit with vertical sides trimmed square to the base. The dimensions were accurately measured and recorded, and the pit was then filled with clean water from a water tanker. The rate of dissipation of water into the ground was measured by recording the head of water at regular time intervals. Only one filling was possible within both trial pits during the single day allocated for the test due to the very slow rate of dissipation.

On completion of each excavation, any remaining water was bailed from the soakaways, the spoil was returned to the pits and replaced in compacted layers. The surface layers were then replaced.

LABORATORY WORK

The samples were inspected in the laboratory and assessments of the soil characteristics have been taken into account during preparation of the trial pit 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 soil samples was obtained by sieve analysis. The results of these tests are given 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 11N 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 were analysed to determine the concentration of soluble sulphates. The pH values were also determined.

Chemical analysis of five 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, all five samples were tested for total petroleum hydrocarbons (TPH) and screened for the presence of asbestos.

One sample was also tested for the full Waste Acceptance Criteria (WAC) CEN leachate test at 10l/kg.

GROUND CONDITIONS

The ground conditions have been plotted as a soil profile in Figure 1. The ground conditions comprised a surface layer of made ground/topsoil to between 0.25m and 0.80m depth. The made ground was underlain by superficial Tidal Flat Deposits, which were encountered to at least the base of the deepest trial pit at 2.50m depth. Groundwater seepages were locally recorded at 1.60m and 1.65m depth during the investigation, which was generally following by pit sidewall collapse.

Made Ground/Topsoil

Topsoil and made ground was encountered to between 0.25m (TP2, TP4 & TP5) and 0.80m (TP3) depth, with the deeper fill associated with old land drains at 0.60m in TP8 and 0.80m depth in TP3. The topsoil generally comprised dark brown, silty fine sand. The made ground generally comprised brown, dark brown and grey, slightly clayey, slightly gravelly, silty sand fill, and locally soft, slightly sandy, slightly gravelly, silty clay fill (TP7). The gravel fraction comprised angular and sub-angular, flint, ironstone, clay pipe, ash and brick fragments.

Tidal Flat Deposits

Beneath the surface made ground/topsoil at between 0.25m and 0.80m depth, generally medium dense, brown, light grey and orange brown, locally slightly clayey, sandy silt/silty sand, with occasional shell fragments and dark grey lenses (TP2), was encountered. A layer of firm, brown, orange brown and light grey, slightly sandy, silty clay was encountered in TP5 at 0.70m to 1.25m depth. The sand fraction was fine grained. These soils were considered to represent the anticipated superficial Tidal Flat Deposits, which were encountered to at least the base of the trial pits, and to at least 2.50m depth.

Groundwater

Groundwater seepages were recorded during excavation at 1.60m (TP2, TP3, TP5, TP7 & TP8), and water was recorded on completion of TP4 at 1.65m depth. No groundwater was recorded during excavation of the shallow trial pits TP1 and TP6 to 1.05m and 1.10m depth. Due to pit sides collapse it was generally not possible to record groundwater levels on completion.

Observations

Roots were observed in all of the exploratory holes and to a maximum depth of 1.50m in TP3.

The shallow trial pit sides were stable, however there was sidewall collapse in trial pits below 1.60m depth associated with groundwater seepages.

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 clay pipe, ash and brick. 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/topsoil to depths of between 0.25m and 0.80m, generally covering superficial sandy silt/silty sand, encountered to at least 2.50m depth. Groundwater was recorded as shallow as 1.60m depth during the investigation. The superficial deposits (clay, silt and sand) could offer support for lightly to modest loaded traditional foundations, however large irregular shaped buildings and heavy loads are likely to require piled foundations.

The proposed development was understood to comprise construction of six new dwellings, with associated garages, gardens and access road. Foundations will need to extend through made ground and any root affected cohesive Tidal Flat Deposits, into medium dense, silty sand. Excavations below about 1.60m 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, was found to a maximum depth of 0.80m, and should be avoided as bearing strata.

Samples of the near surface clay/silt had modified plasticity indices of between 8% and 24%, and the silty clay/slightly clayey, sandy silt is rated as having a low to medium volume change potential based on NHBC Standards Chapter 4.2 ‘Building near trees’ (2023). A minimum foundation depth of 0.60m in silt or fine sand soils, and 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.

Foundations within the range of influence of trees, whether they are removed or retained, will have to be separated from clay soils by a suitable void former. The required gap

dimensions for footings in the medium volume change potential clay soils are detailed in the previously cited NHBC document.

Bearing Capacity/Pressure

Foundations should ideally be extended to bear within the non-shrinkable, medium dense silty fine sand Tidal Flat Deposits, encountered below 0.60m to 1.25m depth, which could provide a suitable founding stratum. The naturally deposited silty sand has an allowable bearing pressure of 90kN/m^2 for foundations up to 1.20m wide. This bearing pressure 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. A lower allowable bearing pressure would give a reduced settlement, pro-rata.

The firm clay of the Tidal Flat Deposit at 0.90m depth (TP5), would have a maximum safe bearing capacity of 90kN/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.

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 and Tidal Flat Deposits (clay, silt and fine sand), may be unstable and should not be relied upon to stand unsupported.

Excavations could be expected to locally encounter groundwater at depths below 1.60m. 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 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.

Floor Slabs

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

Ground bearing floor slabs should not be adopted for proposed buildings within influencing distance of existing or former neighbouring trees, such as where buildings are proposed close to the northern and eastern 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 0.90m 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

Made ground or naturally deposited, generally medium dense, silty sand was encountered at sub-grade level across this site.

Laboratory CBR tests yielded CBR values ranging between 0.5% and 1.2%. A design CBR value of 1.0% for the naturally deposited sandy silt/silty fine sand 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.

Locally, based on IAN 73/06, Table 5.1 recommends a design CBR value of 3.0% for silty clay with a plasticity index of 30%, and a design CBR value of 1.0% for a silt.

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 silty clay soils at sub-grade level to become exposed to inclement weather conditions, since they are prone to rapid softening and deterioration.

Soakaway Test Results

The results of the soakaway tests in TP4 and TP8 indicate infiltration rates in the order of 1.21×10^{-6} m/s and 1.31×10^{-6} m/s for the silty fine sand Tidal Flat Deposits. This indicates a poor drainage potential in accordance with BS8004: 1986, Section Six, Figure 6 and is fairly typical of silty fine sand.

In conclusion, soakaways may to be feasible although they would need to be designed with a sufficiently large storage capacity in order to compensate for the slow infiltration rate. Groundwater was encountered as shallow as 1.60m depth, which will limit the effective depth of soakaways.

Sulphate Conditions

Sulphate analysis of selected samples of soil yielded soluble sulphate concentrations within Design Sulphate Class DS-1 of the BRE Special Digest 1, Table C1 (2001), presented in Appendix 3. The pH results of the samples ranged between 8.0 and 8.3 indicating alkaline conditions.

These results indicate an Aggressive Chemical Environment for Concrete (ACEC) Class of AC-1 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 AGAC soil screening values produced by Society of Brownfield Risk Assessment (SoBRA) as documented in their July 2020 publication 'Development of Acute Generic Assessment Criteria for Assessing Risks to Human Health from Contaminants in Soil'. With the absence of a S4UL for cyanide, the SoBRA AGAC has been used as the soil screening criteria within this report because the acute dose toxicity thresholds for free cyanide are very close to the chronic dose toxicity thresholds.

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.

Tables 5 and 6 compare 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.

Residential with home grown produce usage values are considered appropriate screening values for the proposed development.

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	5	1.9%	4.5%	-	-	-	-	-	-	-	-
Arsenic	5	6.4	12	0	0	0	10.30	S4UL	37	40	640
Cadmium	5	0.15	0.43	0	0	0	0.38	S4UL	11	85	190
Total Chromium	5	11	18	0	0	0	16.85	S4UL	910	910	8600
Hexavalent Chromium	5	<0.50	<0.50	0	0	0	<0.50	S4UL	6	6	33
Lead	5	51	320	1	1	0	196.04	C4SL	200	310	2330
Mercury	5	0.08	0.27	0	0	0	0.24	S4UL	11	15	320
Selenium	5	0.47	0.73	0	0	0	0.72	S4UL	250	430	12,000
Nickel	5	9.4	15	0	0	0	14.05	S4UL	130	180	980
Phenols	5	<0.10	<0.10	0	0	0	<0.10	S4UL	120	440	440
Copper	5	10	23	0	0	0	22.35	S4UL	2400	7100	68,000
Zinc	5	46	110	0	0	0	100.51	S4UL	3700	40,000	730,000
Free Cyanide	5	<0.50	<0.50	0	0	0	<0.50	AGAC	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'
AGAC soil screening values produced by Society of Brownfield Risk Assessment (SoBRA) as documented in their July 2020 publication 'Development of Acute Generic Assessment Criteria for Assessing Risks to Human Health from Contaminants in Soil'.

Table 6: Comparison of PAH Chemical Test Results for Near Surface Soil with Soil Screening Values (SSV)

Determinand	Number of Samples	Min Value (mg/kg)	Max Value (mg/kg)	Number of Samples Exceeding SSV for:			Soil Screening Values (SSV) (1% SOM)				
				Residential with home grown produce	Residential without home grown produce	Commercial/ Industrial	Measured 95th Percentile mg/kg	Assessment Method	Residential with home grown produce (mg/kg)	Residential without home grown produce (mg/kg)	Commercial/ Industrial (mg/kg)
Acenaphthene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	210	3000	84,000
Acenaphthylene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	170	2900	83,000
Anthracene	5	<0.10	0.20	0	0	0	0.17	S4UL	2400	3100	520,000
Benzo[a]anthracene	5	<0.10	1.5	0	0	0	1.40	S4UL	7.2	11	170
Benzo[a]pyrene	5	<0.10	1.5	0	0	0	1.17	S4UL	2.2	3.2	35
Benzo[b]fluoranthene	5	<0.10	2.2	0	0	0	1.74	S4UL	2.6	3.9	44
Benzo[g,h,i]perylene	5	<0.10	2.2	0	0	0	2.06	S4UL	320	360	390
Benzo[k]fluoranthene	5	<0.10	0.90	0	0	0	0.70	S4UL	77	110	1200
Chrysene	5	<0.10	1.8	0	0	0	1.53	S4UL	15	30	350
Dibenz[a,h]anthracene	5	<0.10	0.45	2	2	0	0.40	S4UL	0.24	0.31	3.5
Fluoranthene	5	<0.10	1.6	0	0	0	1.52	S4UL	280	1500	23,000
Fluorene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	170	2800	63,000
Indeno[1,2,3-cd]pyrene	5	<0.10	0.92	0	0	0	0.73	S4UL	27	45	500
Naphthalene	5	<0.10	<0.10	0	0	0	<0.10	S4UL	2.3	2.3	190
Phenanthrene	5	<0.10	0.76	0	0	0	0.61	S4UL	95	1300	22,000
Pyrene	5	<0.10	1.8	0	0	0	1.60	S4UL	620	3700	54,000

Discussion of Soil Results

The levels of most elements and compounds were within the associated soil screening values for both residential and commercial/industrial end uses. A slightly elevated lead concentration was determined in TP3 at 0.20m depth, and slightly elevated concentrations of dibenz[a,h]anthracene were determined in TP3 at 0.20m depth and also TP8 at 0.20m depth. The speciated PAH concentrations indicate that they are combustion/coal derived, and are likely related to ash in the soils.

The made ground encountered during this investigation was not noted to have olfactory or visual evidence of fuel contamination. All of the tested samples had total petroleum hydrocarbon concentrations 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 or testing in the laboratory.

Statistical analysis indicates that the US95 value for dibenz[a,h]anthracene, exceeded the screening values for the most sensitive residential with home grown produce end use, and the residential without home grown produce end use, but not the screening value for commercial or industrial usage.

None of the other US95 values, including lead, exceeded the screening values for the most sensitive residential with home grown produce end use; the residential without home grown end use; nor the screening values for commercial or industrial usage.

In conclusion, the near surface soils would not be considered suitable for retention or re-use in the proposed garden areas of the residential development. If geotechnically suitable, near surface soils could be used beneath buildings and areas of permanent hardstanding.

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 7 below.

Table 7: 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	Very Low	Low	Very Low	Very Low
Human Health – users of completed development	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	N/A	Low	Very Low	Very Low
Water Environment	Migration through ground into surface water or groundwater	Very Low	Very Low	Very Low	Very 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 7 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 0.25m and 0.80m of made ground/topsoil. The chemical testing has identified slightly elevated concentrations of speciated PAH contaminants in the soils tested, with respect to the proposed gardens in the residential development, presumed to be associated with ash in the soil. The low level of 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 drain runs, if present, should be removed where encountered from beneath the site and precautions should ensure that any remaining 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 underlain by a thin layer of made ground/topsoil, covering superficial Tidal Flat Deposits comprising predominantly silt and fine sand.

Consequently, there is a very low risk that hazardous gases would affect groundworkers during the construction phase and a very low risk of hazardous gases affecting future users of the site.

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.

Human Health - Users of Completed Development

The results of the chemical analysis indicate that the made ground is considered unsuitable for retention or re-use at the surface within any new garden areas.

For the proposed residential setting, a minimum depth of removal and replacement of 0.60m, or the full thickness of made ground where the made ground is less than this, would be considered appropriate in gardens and landscaping areas, where soil will be exposed at the surface, and will involve the removal of the made ground and replacement with a suitably thick cover or barrier layer in order to break the pathway between the underlying made ground and the site users.

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 have been found beneath the site, which are classified by the EA as an 'Unproductive' stratum. The underlying solid geology Oxford Clay Formation at depth is also classified by the EA as an 'Unproductive' stratum. No groundwater abstractions are recorded within 250m of the site. Surface water abstractions are recorded 104m south, and 124m east of the site, both for spray irrigation. The site is not within a source protection zone.

A drain is recorded 11m west of the site. Risegate Eau (drain) is recorded 36m south of the site. The site is within a Zone 2 and Zone 3 floodplain, and has a very low risk of flooding from rivers and the sea. The site is within a nitrate vulnerable zone and an SSSI impact zone, both environmentally sensitive areas.

Groundwater was recorded as shallow as 1.60m 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

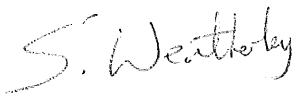
The results of chemical analysis are provided to the rear of this report and can be used within the information necessary for basic characterisation of the soil destined for landfill. The Environment Agency publication Hazardous Waste, Technical Guidance WM3 outlines the methodology for classifying wastes 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. The results of Waste Acceptance Criteria (WAC) leachate testing, on a selected soil sample (TP8 at 0.20m depth) should be used to check whether, if categorised as non-hazardous waste it could be disposed of at an inert waste landfill; or if categorised as hazardous waste, whether it could qualify as stable non-reactive hazardous waste for disposal in non-hazardous landfill.

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.

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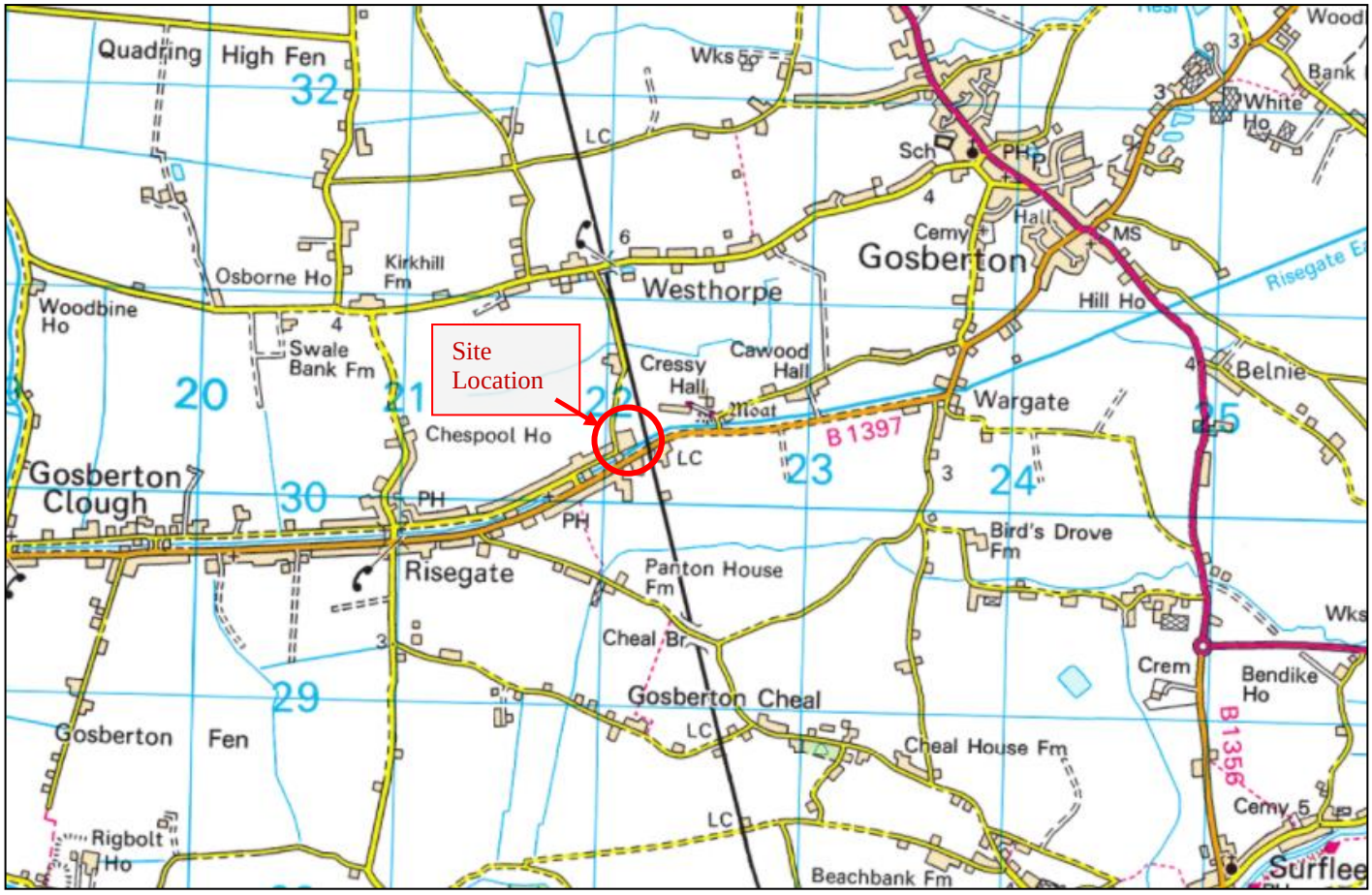


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Site Location Plan

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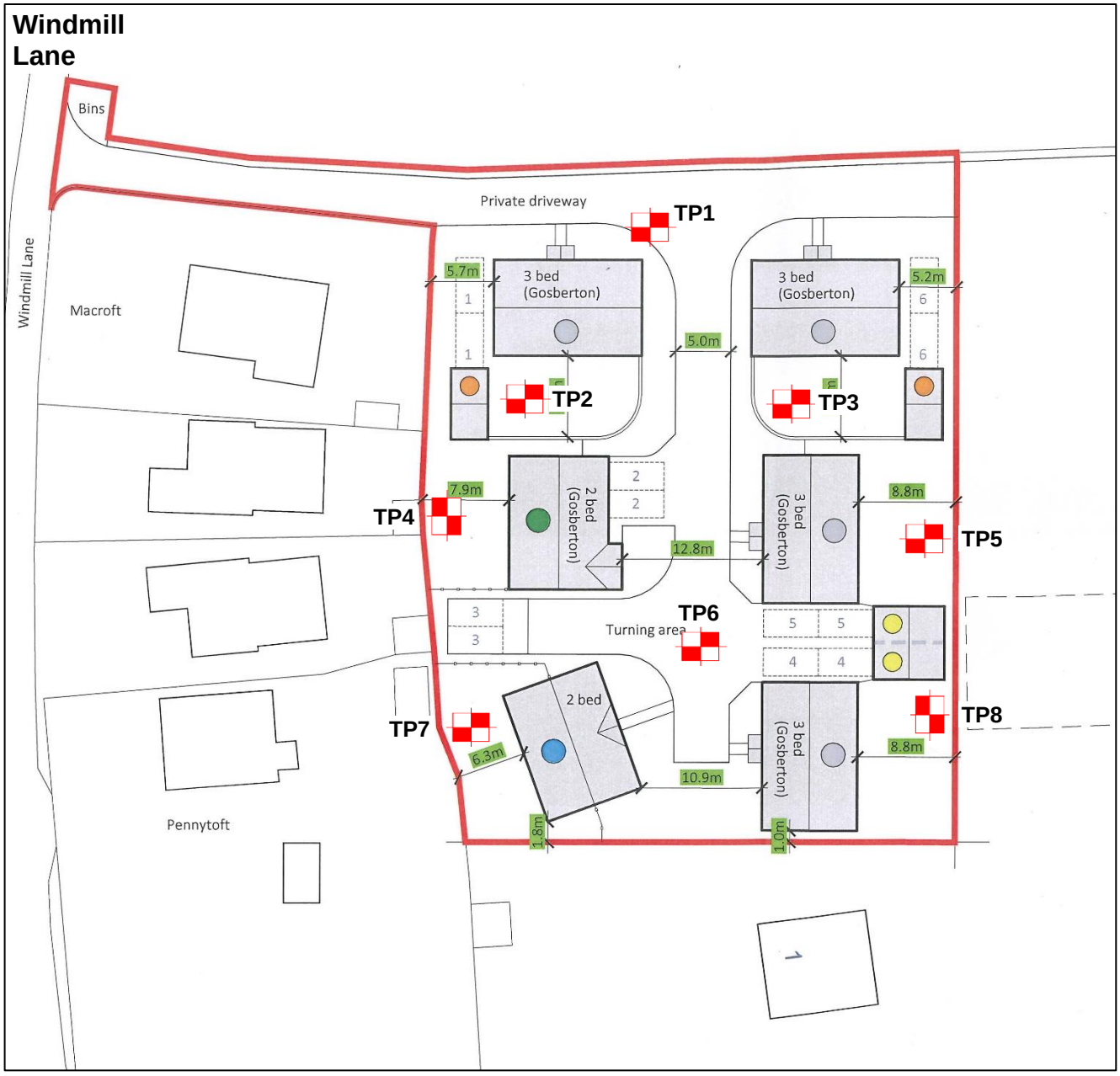


One grid square = 1km

Project: Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client: R. K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Exploratory Hole Location Plan

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



Key

Trial pit

Not to Scale

Project: Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire

Client: R. K. Wilson Builders Limited

GROUND ENGINEERING LIMITED
Peterborough Tel : 01733 566566

Project No. C16066

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Site: RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

TRIAL PIT
TP1

Date: 03/11/23

Pit Size: 1.80m L x 0.35m W x 1.05m D.

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 - Dark grey and dark brown, slightly gravelly, silty SAND. Sand is fine grained. Gravel is fine and medium grained, flint, ash, glass and brick fragments.			
0.10	ES1					0.40	
0.50-0.70	B1			Dark brown and brown, silty SAND. Sand is fine grained.			
0.60	D2			(TIDAL FLAT DEPOSIT)		0.70	
0.70-1.00	MP1	80		Medium dense, brown and grey, silty SAND. Sand is fine grained.			
1.00	D3			(TIDAL FLAT DEPOSIT)			
1.00-1.20	MP2	100				1.05	
				Pit completed at 1.05m depth			

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

REMARKS
1. Roots observed to at least 1.05m depth
2. Pit dry
3. Pit sides stable

Project No 16066

Scale 1:25

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Site: RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

TRIAL PIT TP2

Date: 03/11/23

Pit Size: 1.70m L x 0.35m W x 2.50m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				TOPSOIL - Dark brown, silty SAND. Sand is fine grained.		0.25	
0.20	D1						
0.20	ES1			Medium dense, brown and orange brown, slightly clayey, sandy SILT. Sand is fine grained.			
0.50-0.70	B1						
0.60	D2						
0.60	ES2			(TIDAL FLAT DEPOSIT)			
0.90-1.05	MP1	100				1.10	
1.20	D3			Medium dense, brown and light grey, silty SAND. Sand is fine grained.			
				(TIDAL FLAT DEPOSIT)			
1.60	D4		▽1				
1.60-1.90	MP2	80				1.70	
1.80	D5			Medium dense, brown and light grey, silty SAND with occasional shell fragments.			
				...With occasional dark grey lenses below 2.30m depth			
				(TIDAL FLAT DEPOSIT)		2.50	
				Pit completed at 2.50m depth			

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

REMARKS
1. Roots observed to 1.15m depth
2. Groundwater seepage at 1.60m depth
3. Pit sides unstable below 1.50m depth

Project No 16066

Scale 1:25

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Site: RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

TRIAL PIT
TP3

Date: 03/11/23

Pit Size: 1.80m L x 0.35m W x 2.30m D.

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 - Dark brown, silty SAND. Sand is fine grained.			
0.20	ES1					0.30	
0.50-0.70	B1			MADE GROUND - Light brown and dark brown, slightly gravelly, silty SAND. Sand is fine grained. Gravel is angular clay pipe fragments.			
0.50	D2						
0.50	ES2						
0.70-1.00	MP1	100				0.80	
1.00	D3			Medium dense, brown and light grey, silty SAND. Sand is fine grained.			
1.50	D4						
1.60-1.90	MP2	36	1 ▽	...Becoming loose below 1.60m depth			
				(TIDAL FLAT DEPOSIT)		1.80	
1.90-2.10	MP3	50		Medium dense, brown and grey, silty SAND.			
2.00	D5			(TIDAL FLAT DEPOSIT)			
						2.30	
				Pit completed at 2.30m depth			

KEY

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

REMARKS

1. Land drain at 0.80m depth
2. Roots observed to 1.50m depth
3. Groundwater seepage at 1.60m depth
4. Pit sides collapsed below 0.40m depth

Project No	
16066	
Scale	Page
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GROUND ENGINEERING LIMITED

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

Site: RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

TRIAL PIT
TP4

Date: 03/11/23

Pit Size: 1.70m L x 0.65m W x 1.70m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - Dark brown, slightly gravelly, silty SAND. Sand is fine grained. Gravel is angular and sub-angular flint and brick fragments.			
0.20	D1					0.25	
0.20	ES1			Medium dense, brown and orange brown, slightly sandy SILT. Sand is fine grained.			
0.40-0.60	B1						
0.40	D2						
0.40	ES2						
0.60-0.90	MP1	100					
				(TIDAL FLAT DEPOSIT)			
0.70	D3					0.85	
				Medium dense, light grey, slightly silty, clayey SAND with occasional shell fragments. Sand is fine grained. (TIDAL FLAT DEPOSIT)		0.90	
1.00	D4			Medium dense, brown, light brown and orange brown, silty SAND. Sand is fine grained.			
				(TIDAL FLAT DEPOSIT)			
			▼c			1.70	
1.70	D5						
1.70-2.00	MP2	60		Pit completed at 1.70m depth			
2.00-2.25	MP3	100					

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

REMARKS
1. Roots observed to 0.90m depth
2. Water stood at 1.65m on completion
3. Pit sides stable
4. Soakaway test undertaken at 1.70m depth

Project No	
16066	
Scale	Page
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SOAKAWAY TEST RESULTS

BRE DIGEST 365 - SOIL INFILTRATION RATE

Project: Riseholme Farm, Windmill Lane, Gosberton Risegate
Client: R.K. Wilson Builders Limited

Project No: C16066
Sheet No: 1/1

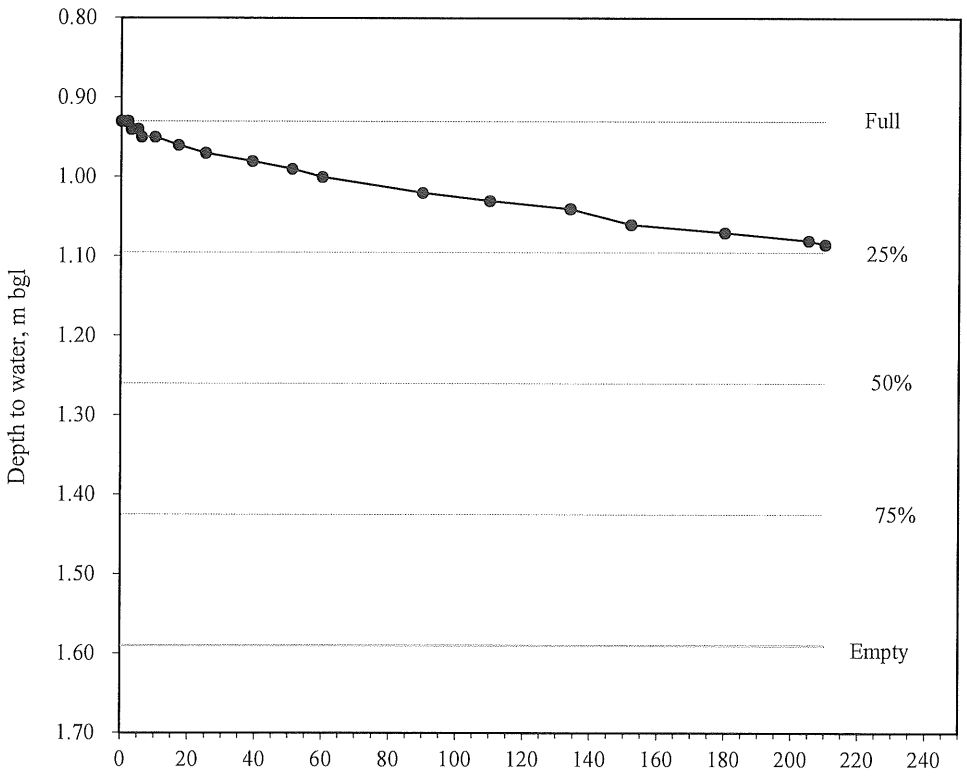
Trial Pit: TP4 FIRST FILLING
Depth: 1.70
Length: 1.70
Width: 0.65

Description of Stratum under test: Brown and light brown, silty fine SAND

Depth to water prior to test: 1.59
(below ground level)

Elapsed Time min	Depth to Water m
0	0.93
1	0.93
2	0.93
3	0.94
5	0.94
6	0.95
10	0.95
17	0.96
25	0.97
39	0.98
51	0.99
60	1.00
90	1.02
110	1.03
134	1.04
152	1.06
180	1.07
205	1.08
210	1.085

DEPTH TO WATER vs ELAPSED TIME



All dimensions given in metres

f = (V75-V25)/A50(T75-T25)

V75-V25 = 0.365
A50 = 2.656
T75-T25 = 1750 (extrapolated)

Extrapolated Soil Infiltration Rate **f = 1.31E-06 m/s**

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Site: RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

TRIAL PIT
TP5

Date: 03/11/23

Pit Size: 1.50m L x 0.35m W x 2.30m D.

Ground Level:

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				TOPSOIL - Dark brown, silty SAND. Sand is fine grained.			
0.20	D1					0.25	
0.20	ES1			Brown and light brown, silty SAND with rare shell fragments. Sand is fine grained.			
0.40	D2						
0.40	ES2						
0.50-0.60	B1			(TIDAL FLAT DEPOSIT)			
						0.70	
0.80	D3			Firm, brown, orange brown and light grey, slightly sandy, silty CLAY.			
1.00	V1	(43)		(TIDAL FLAT DEPOSIT)			
						1.25	
1.30	D4			Medium dense, light brown and light grey, slightly clayey, silty SAND with lenses of silt. Sand is fine grained.			
			1 ▽				
1.70	D5			(TIDAL FLAT DEPSOIT)			
1.70-2.00	MP1	70					
2.00-2.30	MP2	100				2.00	
				Medium dense, brown, orange brown and light grey, sandy SILT. Sand is fine grained.			
2.20	D6			(TIDAL FLAT DEPOSIT)			
						2.30	
				Pit completed at 2.30m depth			

KEY

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

REMARKS

1. Roots observed to 1.50m depth
2. Groundwater seepage at 1.60m depth
3. Pit dry on completion
4. Pit sides collapsed below 0.45m depth

Project No	
16066	
Scale	Page
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Site: RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

TRIAL PIT TP6

Date: 03/11/23

Pit Size: 1.70m L x 0.35m W x 1.10m D.

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			MADE GROUND - Dark brown and brown, clayey, silty, gravelly SAND. Gravel is angular flint, ironstone, brick and glass fragments.			
0.20	ES1					0.30	
0.50-0.70	B1			Brown, light brown and orange brown, slightly clayey, silty SAND. Sand is fine grained.			
0.50	D2						
0.50	ES2						
0.70-0.86	MP1	100		(TIDAL FLAT DEPOSIT)			
0.80	D3					0.90	
				Light brown and orange brown, silty SAND. Sand is fine grained. (TIDAL FLAT DEPOSIT)			
1.10	D4					1.10	
				Pit completed at 1.10m depth			

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

REMARKS
1. Roots observed to 0.90m depth
2. Pit dry
3. Pit sides stable

Project No 16066

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Site: RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

TRIAL PIT
TP7

Date: 03/11/23

Pit Size: 1.80m L x 0.35m W x 2.00m D.

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			MADE GROUND - Soft, dark brown, slightly sandy, slightly gravelly, silty CLAY. Gravel is angular flint.			
0.20	ES1					0.30	
0.40	D2			Brown and dark brown, slightly clayey, silty SAND. Sand is fine grained. (TIDAL FLAT DEPOSIT)			
0.40	ES2					0.50	
0.60-0.70	B1			Medium dense, brown, orange brown and light grey, sandy SILT. Sand is fine grained.			
0.80	D3						
0.80-1.10	MP1	100		(TIDAL FLAT DEPOSIT)			
						1.20	
1.40	D4		▽1	Brown, light brown and orange brown, silty SAND. Sand is fine grained.			
				(TIDAL FLAT DEPOSIT)			
2.00	D5					2.00	
				Pit completed at 2.00m depth			

KEY

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

REMARKS

1. Roots observed to 1.20m depth
2. Groundwater seepage at 1.60m depth
3. Pit sides collapsed below 1.30m depth

Project No	
16066	
Scale	Page
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Site: RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

TRIAL PIT
TP8

Date: 03/11/23

Pit Size: 1.80m L x 0.65m W x 2.10m D.

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			MADE GROUND - Dark brown, slightly clayey, slightly gravelly, silty SAND. Gravel is angular flint and brick fragments.		0.25	
0.20	ES1			MADE GROUND - Light brown and dark brown, slightly gravelly, silty SAND. Sand is fine grained. Gravel is angular flint, ash and brick fragments.		0.65	
0.40	D2						
0.40	ES2						
0.65-0.80	B1						
0.70	D3			Medium dense, light brown and orange brown, very silty SAND. Sand is fine grained.			
0.80-1.10	MP1	100		(TIDAL FLAT DEPOSIT)		1.15	
1.30	D4			Brown, orange brown and light grey, silty SAND. Sand is fine grained.			
1.60	D5		1 ▽	(TIDAL FLAT DEPOSIT)			
2.00	D6					2.10	
				Pit completed at 2.10m depth			

KEY

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

REMARKS

1. Land drain at 0.60m depth
2. Roots observed to 1.05m depth
3. Groundwater seepage at 1.60m depth
4. Pit dry on completion
5. Pit sides collapsed below 1.20m depth
6. Soakaway test undertaken at 2.10m depth

Project No	
16066	
Scale	Page
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SOAKAWAY TEST RESULTS

BRE DIGEST 365 - SOIL INFILTRATION RATE

Project: Riseholme Farm, Windmill Lane, Gosberton Risegate
Client: R.K. Wilson Builders Limited

Project No: C16066
Sheet No: 1/1

Trial Pit: TP8 FIRST FILLING
Depth: 2.10
Length: 1.80
Width: 0.65

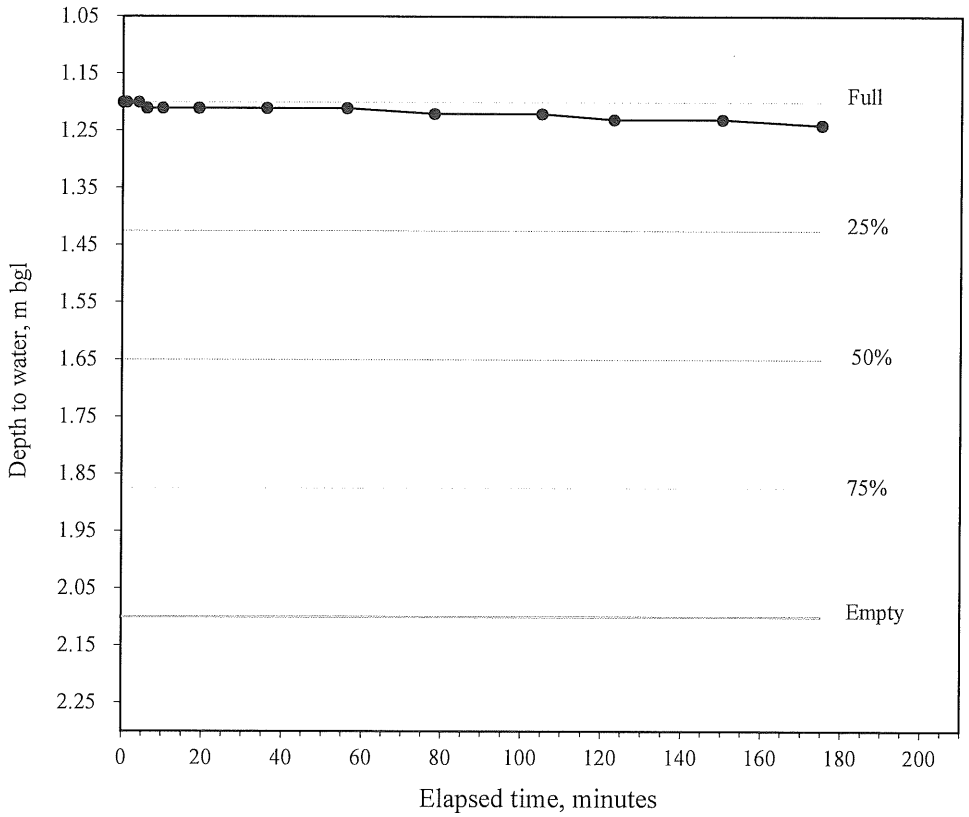
Description of Stratum under test: Brown and light grey, slightly silty, fine SAND

Depth to water prior to test: Dry
(below ground level)

Elapsed Time min	Depth to Water m
0	1.20
1	1.20
4	1.20
6	1.21
10	1.21
19	1.21
36	1.21
56	1.21
78	1.22
105	1.22
123	1.23
150	1.23
175	1.24

All dimensions given in metres

DEPTH TO WATER vs ELAPSED TIME



f = (V75-V25)/A50(T75-T25)

V75-V25 = 0.527
A50 = 3.375
T75-T25 = 2155 (extrapolated)

Extrapolated Soil Infiltration Rate **f = 1.21E-06 m/s**

LABORATORY TEST RESULTS

CONTRACT RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE

Trial-pit	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 %	
TP1	B1	0.50 - 0.70				24	1.91	1.54										0.5	0.5	1% retained on 20mm sieve
	D3	1.00													263		8.0			
TP2	D2	0.60	32	24	8	24														SOIL CLASSIFICATION = CL/ML 0% retained on 425µm sieve
TP3	D3	1.00													107		8.3			
TP5	D3	0.80	47	23	24	33														SOIL CLASSIFICATION = CI 0% retained on 425µm sieve
	D4	1.30													33		8.3			
	D6	2.20	34	25	9	31														SOIL CLASSIFICATION = ML 0% retained on 425µm sieve
TP6	B1	0.50 - 0.70				23	1.89	1.53										0.6	1.2	0% retained on 20mm sieve
TP7	D3	0.80													41		8.1			
TP8	D4	1.30													49		8.3			

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

16066

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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:	PL8453-1/5/710-2
Client Address:	Newark Road	Client Reference:	C16066
	Peterborough	Lab Job Number:	PL8453-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	08.11.2023
Contact:	Simon Weatherley	Date Tested:	27.11.2023
		Certificate of Sampling:	N/A
Site Name:	Riseholme Farm	Sampling Certificate No.:	N/A
Site Address:	Gosberton Risegate	Sampled By:	Client

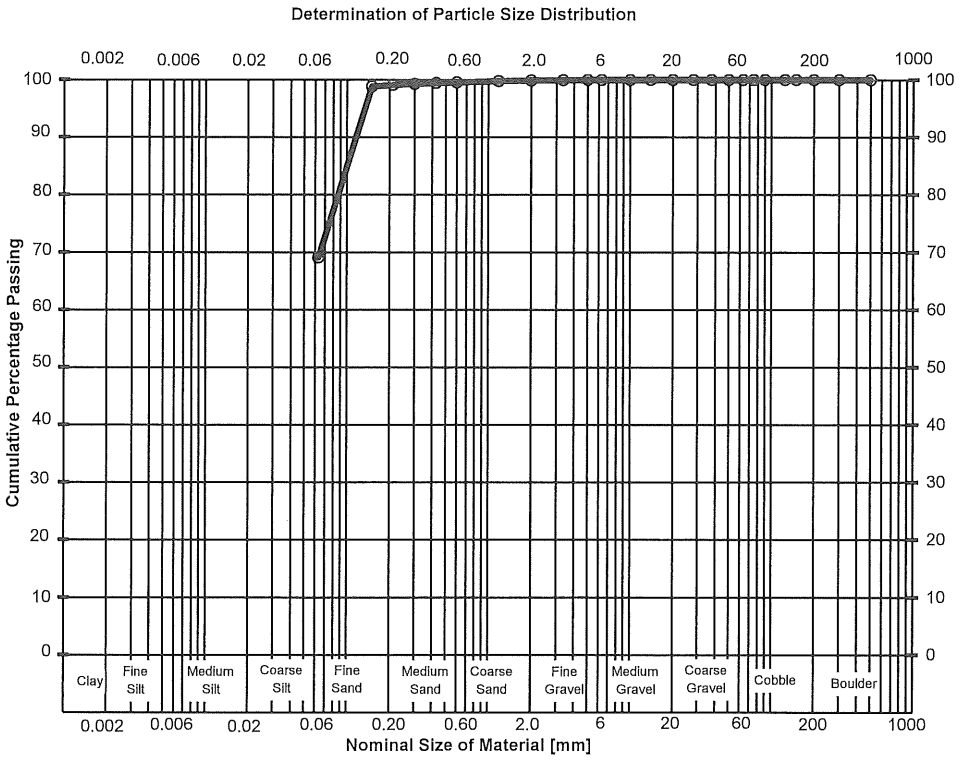
TEST RESULTS **Laboratory Reference:** PL8453-1/5 **Pre-treatment for organic material:** N/A

Client Reference: B1

Sample Description: Brown orange-brown grey sandy SILT with occasional fine roots.

Material Specification: Not Required
Location: TP4
Source:

Depth Top: 0.40m
Depth Base: 0.60m
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	99
0.300	99
0.212	99
0.150	99
0.063	69
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 29.11.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

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Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

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GROUND ENGINEERING

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e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Particle Size Distribution

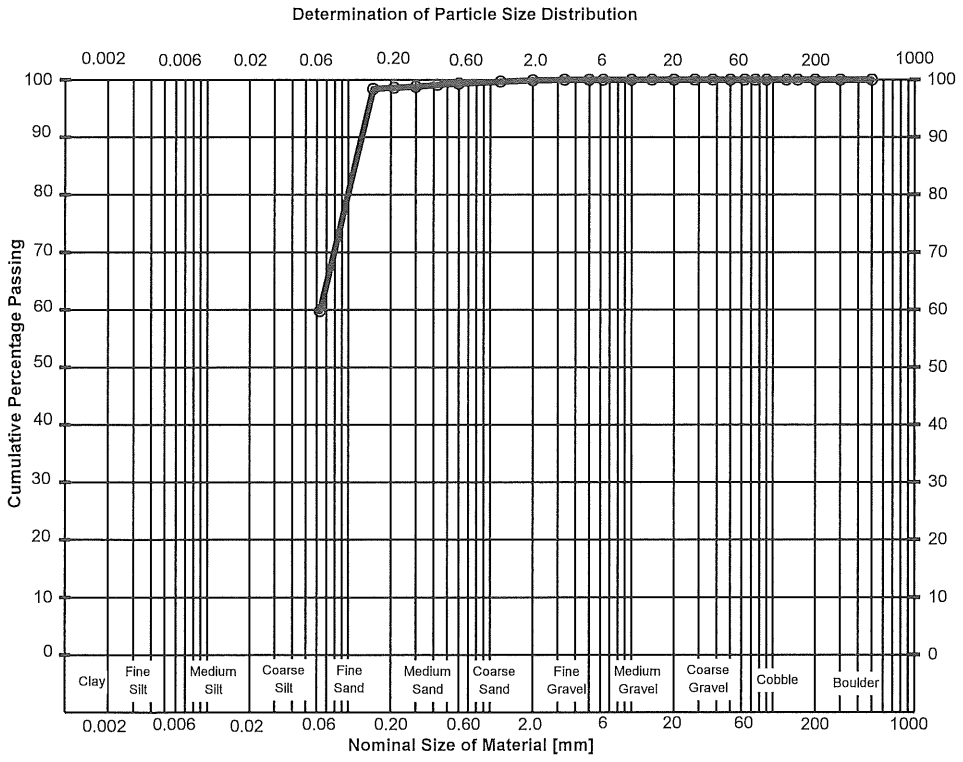
Tested in Accordance with BS 1377-2: 1990: Clause 9.2
Wet Sieving Method

Client:	Ground Engineering Ltd	Certificate Number:	PL8453-1/10/710-2
Client Address:	Newark Road	Client Reference:	C16066
	Peterborough	Lab Job Number:	PL8453-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	08.11.2023
Contact:	Simon Weatherley	Date Tested:	27.11.2023
		Certificate of Sampling:	N/A
Site Name:	Riseholme Farm	Sampling Certificate No.:	N/A
Site Address:	Gosberton Risegate	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8453-1/10 **Pre-treatment for organic material:** N/A
Client Reference: B1

Sample Description: Brown orange-brown grey sandy SILT with occasional fine roots.

Material Specification: Not Required **Depth Top:** 0.60m
Location: TP7 **Depth Base:** 0.70m
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	99
0.425	99
0.300	99
0.212	99
0.150	98
0.063	60
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 29.11.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

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TEST CERTIFICATE

Determination of Particle Size Distribution

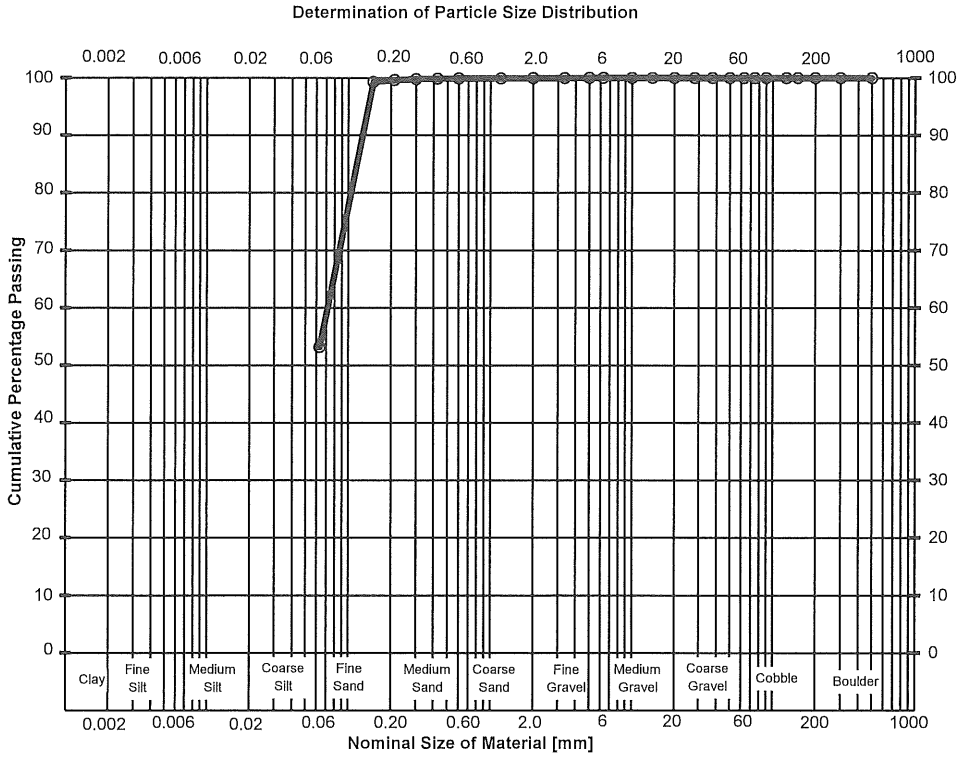
Tested in Accordance with BS 1377-2: 1990: Clause 9.2
Wet Sieving Method

Client:	Ground Engineering Ltd	Certificate Number:	PL8453-1/12/710-2
Client Address:	Newark Road	Client Reference:	C16066
	Peterborough	Lab Job Number:	PL8453-1
	PE1 5UA	Date Sampled:	Unknown
		Date Received:	08.11.2023
Contact:	Simon Weatherley	Date Tested:	27.11.2023
		Certificate of Sampling:	N/A
Site Name:	Riseholme Farm	Sampling Certificate No.:	N/A
Site Address:	Gosberton Risegate	Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL8453-1/12 **Pre-treatment for organic material:** N/A
Client Reference: B1

Sample Description: Brown orange-brown SILT/SAND with occasional fine roots.

Material Specification: Not Required **Depth Top:** 0.65m
Location: TP8 **Depth Base:** 0.80m
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	100
0.150	99
0.063	53
0.020	
0.006	
0.002	

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 29.11.2023 Page 1 of 1
Form Number: GELab/C/709-2 Version 57

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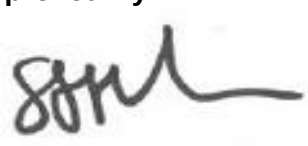
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-37158-1
Initial Date of Issue:	13-Nov-2023
Re-Issue Details:	
Client	Ground Engineering Limited
Client Address:	Newark Road Peterborough Cambridgeshire PE1 5UA
Contact(s):	Simon Weatherley
Project	SW/C16066 WINDMILL LANE

Quotation No.:		**Date Received:**	08-Nov-2023
Order No.:	SW/C16066	**Date Instructed:**	08-Nov-2023
No. of Samples:	5		
Turnaround (Wkdays):	5	**Results Due:**	14-Nov-2023
Date Approved:	13-Nov-2023		

Approved By:



Details: Stuart Henderson, Technical Manager

Results - Soil

Project: SW/C16066 WINDMILL LANE

Client: Ground Engineering Limited		**Chemtest Job No.:**			23-37158	23-37158	23-37158	23-37158	23-37158
Quotation No.:		**Chemtest Sample ID.:**			1727821	1727822	1727823	1727824	1727825
Order No.: SW/C16066		Client Sample Ref.:			D1/ES1	D1/ES1	D1/ES1	D1/ES1	D1/ES1
		Sample Location:			TP2	TP3	TP4	TP5	TP8
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.20	0.20	0.20	0.20	0.20
		Date Sampled:			03-Nov-2023	03-Nov-2023	03-Nov-2023	03-Nov-2023	03-Nov-2023
		Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
pH at 20C	M	2010		4.0	7.5	7.7	7.8	7.7	7.4
Moisture	N	2030	%	0.020	20	19	18	16	18
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	2.0	1.1	0.59	0.94	0.99
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.22	< 0.010	< 0.010	< 0.010	< 0.010
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	3.4	5.0	3.3	4.9	3.6
Arsenic	M	2455	mg/kg	0.5	6.5	12	6.4	7.3	8.3
Cadmium	M	2455	mg/kg	0.10	0.19	0.43	0.15	0.25	0.34
Chromium	M	2455	mg/kg	0.5	12	18	11	15	15
Copper	M	2455	mg/kg	0.50	17	23	10	17	21
Mercury	M	2455	mg/kg	0.05	0.10	0.21	0.08	0.27	0.14
Nickel	M	2455	mg/kg	0.50	10	13	9.4	12	15
Lead	M	2455	mg/kg	0.50	110	320	51	56	86
Selenium	M	2455	mg/kg	0.25	0.50	0.67	0.47	0.73	0.67
Zinc	M	2455	mg/kg	0.50	83	110	46	67	84
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	3.8	4.5	1.9	3.6	2.5
Acenaphthene	M	2700	mg/kg	0.10	< 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	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	0.13	< 0.10	< 0.10	0.20
Benzo[a]anthracene	M	2700	mg/kg	0.10	1.2	1.0	< 0.10	< 0.10	1.5
Benzo[a]pyrene	M	2700	mg/kg	0.10	0.89	0.43	< 0.10	< 0.10	1.5
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	1.4	0.58	< 0.10	< 0.10	2.2
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	2.2	2.0	< 0.10	< 0.10	1.1
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	0.51	0.32	< 0.10	< 0.10	0.90
Chrysene	M	2700	mg/kg	0.10	1.2	0.95	< 0.10	< 0.10	1.8
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.22	0.45	< 0.10	< 0.10	0.37
Fluoranthene	M	2700	mg/kg	0.10	1.6	0.57	< 0.10	0.30	1.6
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	0.56	0.33	< 0.10	< 0.10	0.92
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	0.76	0.42	< 0.10	< 0.10	0.35
Pyrene	M	2700	mg/kg	0.10	1.5	0.74	< 0.10	0.38	1.8
Total Of 16 PAH's	M	2700	mg/kg	2.0	12	7.9	< 2.0	< 2.0	14
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
ACM Type	U	2192		N/A	-	-	-	-	-

Results - Soil

Project: SW/C16066 WINDMILL LANE

Client: Ground Engineering Limited			**Chemtest Job No.:**		23-37158	23-37158	23-37158	23-37158	23-37158
Quotation No.:			**Chemtest Sample ID.:**		1727821	1727822	1727823	1727824	1727825
Order No.: SW/C16066			Client Sample Ref.:		D1/ES1	D1/ES1	D1/ES1	D1/ES1	D1/ES1
			Sample Location:		TP2	TP3	TP4	TP5	TP8
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.20	0.20	0.20	0.20	0.20
			Date Sampled:		03-Nov-2023	03-Nov-2023	03-Nov-2023	03-Nov-2023	03-Nov-2023
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones and Roots	Stones and Roots	Stones and Roots	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 at 20°C	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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
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

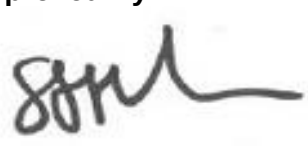
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-37159-1
Initial Date of Issue:	14-Nov-2023
Re-Issue Details:	
Client	Ground Engineering Limited
Client Address:	Newark Road Peterborough Cambridgeshire PE1 5UA
Contact(s):	Simon Weatherley
Project	SW/C16066 WINDMILL LANE

Quotation No.:		**Date Received:**	08-Nov-2023
Order No.:	SW/C16066	**Date Instructed:**	08-Nov-2023
No. of Samples:	1		
Turnaround (Wkdays):	7	**Results Due:**	16-Nov-2023
Date Approved:	14-Nov-2023		

Approved By:



Details: Stuart Henderson, Technical Manager

Results - 2 Stage WAC

Project: SW/C16066 WINDMILL LANE

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	23-37159								
Chemtest Sample ID:	1727826								
Sample Ref:	D1/ES1						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	TP8								
Top Depth(m):	0.20								
Bottom Depth(m):									
Sampling Date:	03-Nov-2023								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	M	%			1.7	3	5	6
Loss On Ignition	2610	M	%			4.8	--	--	10
Total BTEX	2760	M	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg			< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			6.0	100	--	--
pH at 20C	2010	M				7.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0070	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.011	0.0060	0.022	0.062	0.5	2	25
Barium	1455	U	0.015	0.009	0.030	0.096	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	0.0013	< 0.0005	0.013	0.5	10	70
Copper	1455	U	0.0087	0.0041	0.017	0.0042	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0041	0.0008	0.0080	0.0095	0.5	10	30
Nickel	1455	U	0.0028	0.0015	0.0055	0.016	0.4	10	40
Lead	1455	U	0.0035	0.0047	0.0068	0.046	0.5	10	50
Antimony	1455	U	0.0056	0.0011	0.011	0.013	0.06	0.7	5
Selenium	1455	U	0.0009	< 0.0005	0.0018	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.009	0.010	0.018	0.10	4	50	200
Chloride	1220	U	1.2	< 1.0	< 10	< 10	800	15000	25000
Fluoride	1220	U	0.83	0.32	1.6	3.4	10	150	500
Sulphate	1220	U	< 1.0	< 1.0	< 10	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	130	44	260	480	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	11	5.6	< 50	59	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	18

Leachate Test Information	
Leachant volume 1st extract/l	0.312
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.083

Waste Acceptance Criteria

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

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity at 25°C and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH at 20°C	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; 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)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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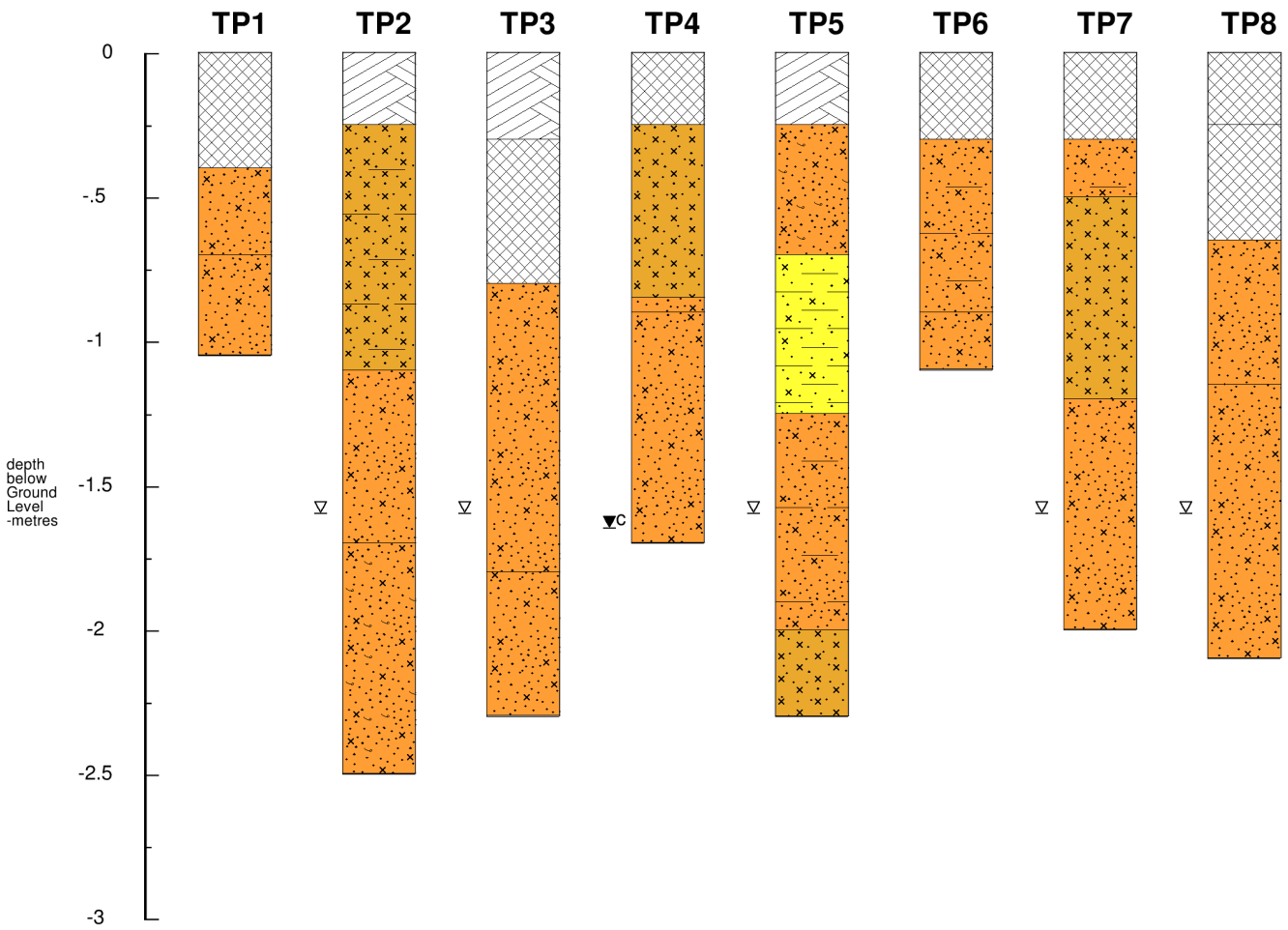
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customerservices@chemtest.com



KEY TO LEGENDS

- TOPSOIL
- MADE GROUND
- TIDAL FLAT DEPOSIT - CLAY
- TIDAL FLAT DEPOSIT - SILT
- TIDAL FLAT DEPOSIT - SAND
- Groundwater Encountered
- Groundwater Rise
- Level on Completion

Project : Riseholme Farm, Windmill Lane, Gosberton Risegate	**GROUND ENGINEERING LIMITED**	**Soil Profile**	**Project No** C16066
Client : R.K. Wilson Builders Limited	Tel : 01733 566566	**Fig No. 1**	**Vertical Scale** 1:25

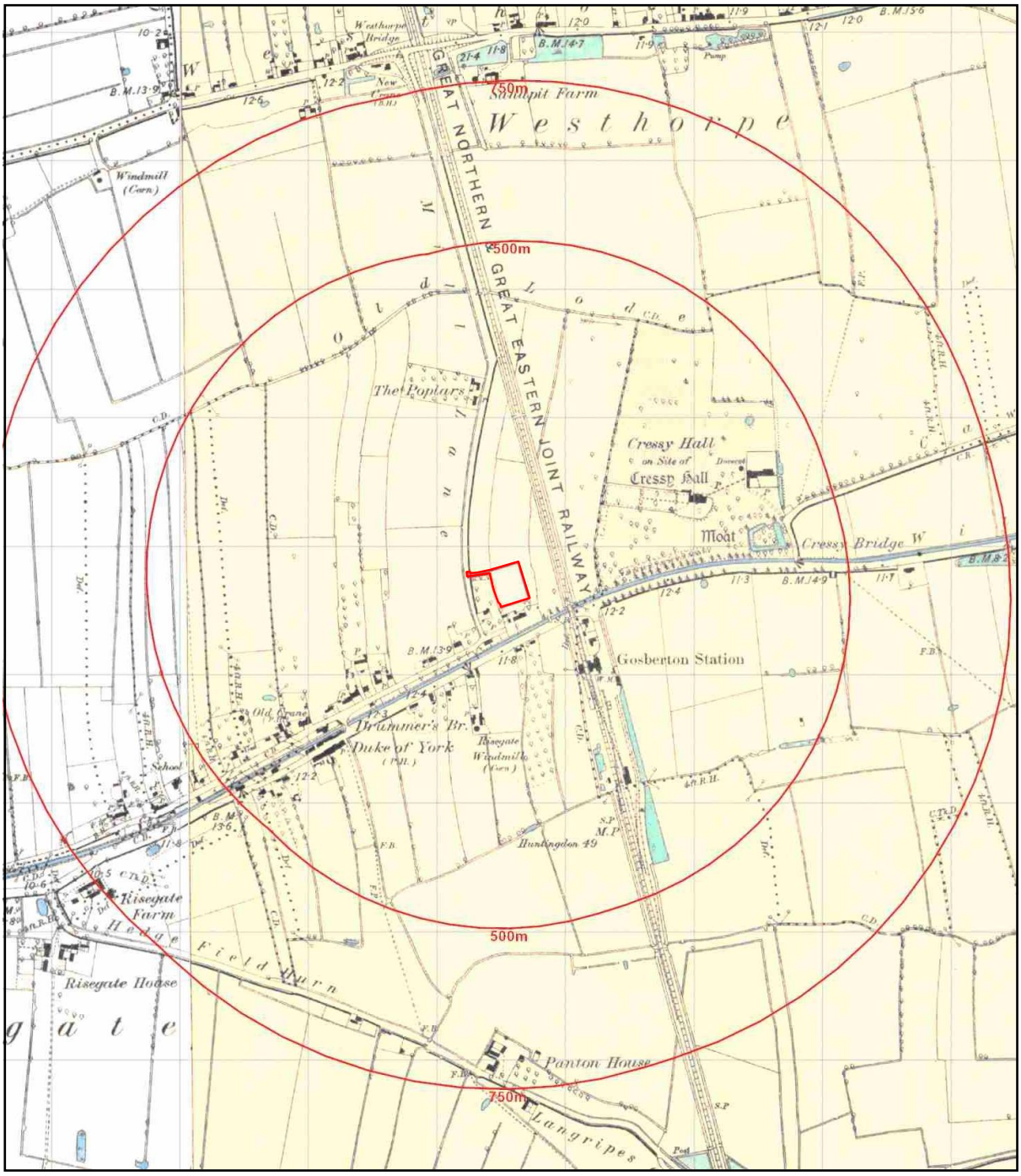
APPENDIX 1

HISTORICAL MAP EXTRACTS

Site History

Figure A

Reproduced from the **1887** edition Ordnance Survey sheets **Lincolnshire 25SE & 26SW** at **1:10,560** scale

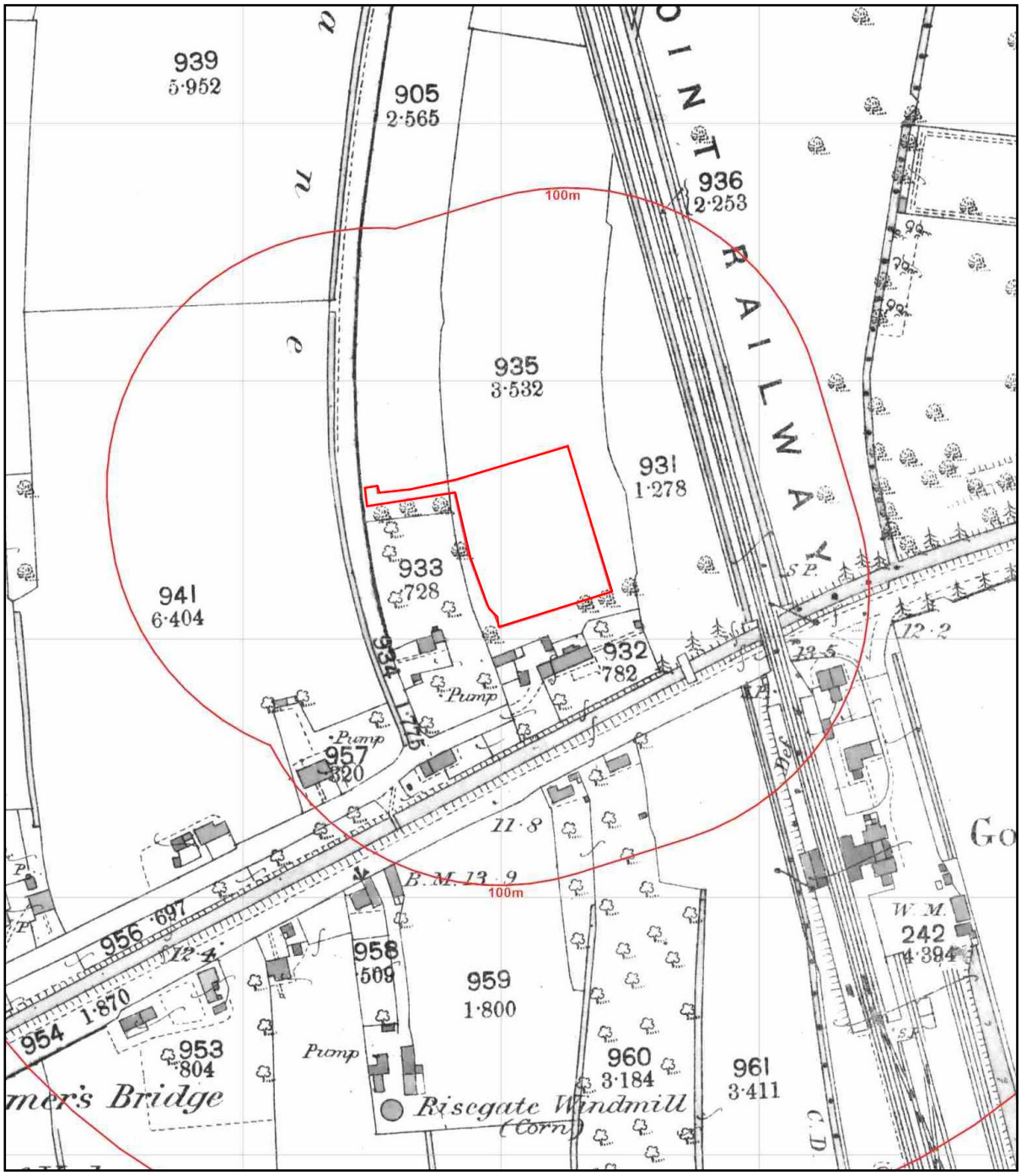


Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure B

Reproduced from the **1888** edition Ordnance Survey sheet **Lincolnshire 126.13** at **1:2500** scale

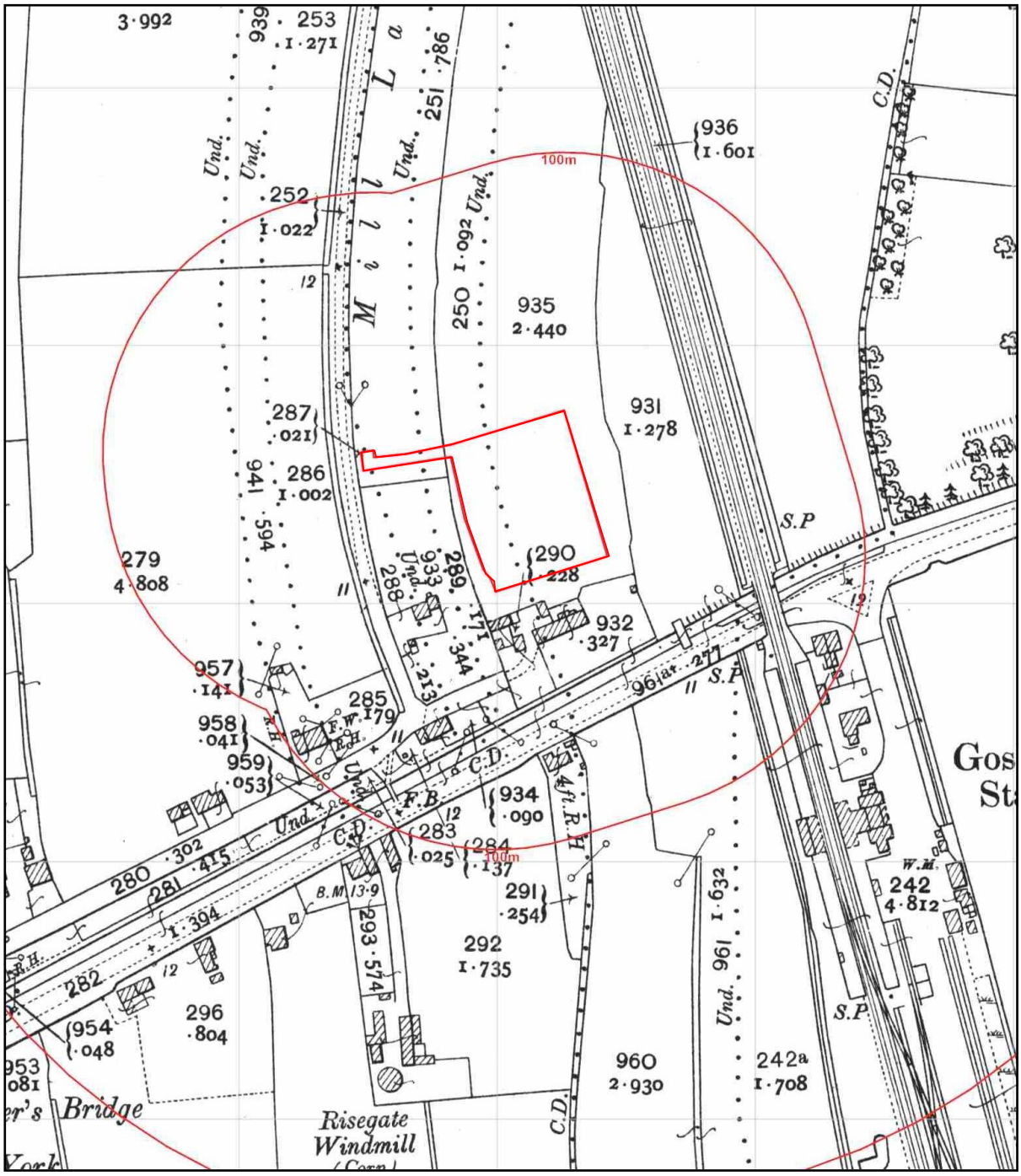


Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure C

Reproduced from the **1905** edition Ordnance Survey sheet **Lincolnshire 126.13** at **1:2500** scale

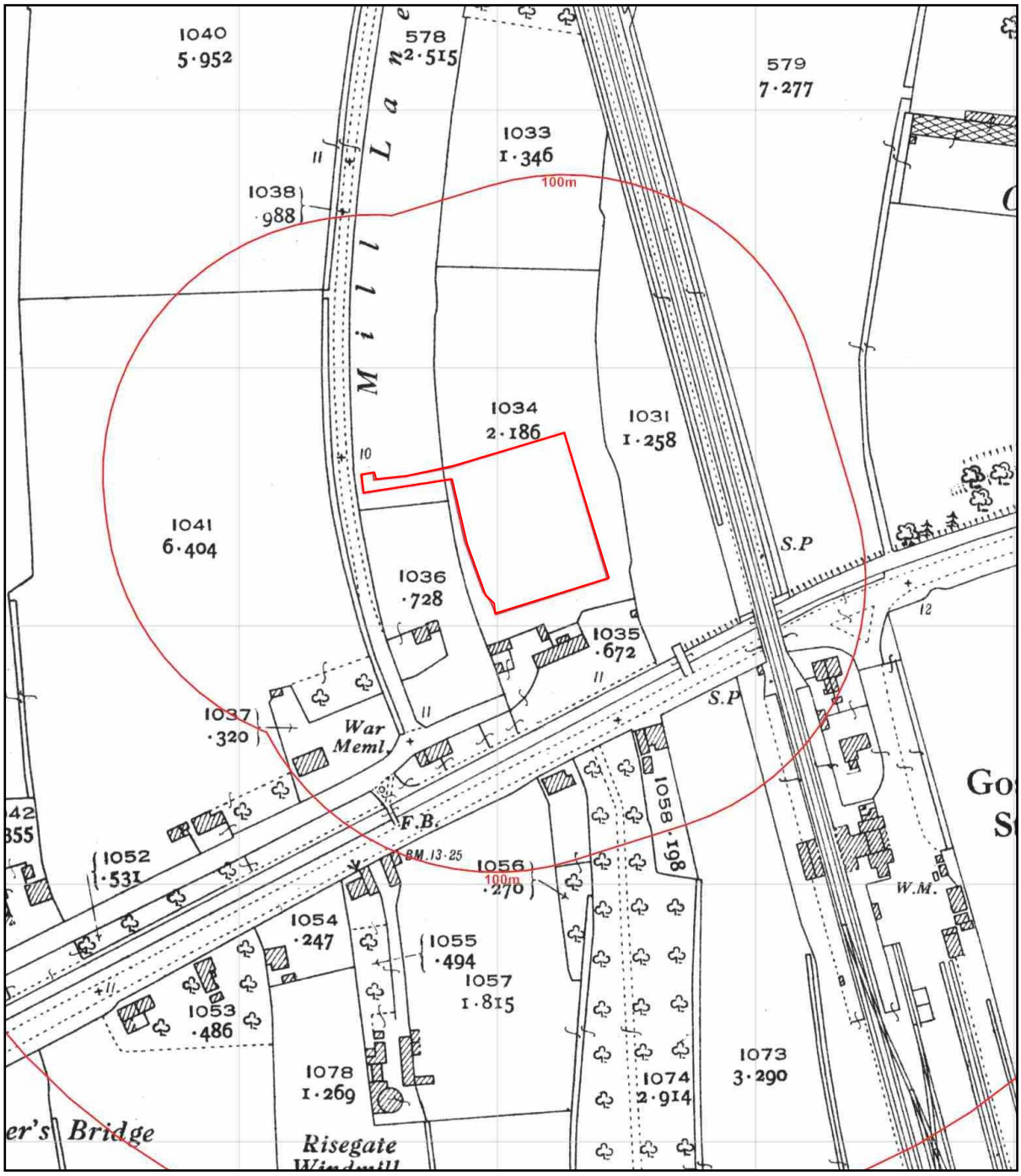


Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure D

Reproduced from the **1932** edition Ordnance Survey sheet **Lincolnshire 126.13** at **1:2500** scale

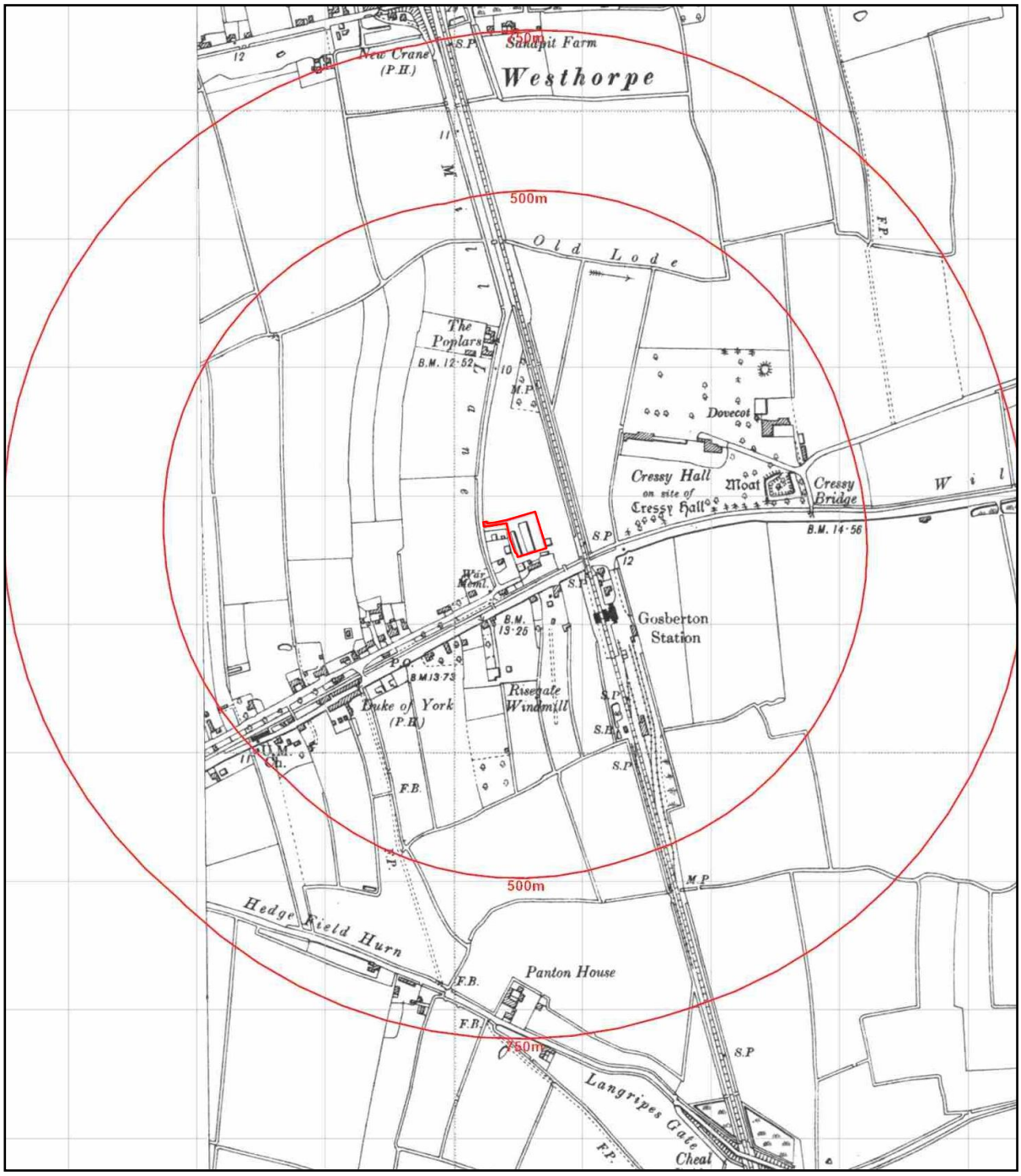


Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure E

Reproduced from the **1947** edition Ordnance Survey sheet **Lincolnshire 26SW** at **1:10,560** scale

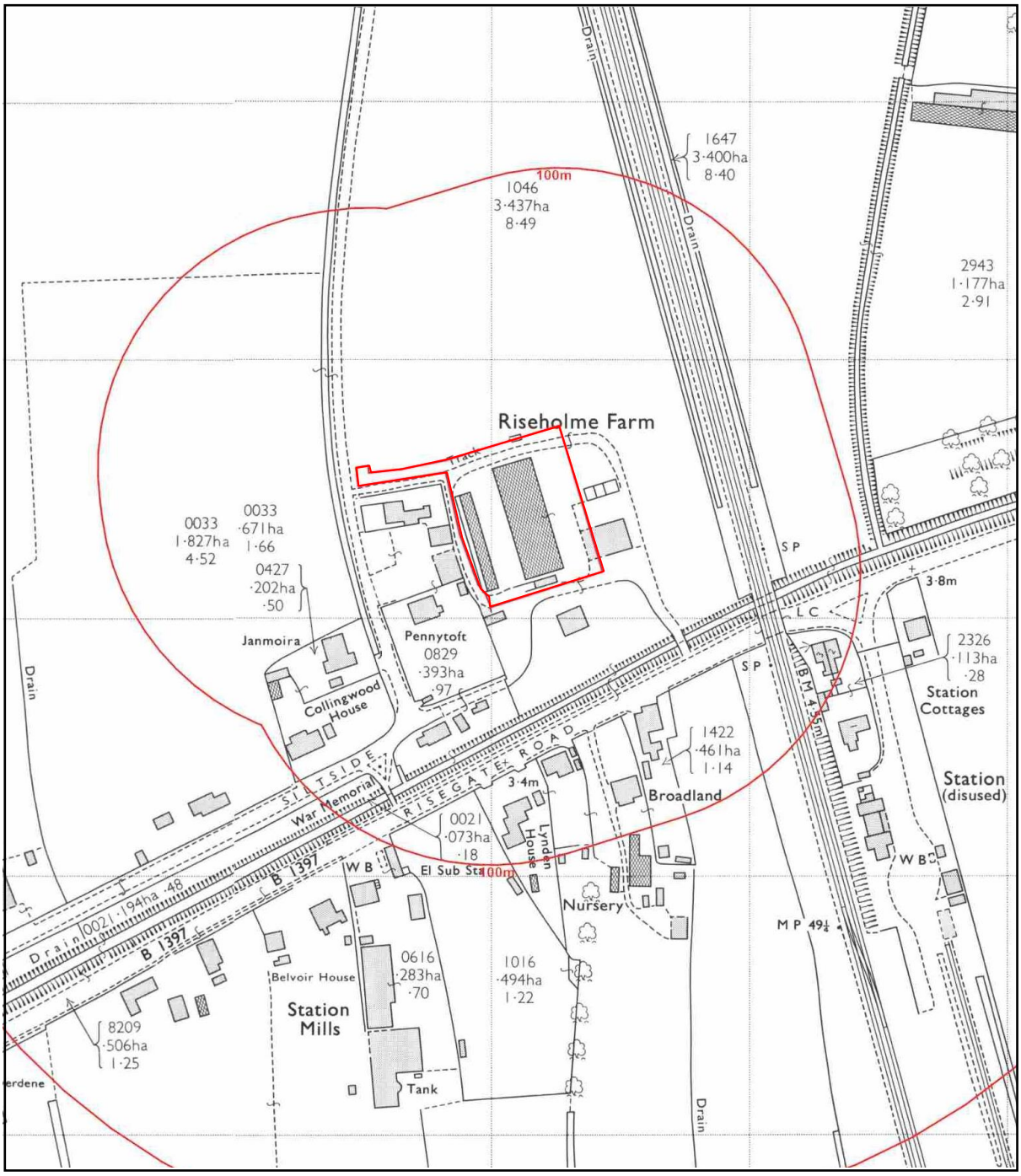


Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure F

Reproduced from the **1971-1972** edition Ordnance Survey sheets **TF2130 & TF2230** at **1:2500** scale

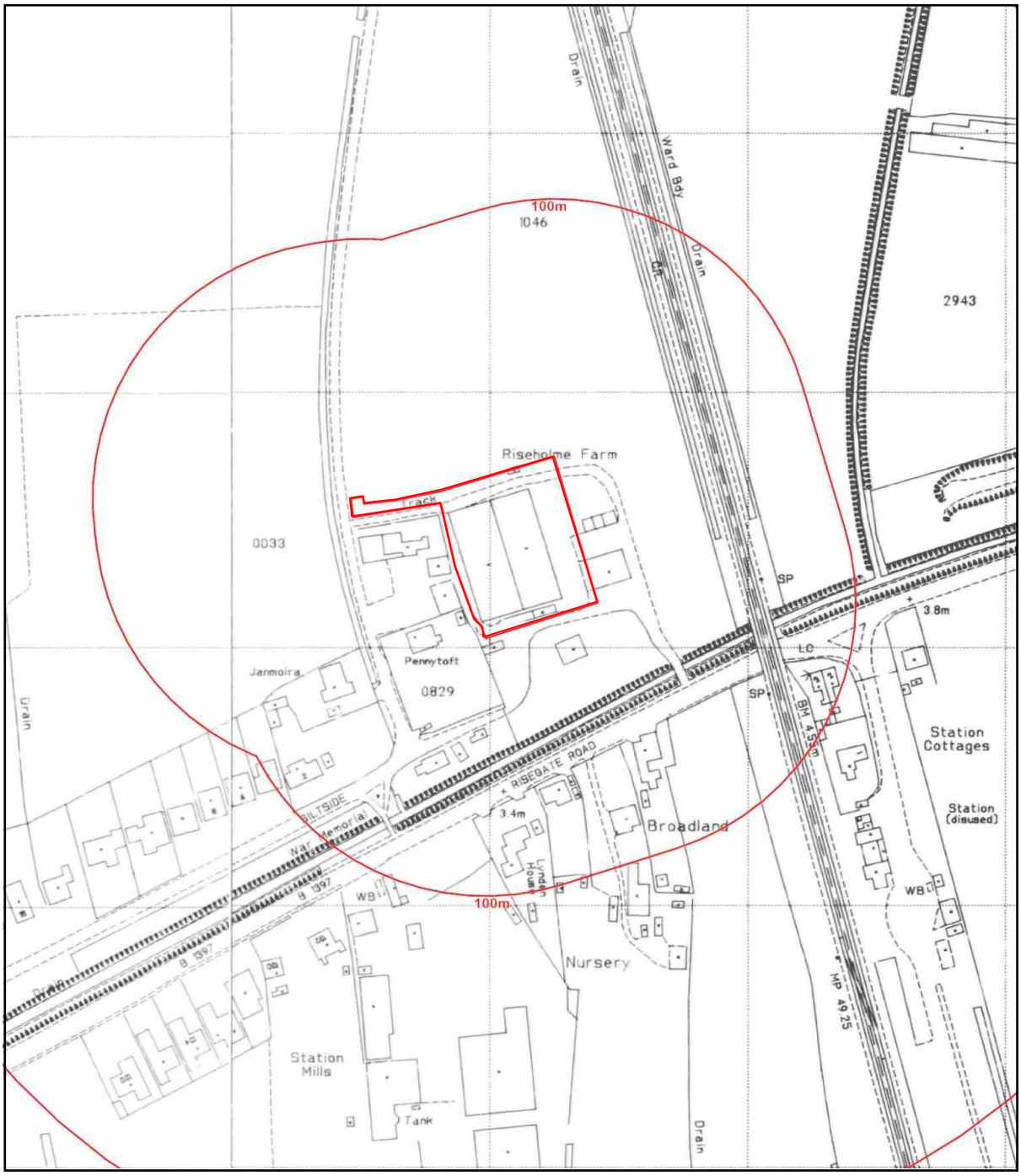


Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure G

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Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure H

Reproduced from the **2001** edition Ordnance Survey sheets **TF22NW & TF23SW** at **1:10,000** scale
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Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure I

Reproduced from the **2003** edition Ordnance Survey sheets **TF2130SE & TF2230SW** at not to scale
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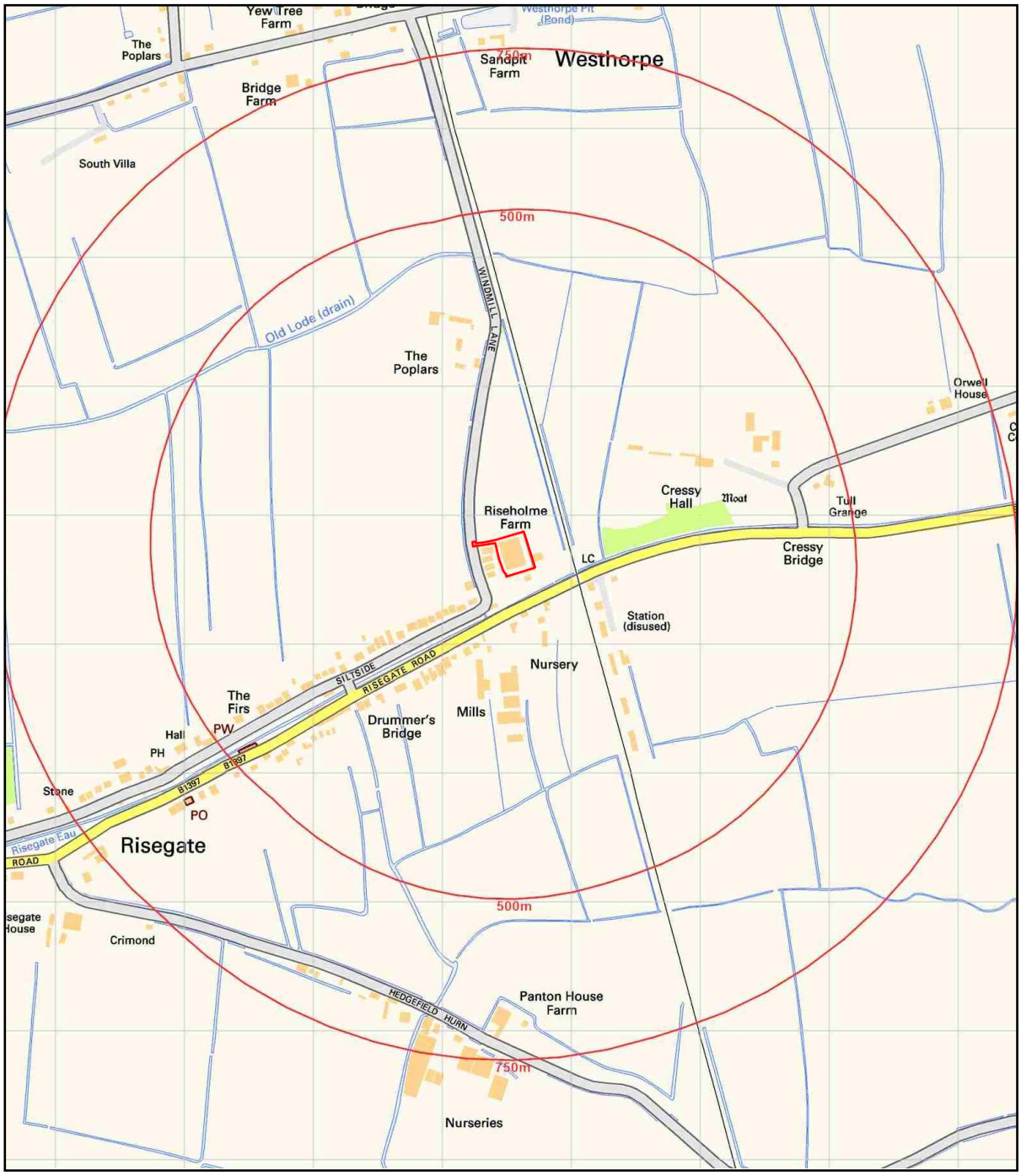


Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure J

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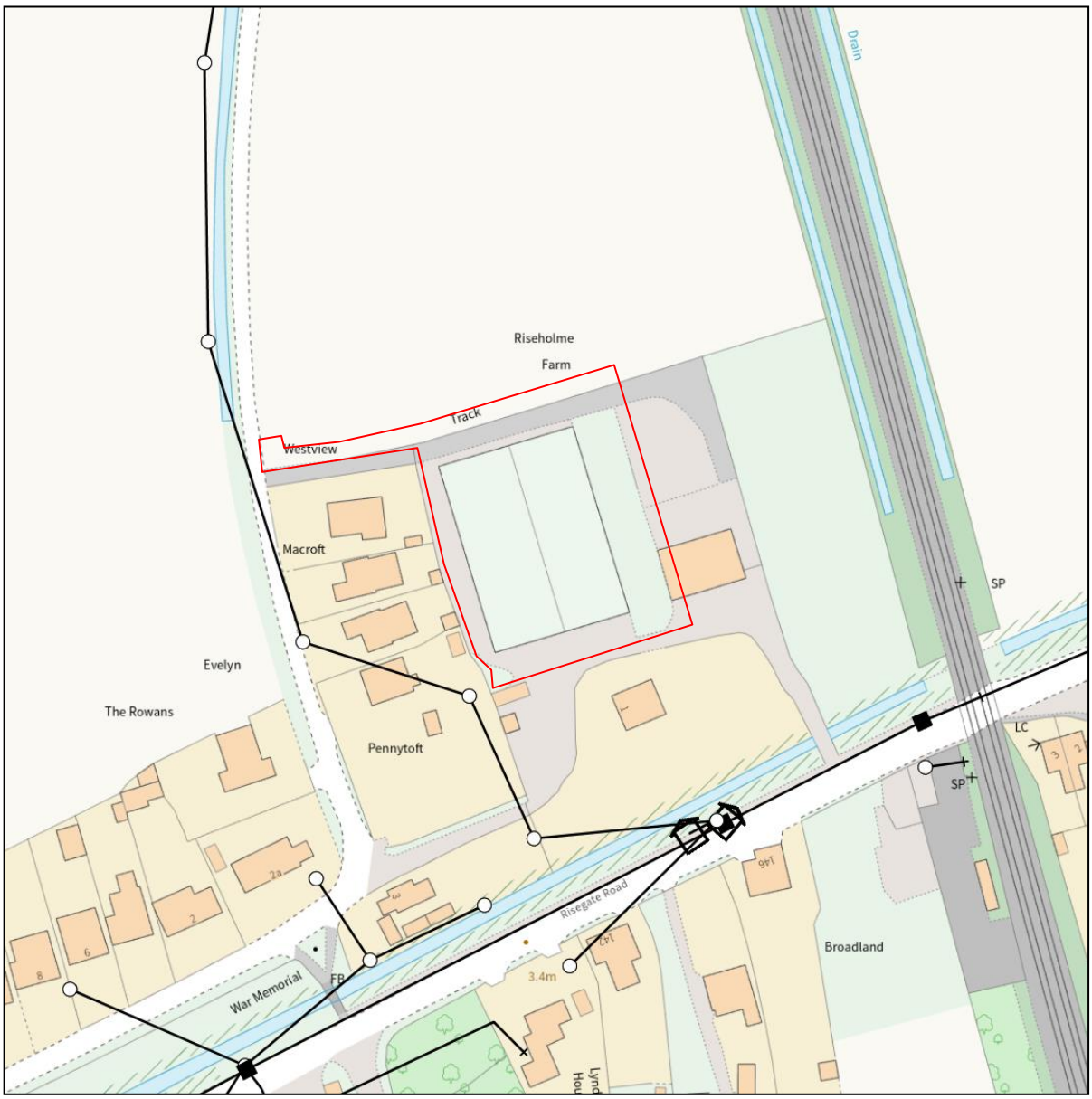


Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

Site History

Figure K

Reproduced from the **2023** edition Ordnance Survey sheets **TF2130SE & TF2230SW (BT Plan)** at not to scale
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Project : Riseholme Farm, Windmill Lane, Gosberton Risegate, Lincolnshire **Client : R.K. Wilson Builders Limited**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C16066**

APPENDIX 2

ENVIRONMENTAL DATABASE SEARCH

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

RISEHOLME FARM, WINDMILL LANE, GOSBERTON RISEGATE, SPALDING, PE11 4ES

Order Details

Date: 24/10/2023

Your ref: SWC16066

Our Ref: HMD-864-MZE-AVC-SGH

Site Details

Location: 522110 330337

Area: 0.3 ha

Authority: South Holland District Council ↗



Summary of findings p. 2 >

OS MasterMap site plan p.14 >

Aerial image p. 9 >

groundsure.com/insightuserguide ↗

Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

Certified B Corporation

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
15 >	1.1 >	Historical industrial land uses >	0	1	16	6	-
16 >	1.2 >	Historical tanks >	0	0	2	1	-
17 >	1.3 >	Historical energy features >	0	0	1	0	-
17	1.4	Historical petrol stations	0	0	0	0	-
18	1.5	Historical garages	0	0	0	0	-
18	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
19 >	2.1 >	Historical industrial land uses >	0	1	23	9	-
21 >	2.2 >	Historical tanks >	0	0	2	2	-
21 >	2.3 >	Historical energy features >	0	0	1	0	-
22	2.4	Historical petrol stations	0	0	0	0	-
22	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
23	3.1	Active or recent landfill	0	0	0	0	-
23	3.2	Historical landfill (BGS records)	0	0	0	0	-
24	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
24	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
24	3.5	Historical waste sites	0	0	0	0	-
24	3.6	Licensed waste sites	0	0	0	0	-
24 >	3.7 >	Waste exemptions >	0	21	14	51	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
32 >	4.1 >	Recent industrial land uses >	0	0	3	-	-
33	4.2	Current or recent petrol stations	0	0	0	0	-
33	4.3	Electricity cables	0	0	0	0	-
33	4.4	Gas pipelines	0	0	0	0	-
33	4.5	Sites determined as Contaminated Land	0	0	0	0	-

33	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
34	4.7	Regulated explosive sites	0	0	0	0	-
34	4.8	Hazardous substance storage/usage	0	0	0	0	-
34	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
34	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
34 >	**4.11 >**	**Licensed pollutant release (Part A(2)/B) >**	0	0	2	0	-
35	4.12	Radioactive Substance Authorisations	0	0	0	0	-
35 >	**4.13 >**	**Licensed Discharges to controlled waters >**	0	0	0	5	-
36	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
36	4.15	Pollutant release to public sewer	0	0	0	0	-
36	4.16	List 1 Dangerous Substances	0	0	0	0	-
36	4.17	List 2 Dangerous Substances	0	0	0	0	-
37 >	**4.18 >**	**Pollution Incidents (EA/NRW) >**	0	0	4	0	-
37	4.19	Pollution inventory substances	0	0	0	0	-
38	4.20	Pollution inventory waste transfers	0	0	0	0	-
38	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	**Hydrogeology >**	On site	0-50m	50-250m	250-500m	500-2000m
39 >	**5.1 >**	**Superficial aquifer >**	Identified (within 500m)				
40 >	**5.2 >**	**Bedrock aquifer >**	Identified (within 500m)				
41 >	**5.3 >**	**Groundwater vulnerability >**	Identified (within 50m)				
42	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
42	5.5	Groundwater vulnerability- local information	None (within 0m)				
43 >	**5.6 >**	**Groundwater abstractions >**	0	0	0	0	2
44 >	**5.7 >**	**Surface water abstractions >**	0	0	3	3	23
50	5.8	Potable abstractions	0	0	0	0	0
51	5.9	Source Protection Zones	0	0	0	0	-
51	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	**Hydrology >**	On site	0-50m	50-250m	250-500m	500-2000m
52 >	**6.1 >**	**Water Network (OS MasterMap) >**	0	4	18	-	-

54 >	6.2 >	Surface water features >	0	2	10	-	-
55 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
55 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
55	6.5	WFD Groundwater bodies	0	-	-	-	-
Page	Section	River and coastal flooding >	On site	0-50m	50-250m	250-500m	500-2000m
56 >	7.1 >	Risk of flooding from rivers and the sea >	High (within 50m)				
57	7.2	Historical Flood Events	0	0	0	-	-
57	7.3	Flood Defences	0	0	0	-	-
57	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
57	7.5	Flood Storage Areas	0	0	0	-	-
58 >	7.6 >	Flood Zone 2 >	Identified (within 50m)				
59 >	7.7 >	Flood Zone 3 >	Identified (within 50m)				
Page	Section	Surface water flooding >					
60 >	8.1 >	Surface water flooding >	1 in 100 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding >					
62 >	9.1 >	Groundwater flooding >	Negligible (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
63	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
63	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
63	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
63	10.4	Special Protection Areas (SPA)	0	0	0	0	0
64	10.5	National Nature Reserves (NNR)	0	0	0	0	0
64	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
64	10.7	Designated Ancient Woodland	0	0	0	0	0
64	10.8	Biosphere Reserves	0	0	0	0	0
65	10.9	Forest Parks	0	0	0	0	0
65	10.10	Marine Conservation Zones	0	0	0	0	0
65	10.11	Green Belt	0	0	0	0	0
65	10.12	Proposed Ramsar sites	0	0	0	0	0

65	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
66	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
66	10.15	Nitrate Sensitive Areas	0	0	0	0	0
66 >	**10.16 >**	**Nitrate Vulnerable Zones >**	1	0	0	0	3
67 >	**10.17 >**	**SSSI Impact Risk Zones >**	1	-	-	-	-
68	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
69	11.1	World Heritage Sites	0	0	0	-	-
70	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
70	11.3	National Parks	0	0	0	-	-
70 >	**11.4 >**	**Listed Buildings >**	0	0	1	-	-
71	11.5	Conservation Areas	0	0	0	-	-
71 >	**11.6 >**	**Scheduled Ancient Monuments >**	0	0	1	-	-
71	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	**Agricultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
72 >	**12.1 >**	**Agricultural Land Classification >**	Grade 1 (within 250m)				
73	12.2	Open Access Land	0	0	0	-	-
73	12.3	Tree Felling Licences	0	0	0	-	-
73	12.4	Environmental Stewardship Schemes	0	0	0	-	-
73	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	**Habitat designations >**	On site	0-50m	50-250m	250-500m	500-2000m
74 >	**13.1 >**	**Priority Habitat Inventory >**	0	0	1	-	-
75	13.2	Habitat Networks	0	0	0	-	-
75	13.3	Open Mosaic Habitat	0	0	0	-	-
75	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
76 >	**14.1 >**	**10k Availability >**	Identified (within 500m)				
77	14.2	Artificial and made ground (10k)	0	0	0	0	-
78	14.3	Superficial geology (10k)	0	0	0	0	-

78	14.4	Landslip (10k)	0	0	0	0	-
79	14.5	Bedrock geology (10k)	0	0	0	0	-
79	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
80 >	**15.1 >**	**50k Availability >**	Identified (within 500m)				
81	15.2	Artificial and made ground (50k)	0	0	0	0	-
81	15.3	Artificial ground permeability (50k)	0	0	-	-	-
82 >	**15.4 >**	**Superficial geology (50k) >**	1	0	0	0	-
83 >	**15.5 >**	**Superficial permeability (50k) >**	Identified (within 50m)				
83	15.6	Landslip (50k)	0	0	0	0	-
83	15.7	Landslip permeability (50k)	None (within 50m)				
84 >	**15.8 >**	**Bedrock geology (50k) >**	1	0	0	0	-
85 >	**15.9 >**	**Bedrock permeability (50k) >**	Identified (within 50m)				
85	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
86	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	**Natural ground subsidence >**					
87 >	**17.1 >**	**Shrink swell clays >**	Low (within 50m)				
88 >	**17.2 >**	**Running sands >**	Moderate (within 50m)				
89 >	**17.3 >**	**Compressible deposits >**	Moderate (within 50m)				
90 >	**17.4 >**	**Collapsible deposits >**	Negligible (within 50m)				
91 >	**17.5 >**	**Landslides >**	Very low (within 50m)				
92 >	**17.6 >**	**Ground dissolution of soluble rocks >**	Negligible (within 50m)				
Page	Section	**Mining and ground workings >**	On site	0-50m	50-250m	250-500m	500-2000m
94	18.1	BritPits	0	0	0	0	-
95 >	**18.2 >**	**Surface ground workings >**	0	0	3	-	-
95	18.3	Underground workings	0	0	0	0	0
95	18.4	Underground mining extents	0	0	0	0	-
95	18.5	Historical Mineral Planning Areas	0	0	0	0	-

96	18.6	Non-coal mining	0	0	0	0	0
96	18.7	JPB mining areas	None (within 0m)				
96	18.8	The Coal Authority non-coal mining	0	0	0	0	-
96	18.9	Researched mining	0	0	0	0	-
97	18.10	Mining record office plans	0	0	0	0	-
97	18.11	BGS mine plans	0	0	0	0	-
97	18.12	Coal mining	None (within 0m)				
97	18.13	Brine areas	None (within 0m)				
97	18.14	Gypsum areas	None (within 0m)				
98	18.15	Tin mining	None (within 0m)				
98	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
99	19.1	Natural cavities	0	0	0	0	-
99	19.2	Mining cavities	0	0	0	0	0
99	19.3	Reported recent incidents	0	0	0	0	-
99	19.4	Historical incidents	0	0	0	0	-
100	19.5	National karst database	0	0	0	0	-
Page	Section	**Radon** >					
101 >	**20.1** >	**Radon** >	Less than 1% (within 0m)				
Page	Section	**Soil chemistry** >	On site	0-50m	50-250m	250-500m	500-2000m
103 >	**21.1** >	**BGS Estimated Background Soil Chemistry** >	1	2	-	-	-
103	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
103	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	**Railway infrastructure and projects** >	On site	0-50m	50-250m	250-500m	500-2000m
104	22.1	Underground railways (London)	0	0	0	-	-
104	22.2	Underground railways (Non-London)	0	0	0	-	-
105	22.3	Railway tunnels	0	0	0	-	-
105 >	**22.4** >	**Historical railway and tunnel features** >	0	0	7	-	-
105	22.5	Royal Mail tunnels	0	0	0	-	-

106	22.6	Historical railways	0	0	0	-	-
106 >	**22.7 >**	**Railways >**	0	0	6	-	-
106	22.8	Crossrail 1	0	0	0	0	-
106	22.9	Crossrail 2	0	0	0	0	-
107	22.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 29/05/2021

Site Area: 0.3ha

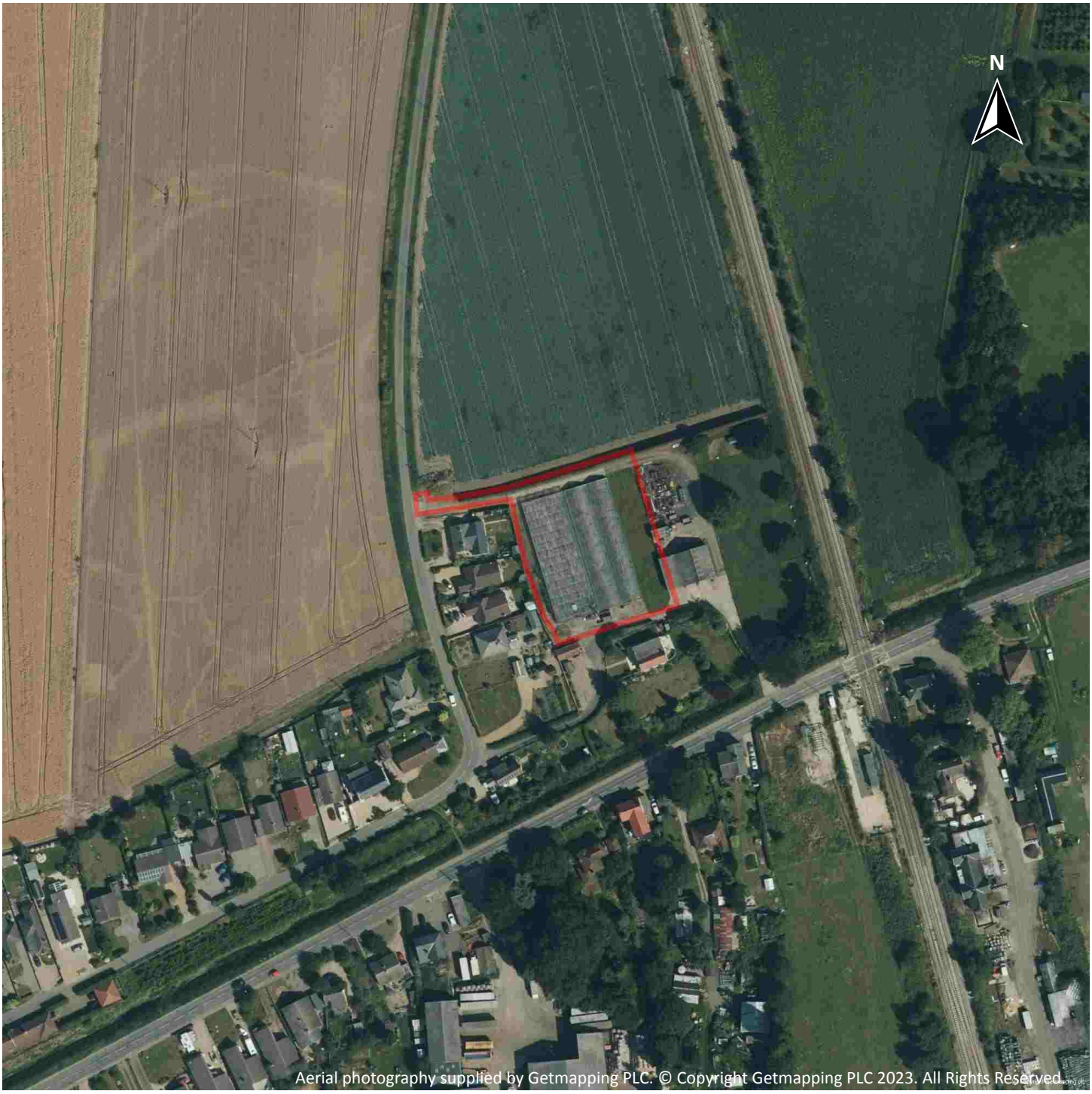
Recent site history - 2018 aerial photograph



Capture Date: 20/04/2018

Site Area: 0.3ha

Recent site history - 2015 aerial photograph



Capture Date: 12/08/2015

Site Area: 0.3ha

Recent site history - 2010 aerial photograph



Capture Date: 23/05/2010

Site Area: 0.3ha

Recent site history - 1999 aerial photograph



Capture Date: 02/09/1999

Site Area: 0.3ha

OS MasterMap site plan



Site Area: 0.3ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

1.1 Historical industrial land uses

Records within 500m	23

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 15 >**

ID	Location	Land use	Dates present	Group ID
1	35m SE	Nursery	1975	2008103

ID	Location	Land use	Dates present	Group ID
A	73m S	Unspecified Mills	1975	2008939
B	123m SE	Railway Station	1955	2013831
B	126m SE	Railway Station	1887 - 1947	2019242
B	132m SE	Disused Railway Station	1975	2006480
A	151m S	Windmill	1947	2036692
A	157m S	Corn Windmill	1887	2006859
C	163m SE	Railway Sidings	1955	2016041
C	169m SE	Railway Sidings	1903 - 1947	2030580
C	169m SE	Railway Sidings	1887	2037801
B	173m SE	Railway Building	1975	2039567
D	175m SE	Railway Sidings	1975	2031058
B	175m SE	Railway Buildings	1955	2021909
A	175m S	Windmill	1903	2025789
B	177m SE	Railway Building	1887	2032495
B	178m SE	Railway Buildings	1903 - 1947	2014458
2	205m S	Windmill	1929	2013577
D	293m SE	Railway Building	1975	2036450
D	298m SE	Railway Building	1887	2037405
D	298m SE	Railway Building	1955	2024766
D	299m SE	Railway Building	1903 - 1947	2026570
D	302m SE	Railway Building	1887	2007698
3	341m SE	Railway Sidings	1973	2013028

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	3

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 15 >**

ID	Location	Land use	Dates present	Group ID
A	183m S	Unspecified Tank	1995	341600
A	183m S	Unspecified Tank	1972	341568
4	372m NE	Unspecified Tank	1972 - 1995	340833

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 15 >**

ID	Location	Land use	Dates present	Group ID
A	106m S	Electricity Substation	1972	220978

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	**0**

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

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

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

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m	0

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

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

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

2.1 Historical industrial land uses

Records within 500m	33

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 19 >**

ID	Location	Land Use	Date	Group ID
1	35m SE	Nursery	1975	2008103
A	73m S	Unspecified Mills	1975	2008939
B	123m SE	Railway Station	1955	2013831

ID	Location	Land Use	Date	Group ID
B	126m SE	Railway Station	1929	2019242
B	126m SE	Railway Station	1903	2019242
B	126m SE	Railway Station	1887	2019242
B	126m SE	Railway Station	1947	2019242
B	132m SE	Disused Railway Station	1975	2006480
A	151m S	Windmill	1947	2036692
A	157m S	Corn Windmill	1887	2006859
C	163m SE	Railway Sidings	1955	2016041
D	169m SE	Railway Sidings	1929	2030580
D	169m SE	Railway Sidings	1903	2030580
D	169m SE	Railway Sidings	1887	2037801
D	169m SE	Railway Sidings	1947	2030580
B	173m SE	Railway Building	1975	2039567
C	175m SE	Railway Sidings	1975	2031058
B	175m SE	Railway Buildings	1955	2021909
A	175m S	Windmill	1903	2025789
B	177m SE	Railway Building	1887	2032495
B	178m SE	Railway Buildings	1929	2014458
B	178m SE	Railway Buildings	1903	2014458
B	178m SE	Railway Buildings	1947	2014458
2	205m S	Windmill	1929	2013577
C	293m SE	Railway Building	1975	2036450
C	298m SE	Railway Building	1887	2037405
C	298m SE	Railway Building	1955	2024766
C	299m SE	Railway Building	1929	2026570
C	299m SE	Railway Building	1903	2026570
C	299m SE	Railway Building	1947	2026570
C	302m SE	Railway Building	1887	2007698

ID	Location	Land Use	Date	Group ID
E	341m SE	Railway Sidings	1955	2016041
E	341m SE	Railway Sidings	1973	2013028

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**4**

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 19 >**

ID	Location	Land Use	Date	Group ID
A	183m S	Unspecified Tank	1995	341600
A	183m S	Unspecified Tank	1972	341568
F	372m NE	Unspecified Tank	1972	340833
F	373m NE	Unspecified Tank	1995	340833

This data is sourced from Ordnance Survey / Groundsure.

2.3 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. 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 19 >**

ID	Location	Land Use	Date	Group ID
A	106m S	Electricity Substation	1972	220978

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

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

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	0

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

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

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

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

3.2 Historical landfill (BGS records)

Records within 500m	0

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

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

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

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

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

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

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

3.5 Historical waste sites

Records within 500m	0

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

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

3.6 Licensed waste sites

Records within 500m	0

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

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

3.7 Waste exemptions

Records within 500m	86

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 23 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	13m SE	1, SILTSIDE, GOSBERTON RISEGATE, SPALDING, PE11 4ET	WEX169683	Using waste exemption	On a farm	Spreading of plant matter to confer benefit